FCC- TEST REPORT

Report Number	:	**68.910.19.0026.01**	Date of Issue:	30 May 2019
Model	:	**X500, X500i, X500w, X500r, X500Pro, D5, D51, D52, D5s, D5Pro, Robvacuum8, X-503, X500, X520, X530, X550, X560**		
Product Type	:	Robotic Vacuum Cleaner		
Applicant	:	Shenzhen Hua Xin Information Technology Co., Ltd.		
Address	:	Section A 10/F, Block 1, No.7 Industrial Park, Yulu Community, Yutang, Guangming New District, 518132 ShenZhen, PEOPLE'S REPUBLIC OF CHINA		
Production Facility	:	Shenzhen Hua Xin Information Technology Co., Ltd.		
Address	:	Section A 10/F, Block 1, No.7 Industrial Park, Yulu Community, Yutang, Guangming New District, 518132 ShenZhen, PEOPLE'S REPUBLIC OF CHINA		
Test Result	:	**n Positive** **o Negative**		
Total pages including Appendices	:	53		

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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:	514049
Telephone:	86 755 8828 6998
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3 Description of the Equipment under Test

Description of the Equipment Under Test

Product:	Robotic Vacuum Cleaner
Model no.:	X500, X500i, X500w, X500r, X500Pro, D5, D51, D52, D5s, D5Pro, Robvacuum8, X-503, X500, X520, X530, X550, X560
FCC ID:	2AMYQ-20190300500
Options and accessories:	NIL
Rated Input:	100-240VAC, 50/60Hz (for Adapter); 19VDC (for Cleaner)
RF Transmission Frequency:	2412-2462MHz
No. of Operated Channel:	11
Modulation:	CCK, DQPSK, DBPSK for 802.11b QPSK,BPSK for 802.11g/n20
Duty Cycle:	100%
Antenna Type:	Integral Antenna
Antenna Gain:	2dBi
Description of the EUT:	Tested with external approved adaptor GSCU0600S019V12E: Input: 100-240V AC, 50/60Hz, 0.5A Max, Output: 19V DC, 0.6A; Or tested with external approved adaptor YJS015D-1900600U: Input: 120V AC, 60Hz, 0.5A, Output: 19V DC, 0.6A

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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 KDB558074 D01 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 Result	Test Site
§15.207	Conducted emission AC power port	13	Pass	Site 1
§15.247(b)(1)	Conducted peak output power	17	Pass	Site 1
§15.247(e)	Power spectral density*	25	Pass	Site 1
§15.247(a)(2)	6dB bandwidth	19	Pass	Site 1
§15.247(a)(1)	20dB bandwidth and 99% Occupied Bandwidth	19	Pass	Site 1
§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	31	Pass	Site 1
§15.247(d)	Band edge	41	Pass	Site 1
§15.247(d) & §15.209 &	Spurious radiated emissions for transmitter	45	Pass	Site 1
§15.203	Antenna requirement	See note 2	Pass	--

Remark 1: N/A – Not Applicable.
Note 1: The EUT uses a permanently integral antenna, which gain is 2dBi. According to §15.203, it is considered sufficiently to comply with the provisions of this section.

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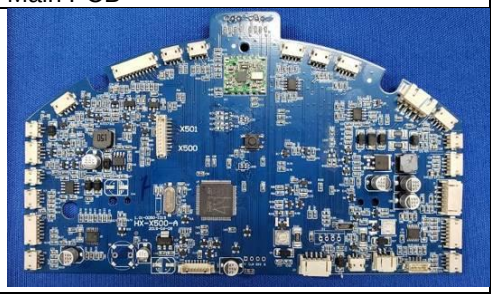
6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: 2AMYQ-20190300500, complies with Section 15.207, 15.209, 15.205, 15.247 of the FCC Part 15, Subpart C rules.
Model differences:

Trade mark	Model No.	Wi-Fi	Keyboard Control PCB			Apperance				other
			Without	A	B	1#	2#	3#	4#	
TESVOR	X500; X500i; X500w; X500r; X500Pro	same	√			√				same
Neatsvor aiwa	X500; X520; X530; X550; X560	same								same
DEALDIG	Robvacuum8	same					√			same
ZIGLINT	D5; D51; D52; D5s; D5Pro	same		√				√		same
Kealive ORFELD	X-503	same			√				√	same

Main PCB	Main PCB
	

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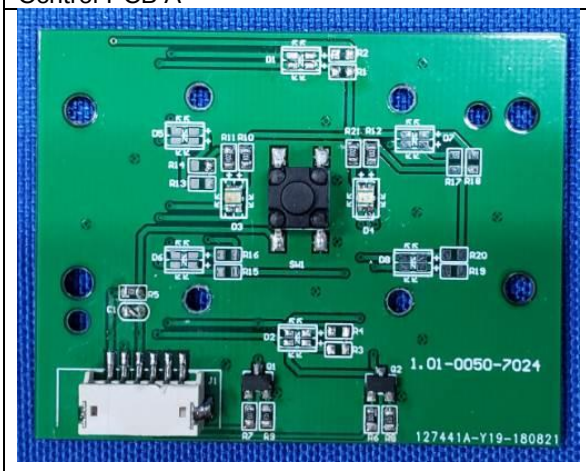
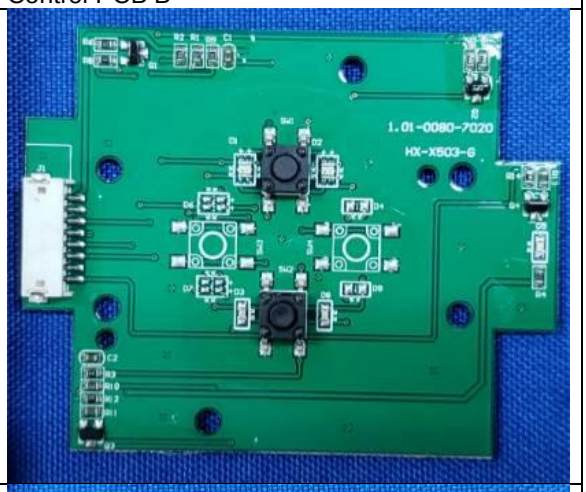
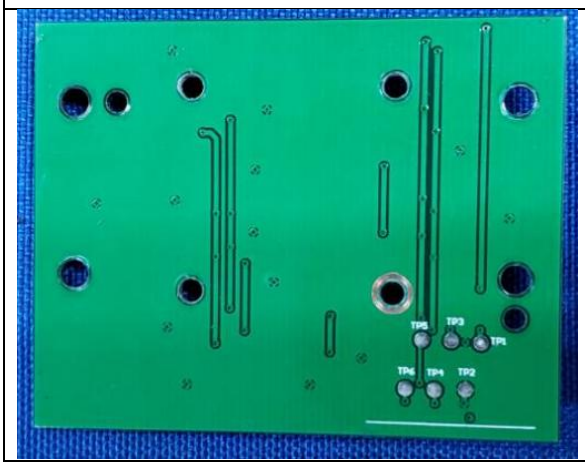
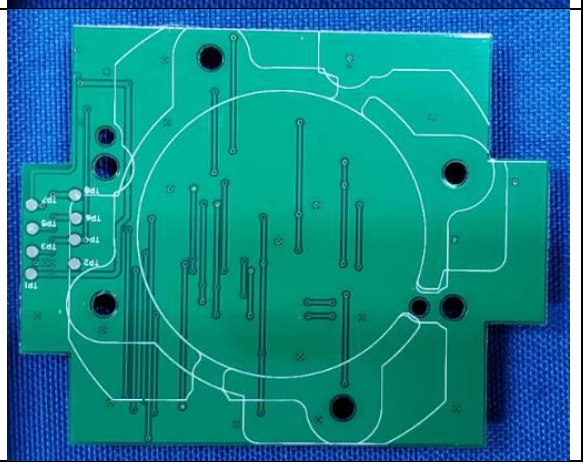
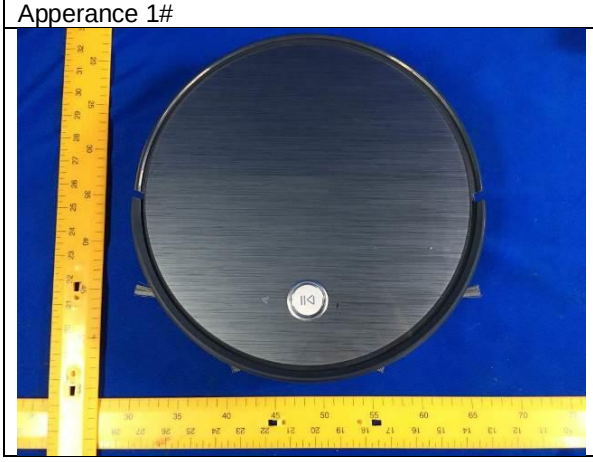
Control PCB A	Control PCB B
	
	

Apperance 1#	Apperance 2#
	

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Apperance 3#	Apperance 4#
	

The difference of all models is described as above and all models have the same WIFI module, therefore all the EMC test requirements were applied on X500; Selected retest item of Spurious radiated emissions (30-1000MHz) was applied on D5 with Control PCB A and X-503 with Control PCB B for verify the difference, other models are deemed to fulfill relevant EMC requirement without further testing.

The EUT has multiple work modes, the worst test results are listed in the report.

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SUMMARY:

All tests according to the regulations cited on page 5 were

n - Performed

o - **Not** Performed

The Equipment under Test

n - **Fulfills** the general approval requirements.

o - **Does not** fulfill the general approval requirements.

Sample Received Date: February 21, 2019

Testing Start Date: February 21, 2019

Testing End Date: May 21, 2019

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Reviewed by:	Prepared by:	Tested by:
Laurent Yuan	Dawi Xu	Tree Zhan
EMC Project Manager	EMC Project Engineer	EMC Test Engineer

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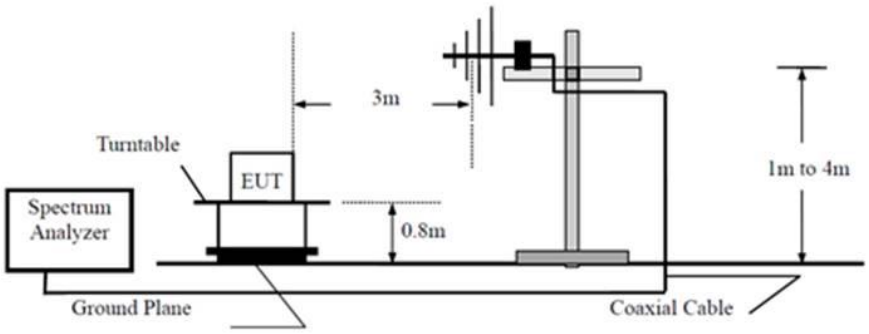
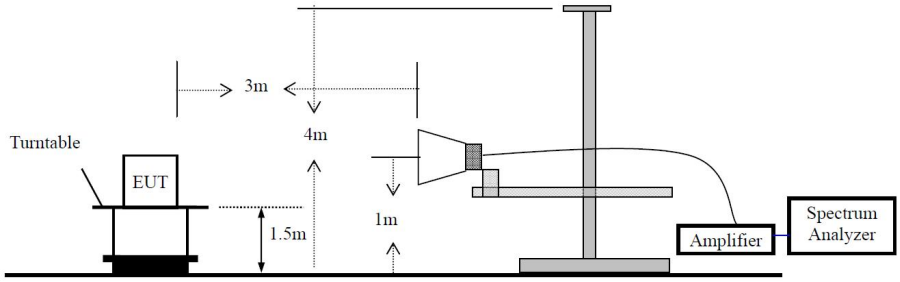
7 Test Setups

7.1 Radiated test setups

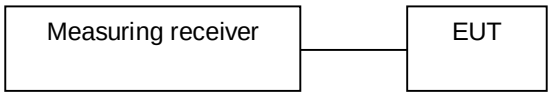
Below 1GHz



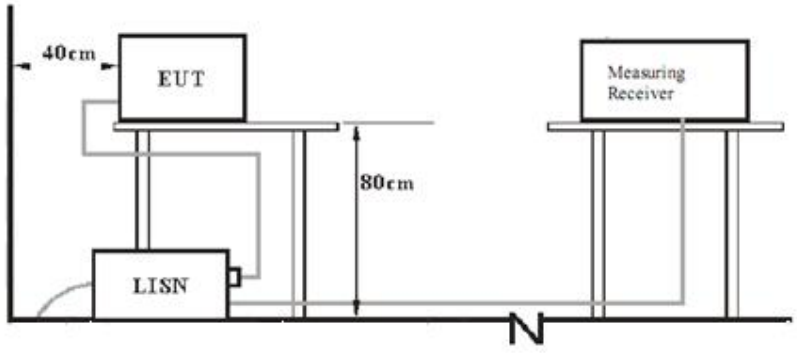
Above 1GHz



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)
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Test software: RF test tool

The system was configured to channel 1, 6 and 11 for the test.

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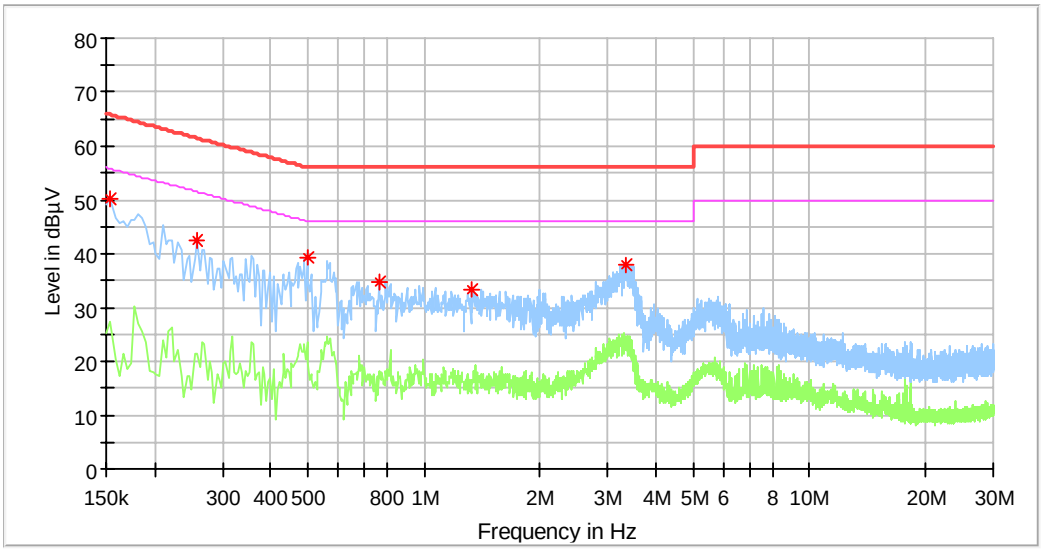
9 Technical Requirement

9.1 Conducted Emission

Conducted Emission Test 150kHz – 30MHz

M/N: X500(with adapter: GSCU0600S019V12E)
Op Cond.: charging + Wi-Fi transmiting
Test Spec.: Power Line, Live
Comment: AC 120V/60Hz

Temperature (°C): 22.5 Relative Humidity (%): 46.7 Atmospheric Pressure(mbar) : 1012



Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.154000	50.00	---	65.78	15.78	L1	10.2
0.258000	42.63	---	61.50	18.86	L1	10.2
0.498000	39.40	---	56.03	16.63	L1	10.2
0.766000	34.73	---	56.00	21.27	L1	10.2
1.330000	33.18	---	56.00	22.82	L1	10.2
3.358000	38.00	---	56.00	18.00	L1	10.3

Remark：
Level=Reading Level + Correction Factor
Correction Factor=Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)

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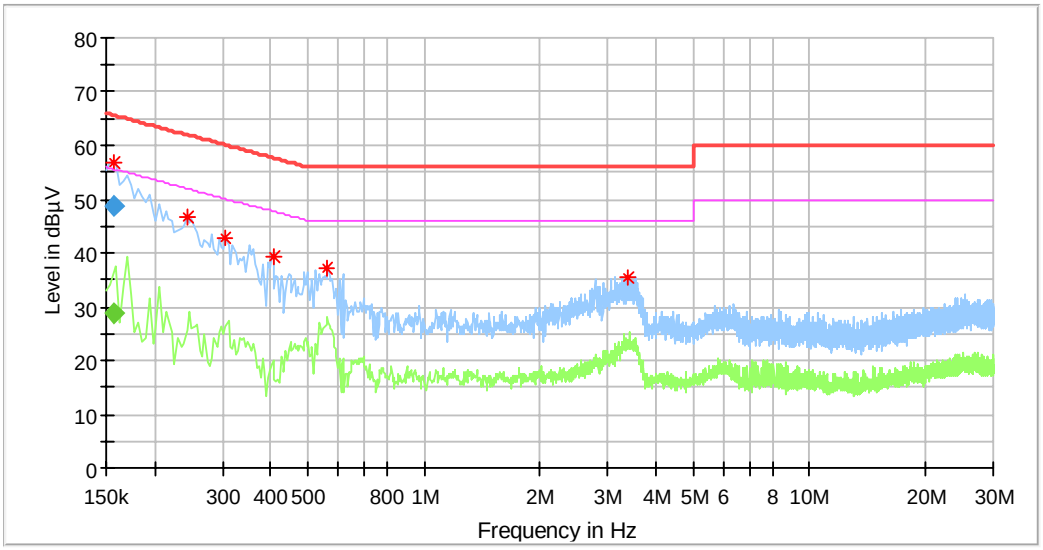
Conducted Emission Test 150kHz – 30MHz

M/N: X500(with adapter: GSCU0600S019V12E)
Op Cond.: charging + Wi-Fi transmiting
Test Spec.: Power Line, Neutral
Comment: AC 120V/60Hz

Temperature (°C): 22.5 Relative Humidity (%): 46.7 Atmospheric Pressure(mbar) : 1012



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.157500	---	28.93	55.59	26.66	N	10.3
0.157500	48.70	---	65.59	16.89	N	10.3

Remark：
Level=Reading Level + Correction Factor
Correction Factor=Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)

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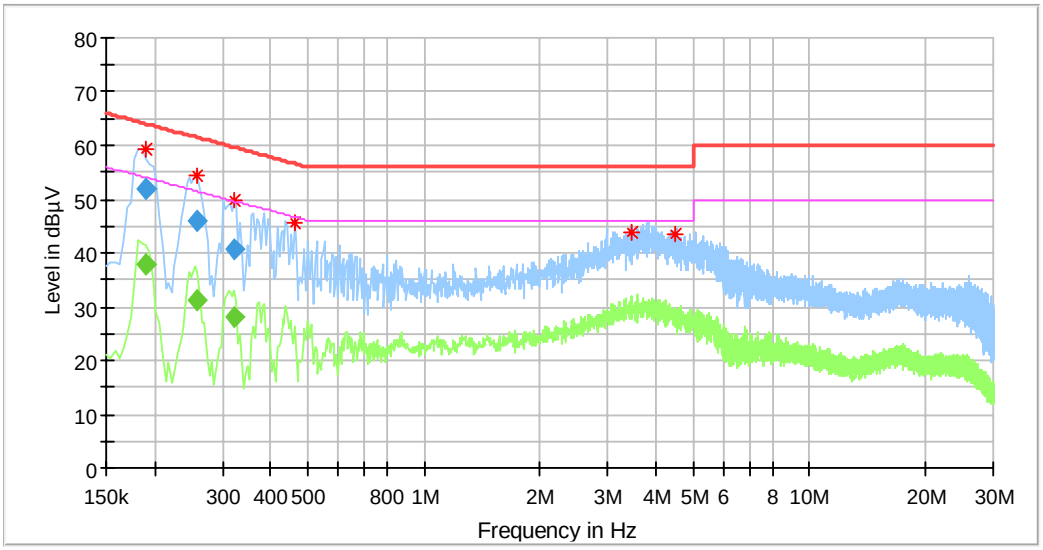
Conducted Emission Test 150kHz – 30MHz

M/N: X500(with adapter: YJS015D-1900600U)
Op Cond.: charging + Wi-Fi transmiting
Test Spec.: Power Line, Live
Comment: AC 120V/60Hz

Temperature (°C): 22.5 Relative Humidity (%): 46.7 Atmospheric Pressure(mbar) : 1012



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.189500	---	37.80	54.06	16.26	L1	10.2
0.189500	51.91	---	64.06	12.15	L1	10.2
0.257500	---	31.27	51.51	20.24	L1	10.2
0.257500	46.02	---	61.51	15.49	L1	10.2
0.321500	---	28.13	49.67	21.54	L1	10.2
0.321500	40.68	---	59.67	18.99	L1	10.2

Remark：
Level=Reading Level + Correction Factor
Correction Factor=Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)

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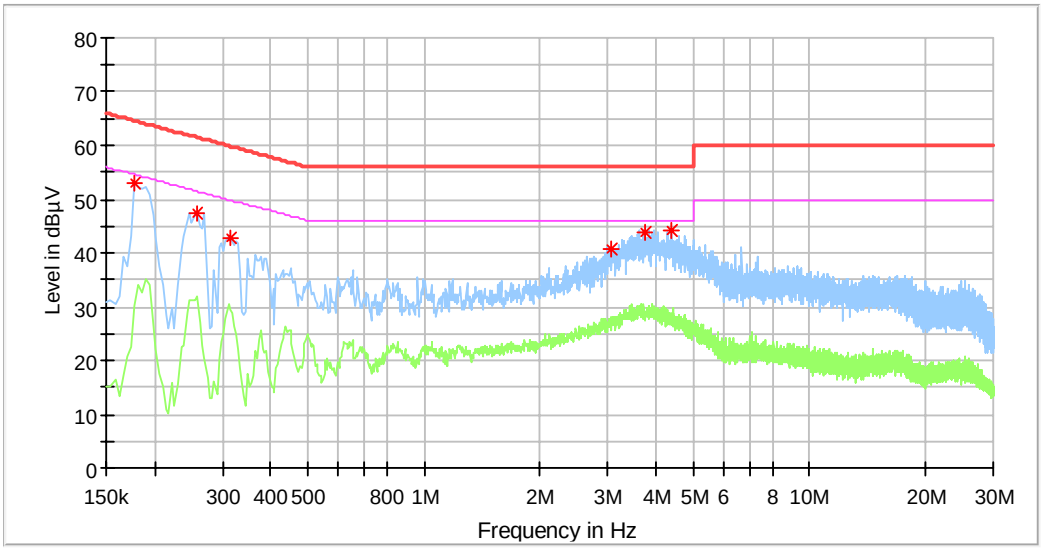
Conducted Emission Test 150kHz – 30MHz

M/N: X500(with adapter: YJS015D-1900600U)
Op Cond.: charging + Wi-Fi transmiting
Test Spec.: Power Line, Neutral
Comment: AC 120V/60Hz

Temperature (°C): 22.5 Relative Humidity (%): 46.7 Atmospheric Pressure(mbar) : 1012



Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.178000	53.10	---	64.58	11.48	N	10.3
0.258000	47.31	---	61.50	14.19	N	10.3
0.314000	42.95	---	59.86	16.91	N	10.3
3.046000	40.66	---	56.00	15.34	N	10.5
3.730000	43.88	---	56.00	12.12	N	10.5
4.374000	44.37	---	56.00	11.63	N	10.5

Remark：
Level=Reading Level + Correction Factor
Correction Factor=Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)

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9.2

9.2 Conducted peak output power

Test Method

1. Connect the power meter to the EUT
   a) The EUT is configured to transmit continuously, or to transmit with a constant duty factor.
   b) At all times the EUT is transmitting at its maximum power control level.
   c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
2. Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
3. Adjust the measurement in dBm by adding 10log (1/x), where x is the duty cycle to the measurement result.

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

802.11b

Frequency MHz	Conducted Peak Output Power dBm	Result
Top channel 2412MHz	13.3	Pass
Middle channel 2437MHz	13.6	Pass
Bottom channel 2462MHz	13.9	Pass

802.11g

Frequency MHz	Conducted Peak Output Power dBm	Result
Top channel 2412MHz	13.9	Pass
Middle channel 2437MHz	14.5	Pass
Bottom channel 2462MHz	14.2	Pass

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802.11nHT20

Frequency	Conducted Peak Output Power	Result
MHz	**dBm**	
Top channel 2412MHz	13.2	Pass
Middle channel 2437MHz	13.9	Pass
Bottom channel 2462MHz	13.5	Pass

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9.3 6dB and 99% 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

802.11b

Frequency MHz	6dB bandwidth KHz	99 bandwidth KHz	Result
Bottom channel 2412MHz	8120	11948	Pass
Middle channel 2437MHz	9120	11948	Pass
Top channel 2462MHz	9080	11788	Pass

802.11g

Frequency MHz	6dB bandwidth KHz	99 bandwidth KHz	Result
Bottom channel 2412MHz	15920	16863	Pass
Middle channel 2437MHz	15920	16943	Pass
Top channel 2462MHz	16120	16703	Pass

802.11nHT20

Frequency MHz	6dB bandwidth KHz	99 bandwidth KHz	Result
Bottom channel 2412MHz	15800	17702	Pass
Middle channel 2437MHz	15800	17782	Pass
Top channel 2462MHz	15800	17582	Pass

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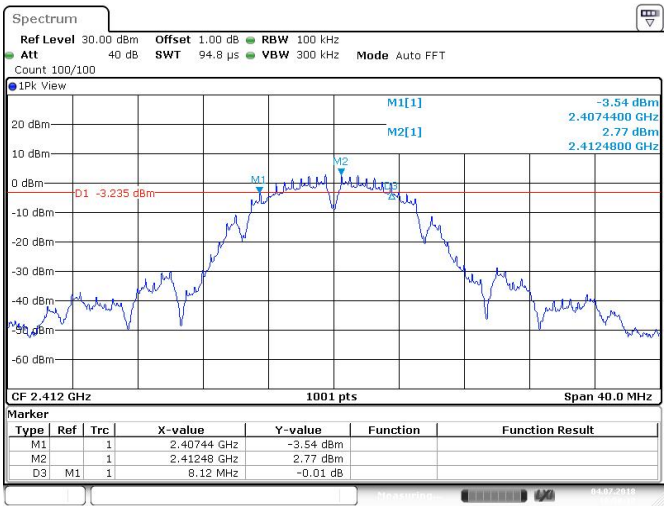
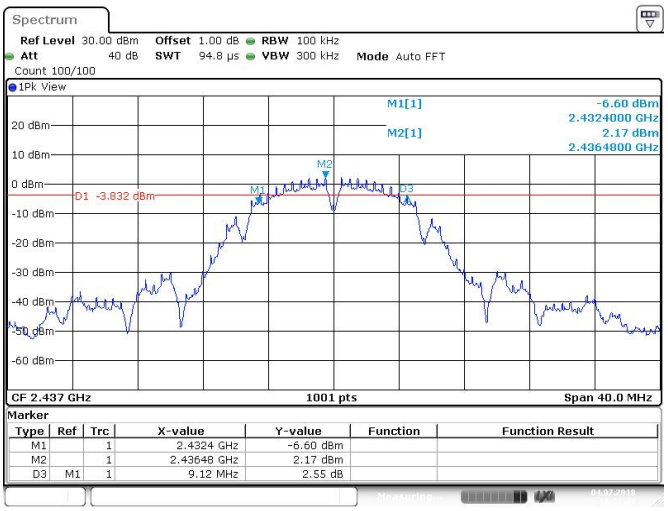
802.11b



2412MHz



2437MHz

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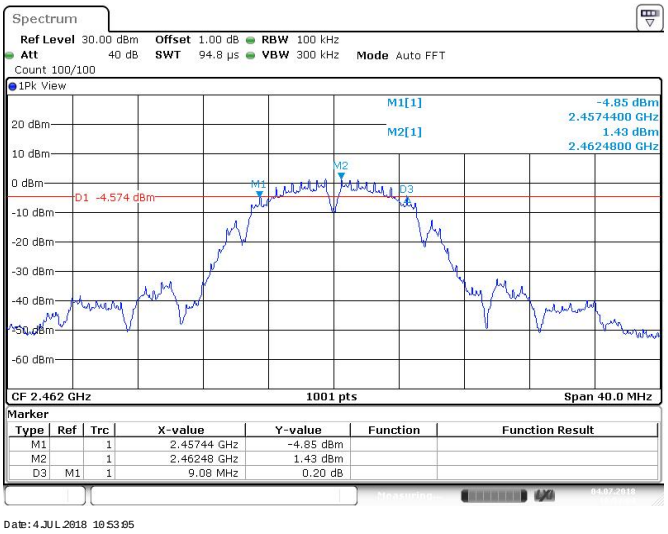
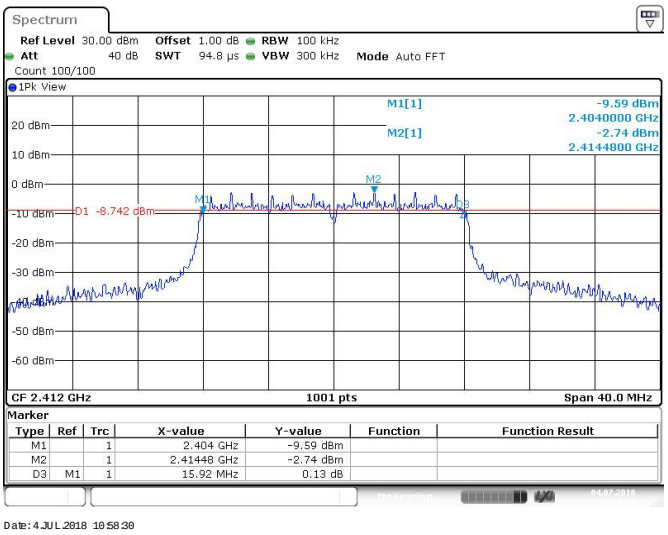


2462MHz

802.11g



2412MHz

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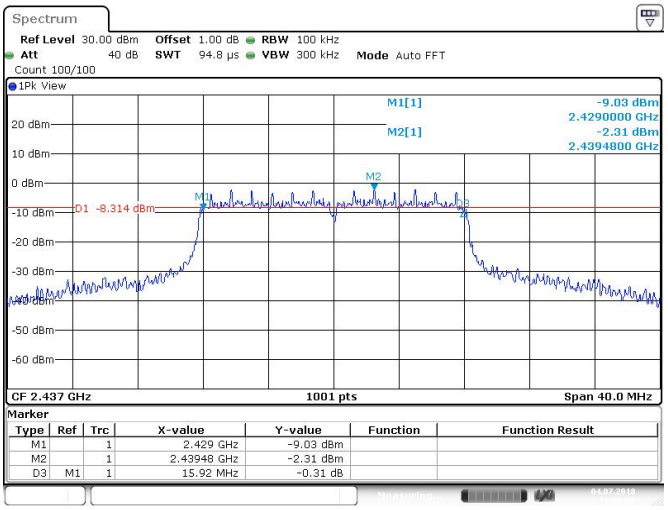
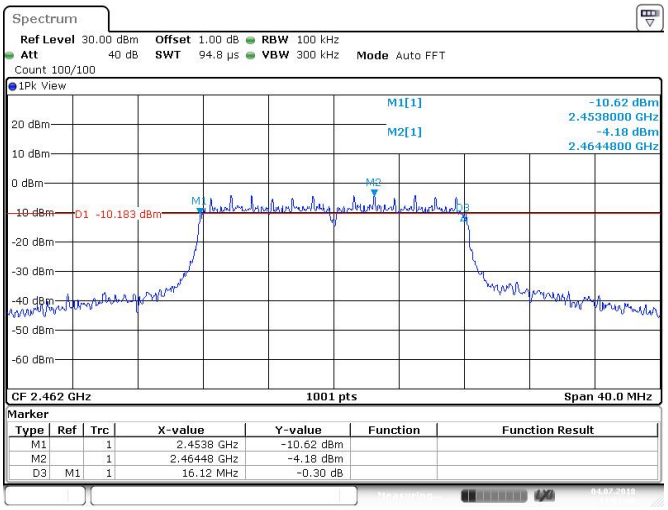


2437MHz



2462MHz

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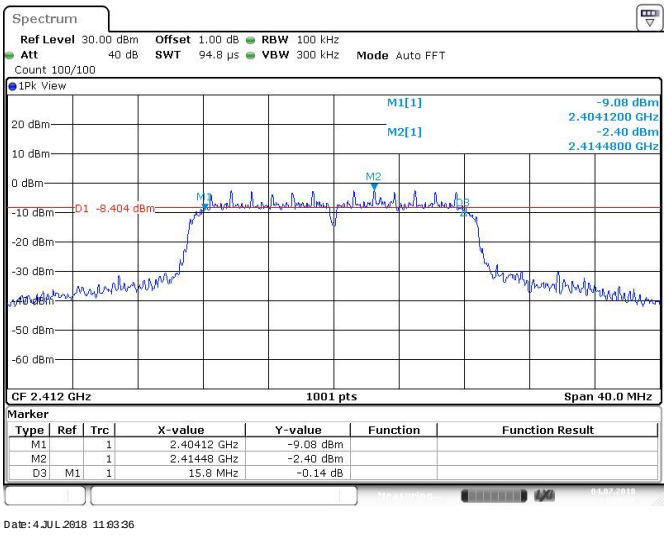
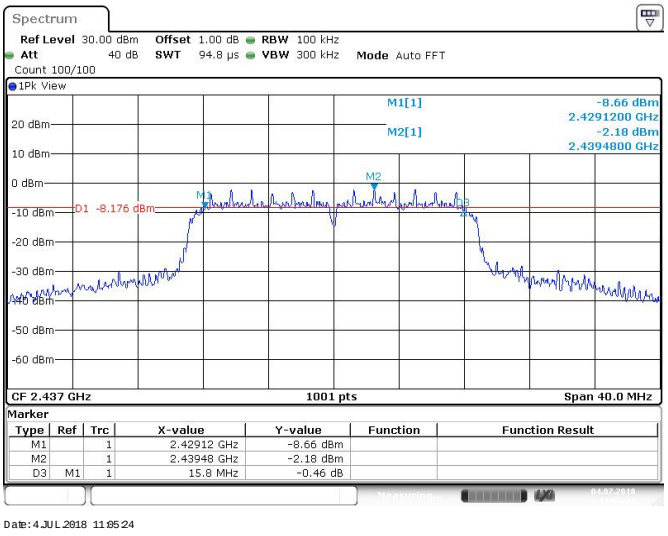
802.11nHT20



2412MHz



2437MHz

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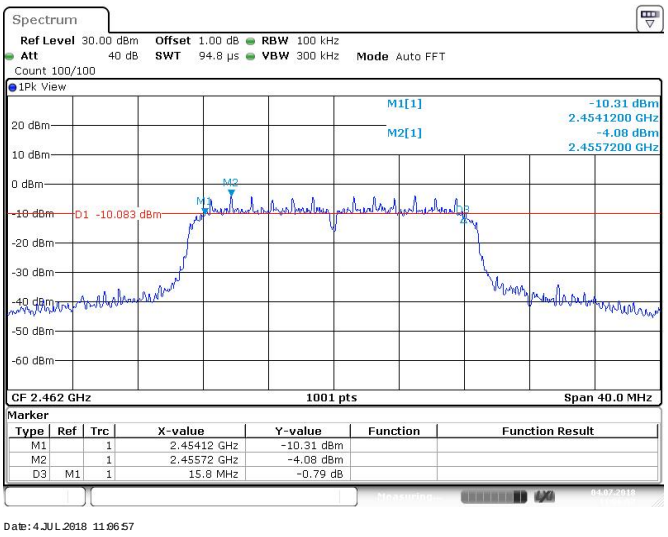

2462MHz

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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

802.11b

Frequency MHz	Power spectral density dBm/3KHz	Result
Top channel 2412MHz	-11.8	Pass
Middle channel 2437MHz	-12.3	Pass
Bottom channel 2462MHz	-13.18	Pass

802.11g

Frequency MHz	Power spectral density dBm/3KHz	Result
Top channel 2412MHz	-17.94	Pass
Middle channel 2437MHz	-17.61	Pass
Bottom channel 2462MHz	-18.97	Pass

802.11nHT20

Frequency MHz	Power spectral density dBm/3KHz	Result
Top channel 2412MHz	-17.94	Pass
Middle channel 2437MHz	-17.61	Pass
Bottom channel 2462MHz	-19.48	Pass

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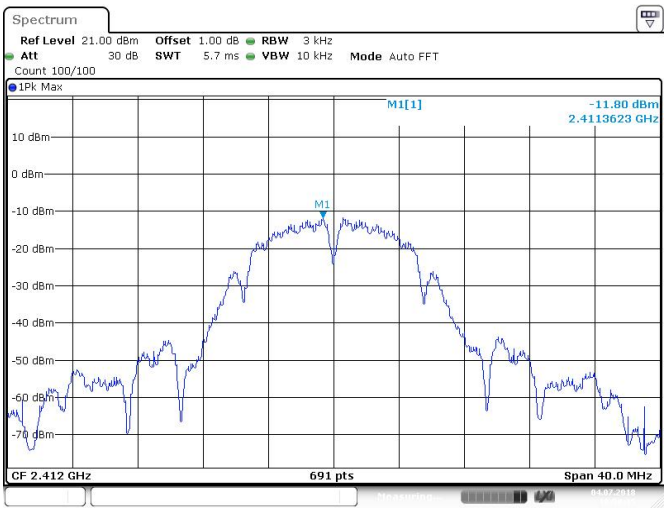
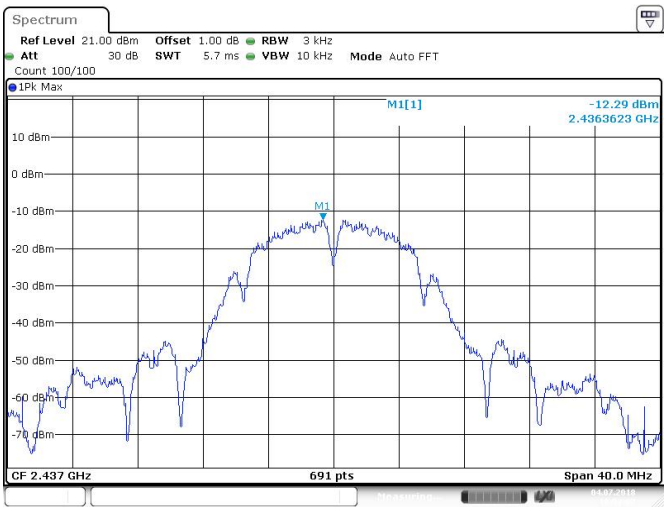
802.11b



2412MHz



2437MHz

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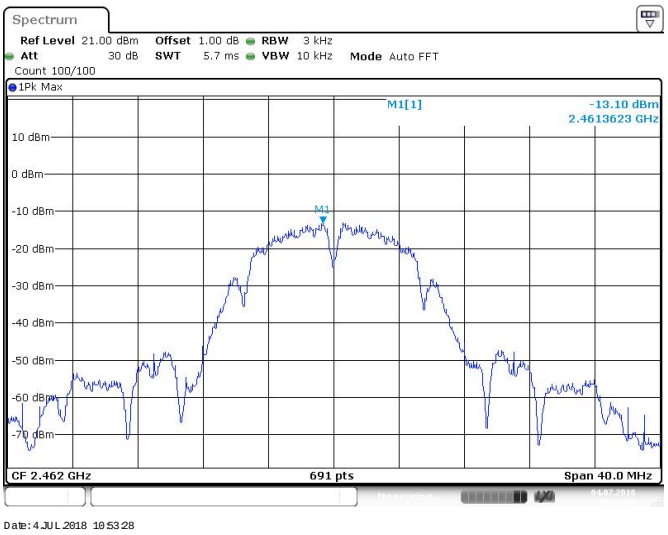
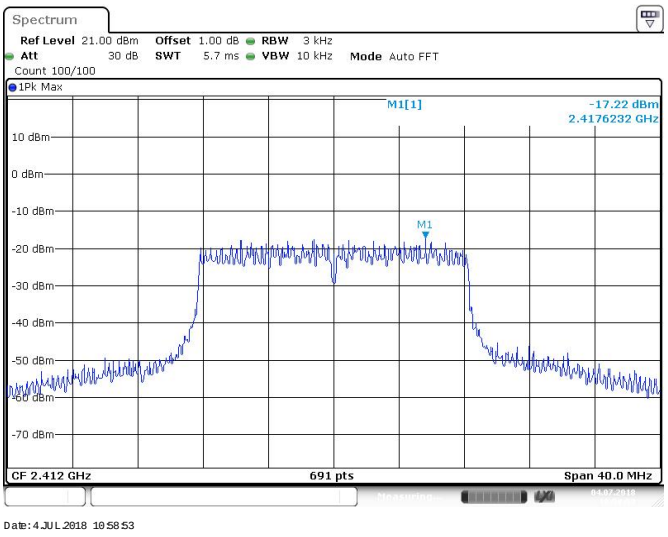


2462MHz

802.11g



2412MHz

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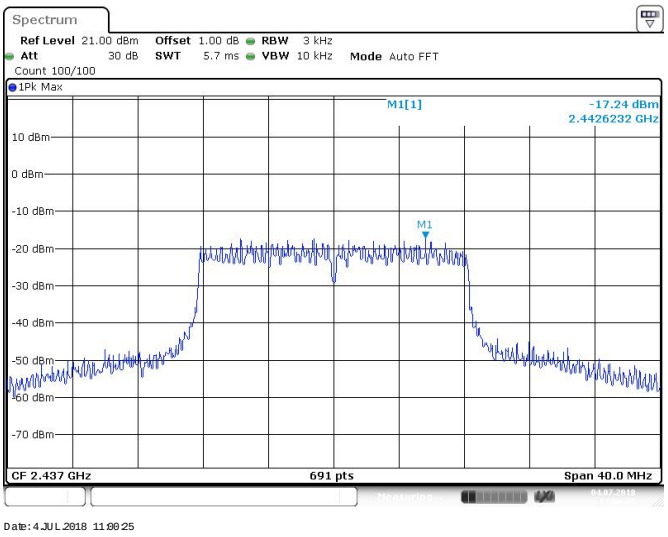
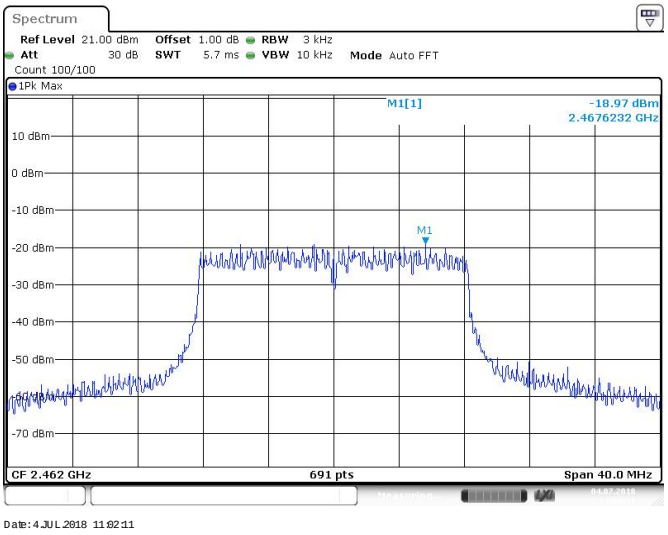


2437MHz



2462MHz

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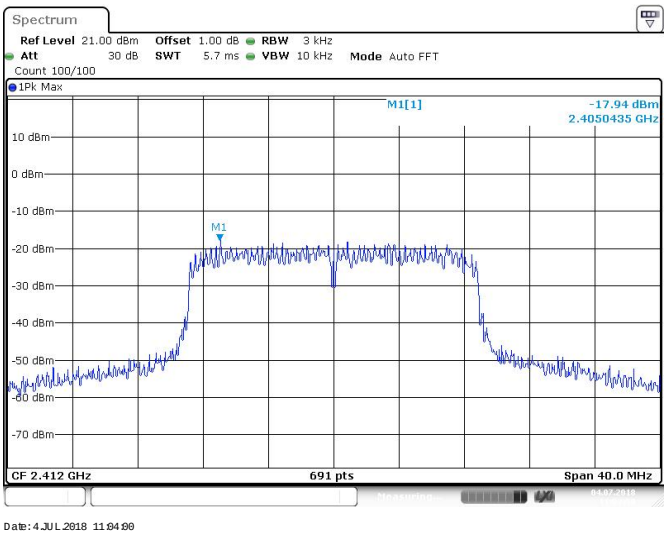
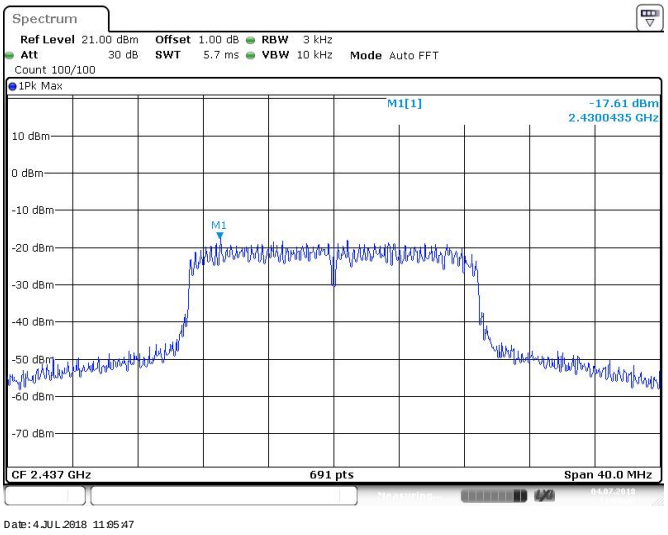
802.11nHT20



2412MHz



2437MHz

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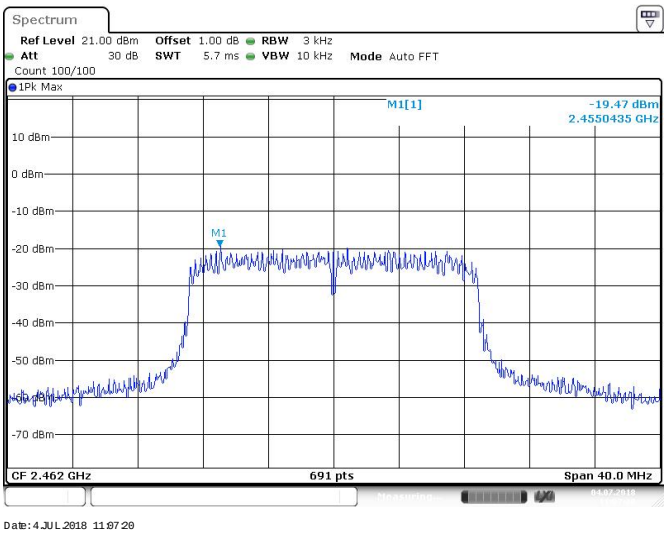

2462MHz

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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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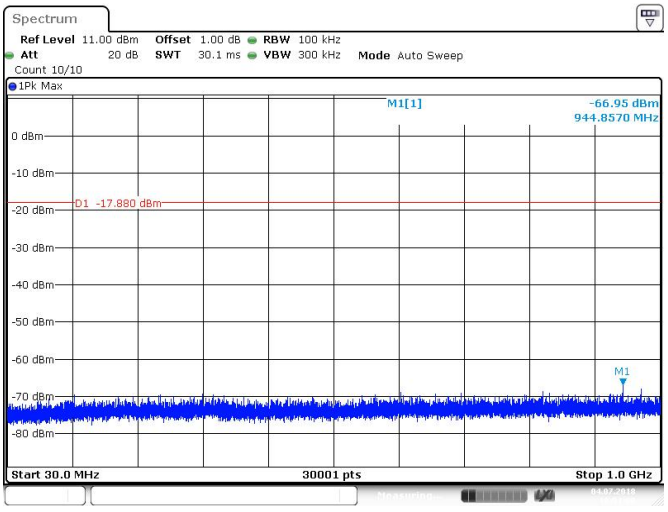
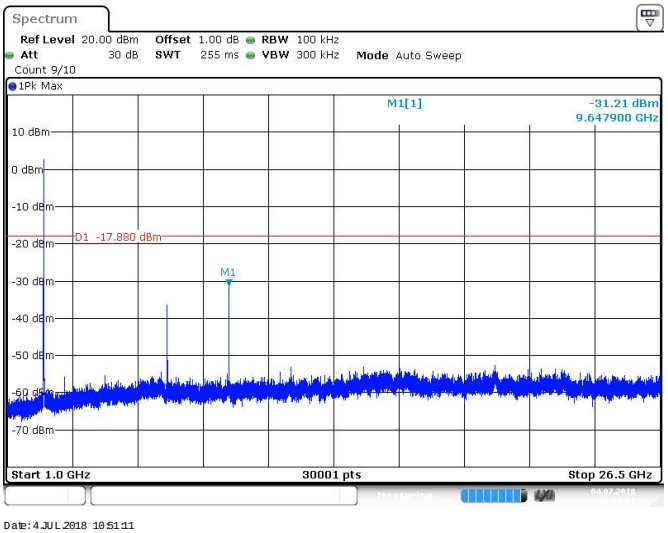
Spurious RF conducted emissions

802.11b





2412MHz

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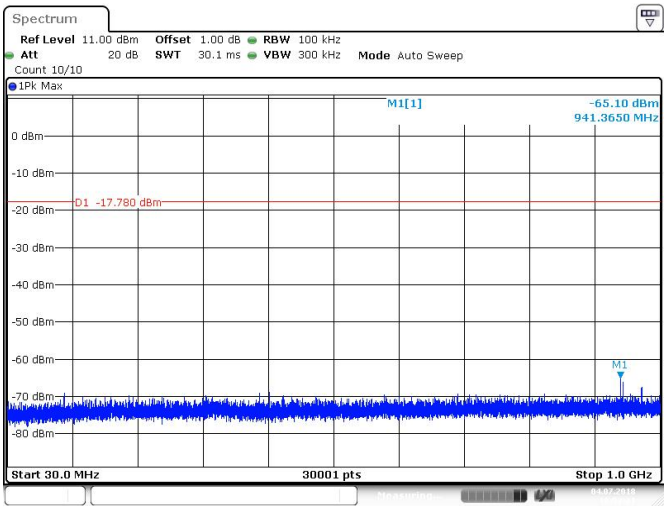

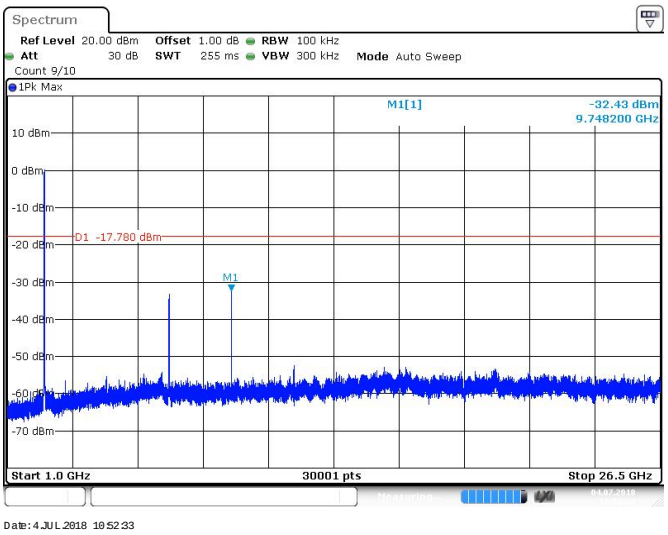

2437MHz

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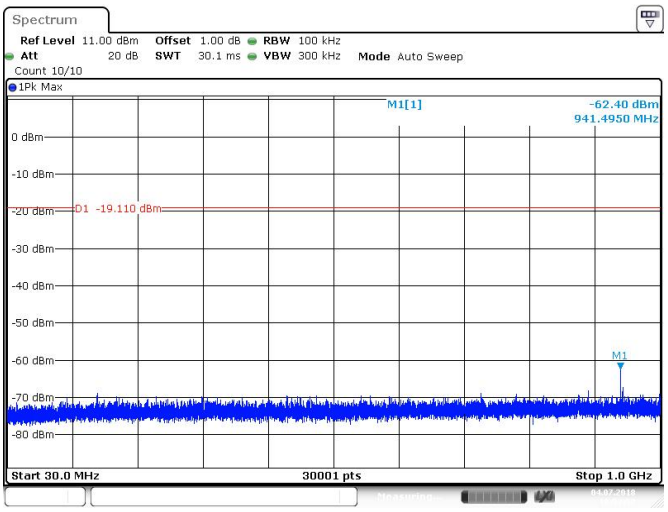
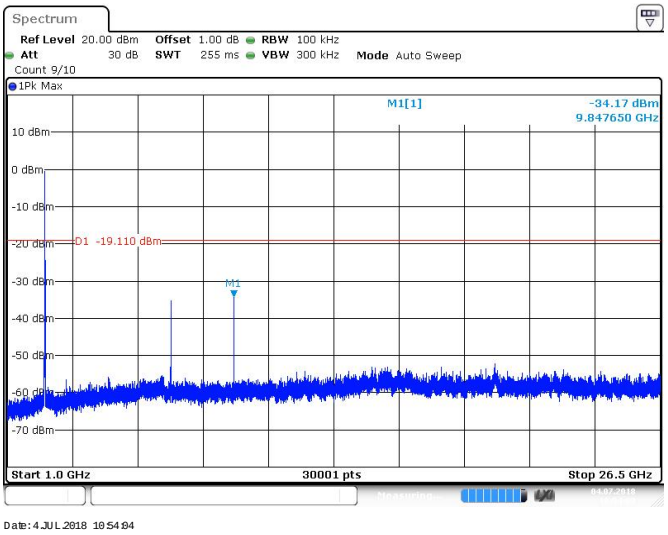
Spurious RF conducted emissions





2462MHz

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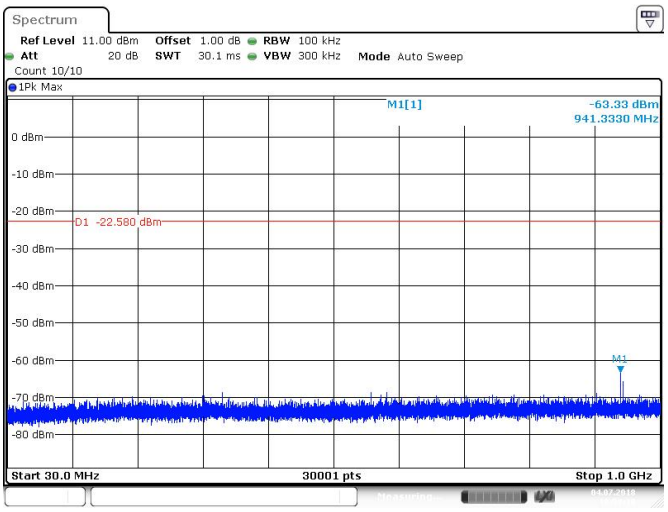
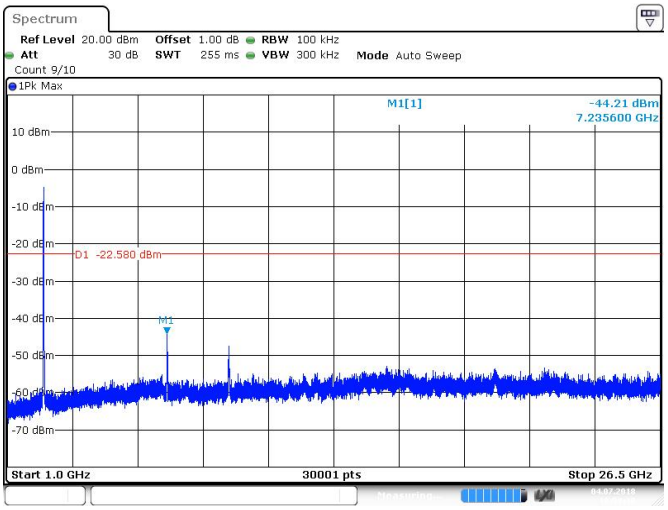
802.11g





2412MHz

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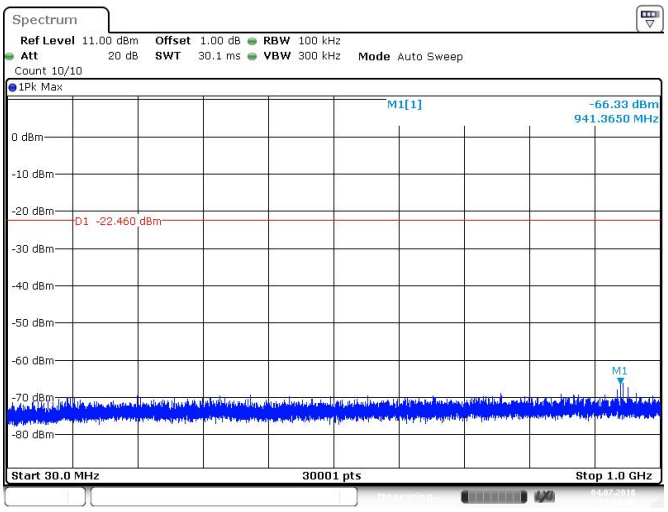
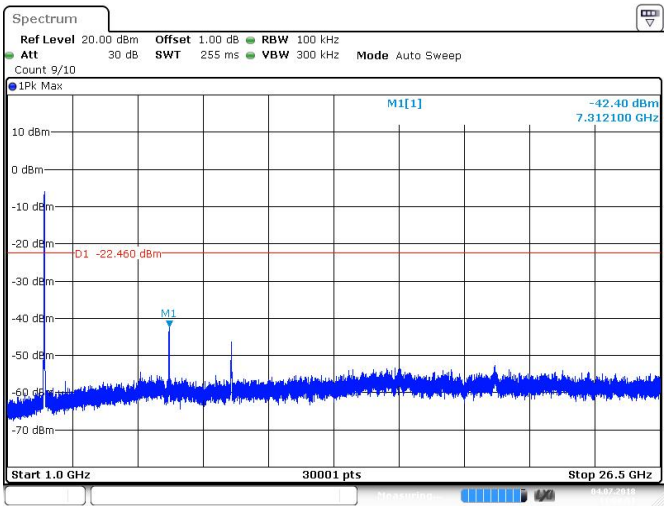
Spurious RF conducted emissions





2437MHz

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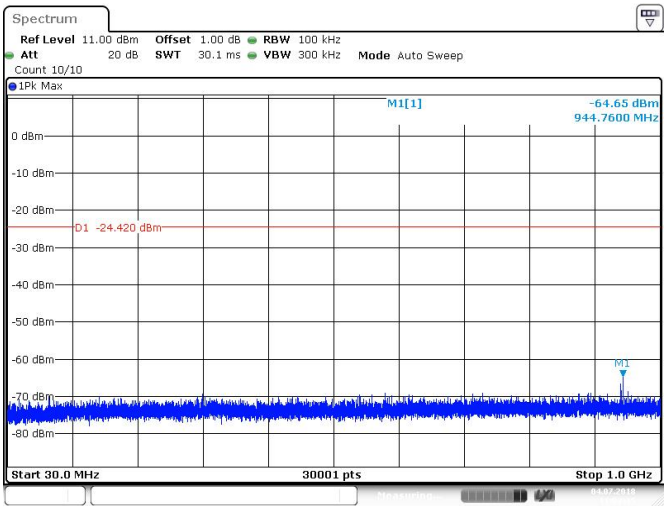

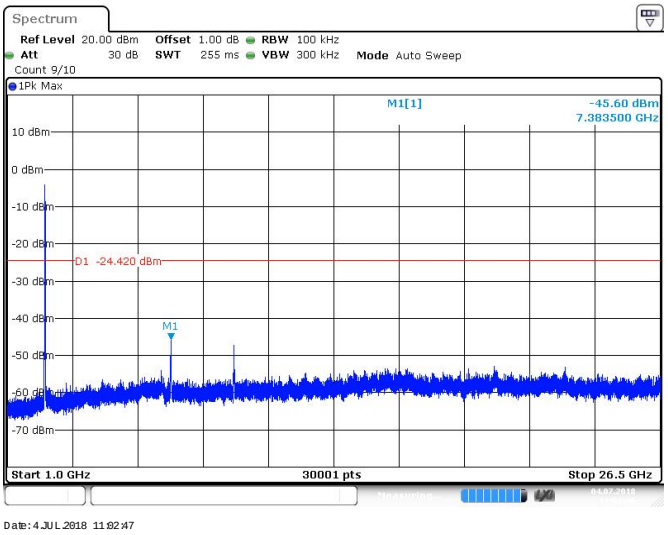

2462MHz

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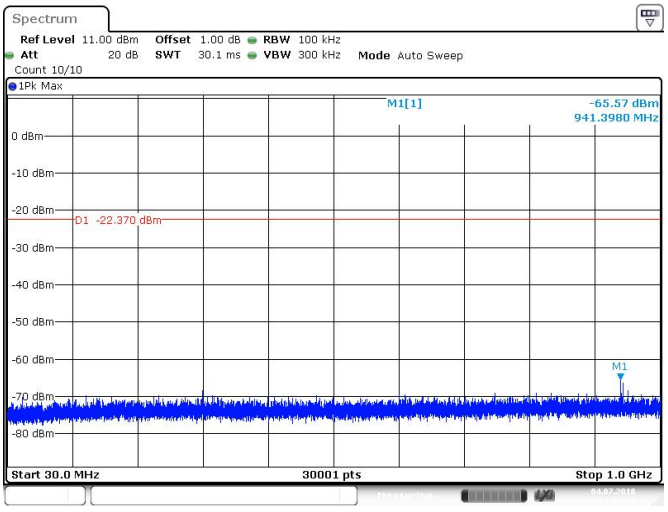
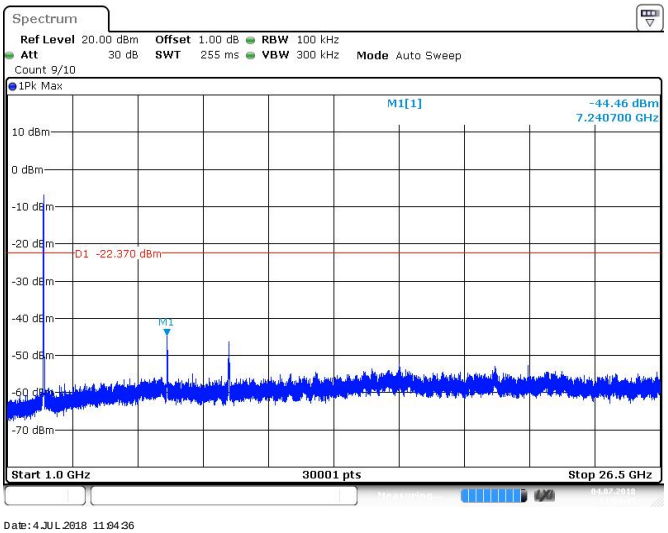
Spurious RF conducted emissions

802.11nHT20





2412MHz

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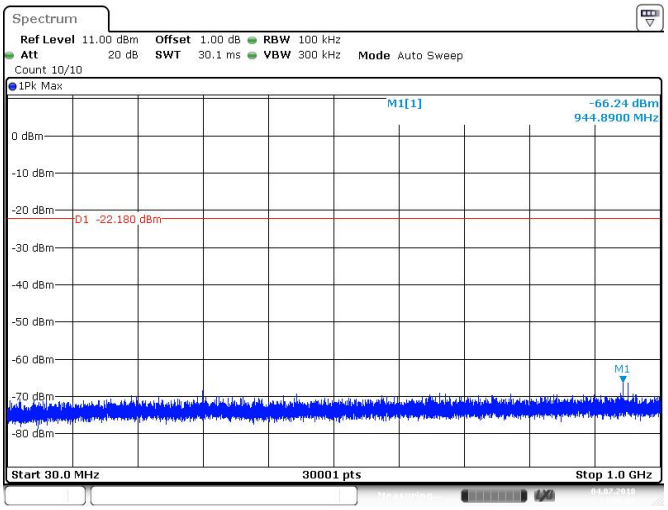

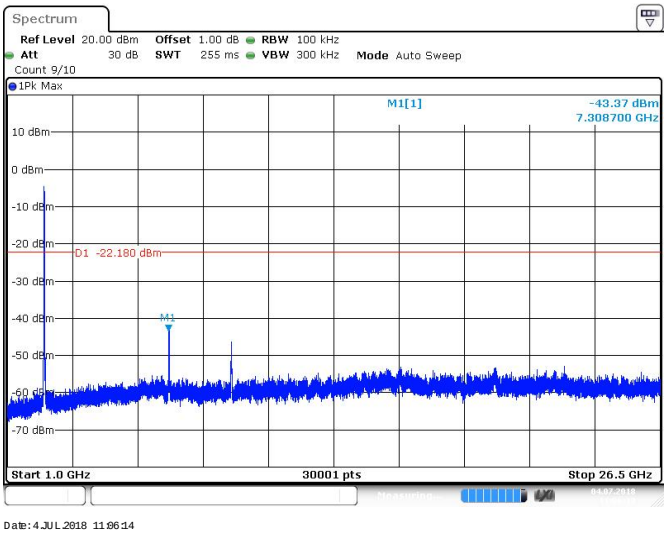

2437MHz

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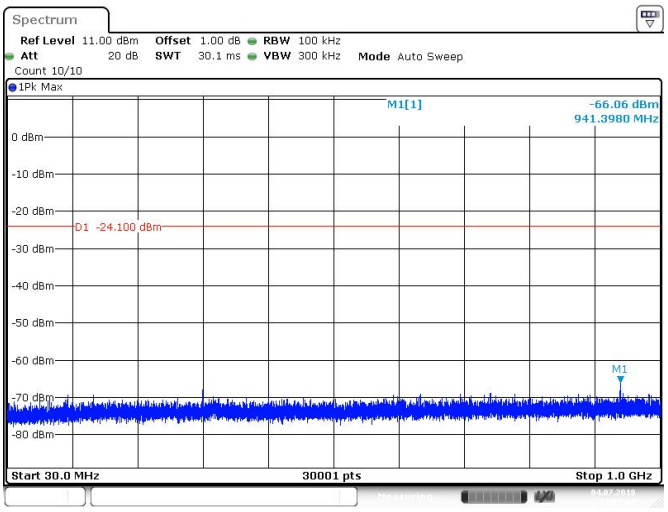
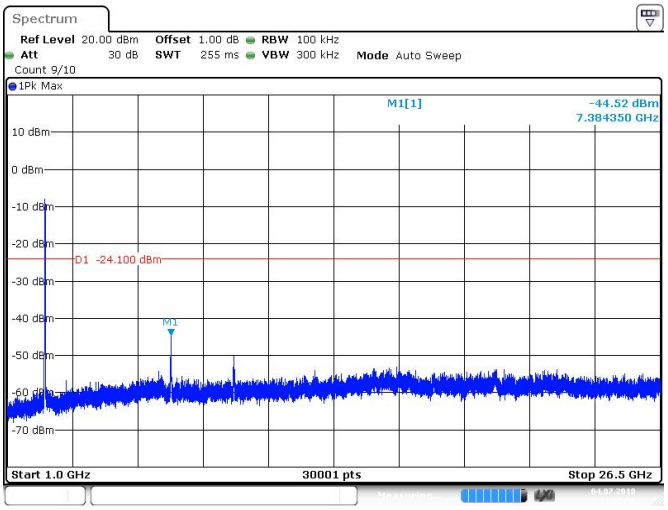
Spurious RF conducted emissions





2462MHz

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9.6 Band edge

Test Method

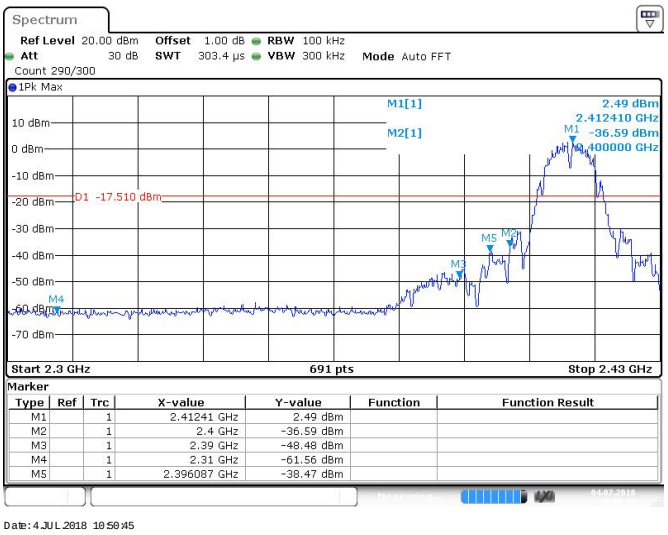
1 Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 kHz, VBW≥RBW, Sweep = auto, Detector function = peak, Trace = max hold.
2 Allow the trace to stabilize, use the peak and delta measurement to record the result.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

Limit

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

Test result

802.11b



2412MHz

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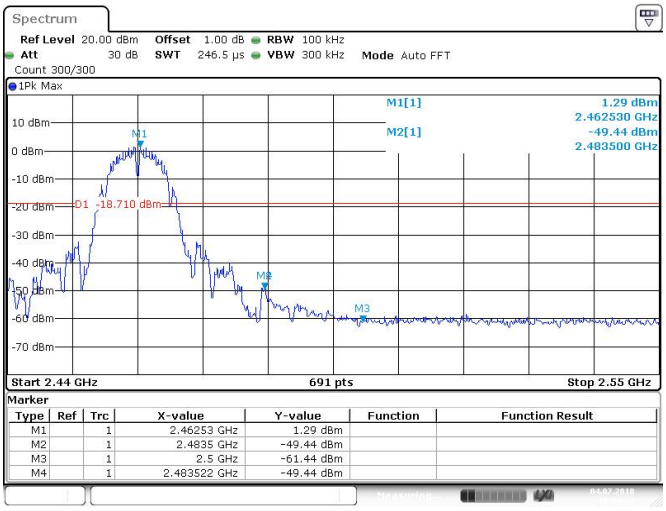
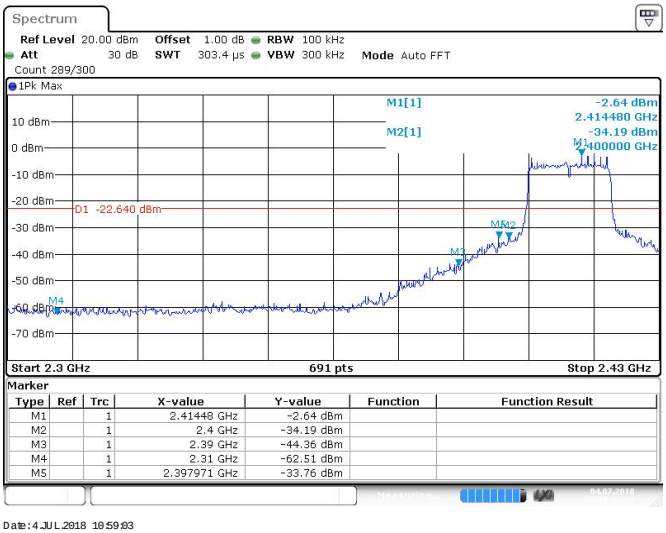
Band edge



2462MHz

802.11g



2412MHz

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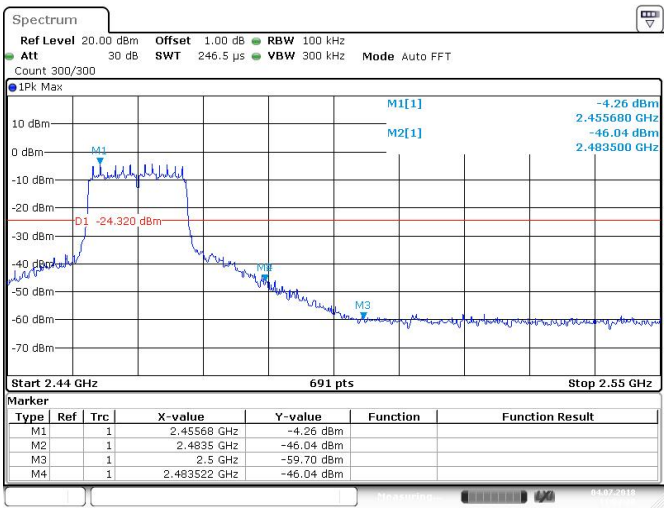
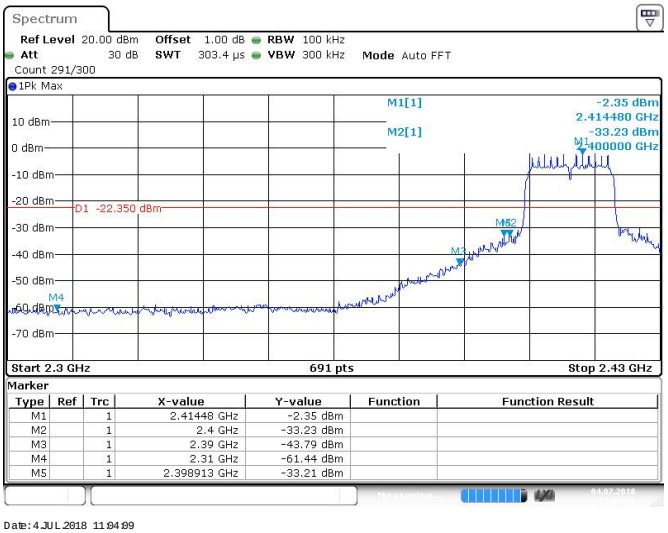
Band edge



2462MHz

802.11nHT20



2412MHz

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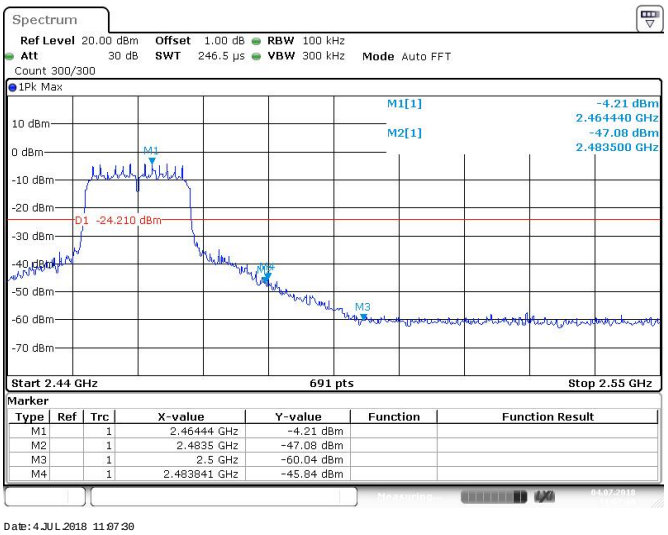
Band edge



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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 3meter 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:

802.11b

2412MHz (30MHz – 1GHz)(for X500)

Frequency	Emission Level	Polarization	Limit	Detector	Result	Corr. (dB)
MHz	dBuV/m		dBµV/m			
360.01	38.83	Horizontal	46.0	QP	Pass	-24.7
320.13	32.79	Vertical	46.0	QP	Pass	-26.3

2412MHz (30MHz – 1GHz)(for X500 with the new main board)

Frequency	Emission Level	Polarization	Limit	Detector	Result	Corr. (dB)
MHz	dBuV/m		dBµV/m			
320.03	39.49	Horizontal	46.0	QP	Pass	-25.1
320.03	32.28	Vertical	46.0	QP	Pass	-25.1

2412MHz (30MHz – 1GHz)(for D5)

Frequency	Emission Level	Polarization	Limit	Detector	Result	Corr. (dB)
MHz	dBuV/m		dBµV/m			
400.01	42.63	Horizontal	46.0	QP	Pass	-24.7
877.78	37.08	Vertical	46.0	QP	Pass	-26.3

2412MHz (30MHz – 1GHz)(for X-503)

Frequency	Emission Level	Polarization	Limit	Detector	Result	Corr. (dB)
MHz	dBuV/m		dBµV/m			
207.03	38.15	Horizontal	46.0	QP	Pass	-24.7
876.54	37.17	Vertical	46.0	QP	Pass	-26.3

2412MHz (Above 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result	Corr. (dB)
MHz	dBuV/m		dBµV/m			
2384 00*	43.29	Horizontal	74.00	PK	Pass	-6.1
17784.27*	51.23	Vertical	74.00	PK	Pass	23.1

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.

(3) Above 1GHz: Level=Reading Level + Correction Factor; Correction Factor=Antenna Factor + Cable Loss – Pre-amplifier

(4) Below 1GHz: Level=Reading Level + Correction Factor; Correction Factor=Antenna Factor + Cable Loss

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

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2437MHz (30MHz – 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result
MHz	dBuV/m		dBµV/m		
--	--	Horizontal	--	QP	Pass
--	--	Vertical	--	QP	Pass

2437MHz (Above 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result	Corr. (dB)
MHz	dBuV/m		dBµV/m			
9647.81*	52.53	Horizontal	54.00	PK	Pass	8.4
4823.90*	49.83	Vertical	74.00	PK	Pass	2.8

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.
(3) Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
(4) Below 1GHz: Corrector factor = Antenna Factor + Cable Loss

2462MHz (30MHz – 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result
MHz	dBuV/m		dBµV/m		
--	--	Horizontal	--	QP	Pass
--	--	Vertical	--	QP	Pass

2462MHz (Above 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result	Corr. (dB)
MHz	dBuV/m		dBµV/m			
4923.75*	53.04	Horizontal	74.00	PK	Pass	3.1
4923.75*	49.78	Vertical	74.00	PK	Pass	3.1

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.
(3) Above 1GHz: Level=Reading Level + Correction Factor; Correction Factor=Antenna Factor + Cable Loss – Pre-amplifier
(4) Below 1GHz: Level=Reading Level + Correction Factor; Correction Factor=Antenna Factor + Cable Loss

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

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802.11g

2412MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result
		Horizontal		QP	Pass
		Vertical		QP	Pass

2412MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result	Corr. (dB)
2381.00*	46.1	Horizontal	74.00	PK	Pass	-6.0
2380.12*	40.28	Vertical	74.00	PK	Pass	-6.0

2437MHz (30MHz – 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result
--	--	Horizontal	--	QP	Pass
--	--	Vertical	--	QP	Pass

2437MHz (Above 1GHz)

Frequency MHz	Emission Level dBuV/m	Polarization	Limit dBµV/m	Detector	Result	Corr. (dB)
9747.65*	41.29	Horizontal	74.00	PK	Pass	7.9
8758.59*	39.33	Vertical	74.00	PK	Pass	6.7

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.

(3) Above 1GHz: Level=Reading Level + Correction Factor; Correction Factor=Antenna Factor + Cable Loss – Pre-amplifier

(4) Below 1GHz: Level=Reading Level + Correction Factor; Correction Factor=Antenna Factor + Cable Loss

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

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2462MHz (30MHz – 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result
MHz	dBuV/m		dBµV/m		
--	--	Horizontal	--	QP	Pass
--	--	Vertical	--	QP	Pass

2462MHz (Above 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result	Corr. (dB)
MHz	dBuV/m		dBµV/m			
4925.15*	43.85	Horizontal	74.00	PK	Pass	7.8
4930.78*	39.09	Vertical	74.00	PK	Pass	3.1

802.11nHT20

2412MHz (30MHz – 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result
MHz	dBuV/m		dBµV/m		
--	--	Horizontal	--	QP	Pass
--	--	Vertical	--	QP	Pass

2412MHz (Above 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result	Corr. (dB)
MHz	dBuV/m		dBµV/m			
2379.50*	44.26	Horizontal	74.00	PK	Pass	-6.1
2383.50*	37.6	Vertical	74.00	PK	Pass	-6.0

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.

(3) Above 1GHz: Level=Reading Level + Correction Factor; Correction Factor=Antenna Factor + Cable Loss – Pre-amplifier

(4) Below 1GHz: Level=Reading Level + Correction Factor; Correction Factor=Antenna Factor + Cable Loss

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

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2437MHz (30MHz – 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result
MHz	dBuV/m		dBµV/m		
--	--	Horizontal	--	QP	Pass
--	--	Vertical	--	QP	Pass

2437MHz (Above 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result	Corr. (dB)
MHz	dBuV/m		dBµV/m			
2523.43 *	38.81	Horizontal	74.00	PK	Pass	-5.0
2440.75*	34.45	Vertical	74.00	PK	Pass	-5.6

2462MHz (30MHz – 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result
MHz	dBuV/m		dBµV/m		
--	--	Horizontal	--	QP	Pass
--	--	Vertical	--	QP	Pass

2462MHz (Above 1GHz)

Frequency	Emission Level	Polarization	Limit	Detector	Result	Corr. (dB)
MHz	dBuV/m		dBµV/m			
4923.28*	42.26	Horizontal	74.00	PK	Pass	3.1
9455.15*	41.51	Vertical	74.00	PK	Pass	9.1

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.

(3) Above 1GHz: Level=Reading Level + Correction Factor; Correction Factor=Antenna Factor + Cable Loss – Pre-amplifier

(4) Below 1GHz: Level=Reading Level + Correction Factor; Correction Factor=Antenna Factor + Cable Loss

(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

Conducted Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	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

TS8997 Test System

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A		108272	2019-7-6
Vector Signal Generator	Rohde & Schwarz	SMBV100A		262825	2019-7-6
Communication Synthetical Test Instrument	Rohde & Schwarz	CMW 270		101251	2019-5-31
Signal Analyzer	Rohde & Schwarz	FSV40		101030	2019-7-6
Vector Signal Generator	Rohde & Schwarz	SMU 200A		105324	2019-7-6
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157		101226/100851	2019-7-6
Power Splitter	Weinschel	1580		SC319	2019-7-5
10dB Attenuator	Weinschel	4M-10		43152	2019-7-14
10dB Attenuator	R&S	DNF		DNF-001	2019-7-6
10dB Attenuator	R&S	DNF		DNF-002	2019-7-6
10dB Attenuator	R&S	DNF		DNF-003	2019-7-6
10dB Attenuator	R&S	DNF		DNF-004	2019-7-6
Test software	Rohde & Schwarz	EMC32		Version 10.38.00	N/A
Test software	Tonscend	System for BT/WIFI		Version 2.5.77.0418	N/A

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Radiated Spurious Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40		101031	2019-7-6
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163		708	2019-7-4
Horn Antenna	Rohde & Schwarz	HF907		102295	2019-6-28
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG		12827	2019-7-12
Loop Antenna	Rohde & Schwarz	HFH2-Z2		100398	2019-7-6
Pre-amplifier	Rohde & Schwarz	SCU 18		102230	2019-7-6
Pre-amplifier	Rohde & Schwarz	SCU 40A		100432	2019-7-6
Fully Anechoic Chamber	TDK	8X4X4		--	2022-7-14
Test software	Rohde & Schwarz	EMC32		Version 9.15.00	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

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.80dB; Vertical: 4.87dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.59dB; Vertical: 4.58dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 5.05dB; Vertical: 5.04dB;
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.16dB Frequency test involved: 0.6×10-7 or 1%
Uncertainty Evaluation for Power Spectral Density Conducted measurement	1.17dB
Uncertainty Evaluation for Spurious emissions Conducted measurement	1.43dB

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