TEST REPORT

FCC ID: ZCB625GA

Product: IP Camera

Model No.: 625GA

Trade Mark: N/A

Report No.: MTI150507001RF

Issued Date: Sep. 14, 2015

Issued for:

Shenzhen Smart-eye Digital Electronics Co.,Ltd

#6 Northern Area,Shangxue S&t Industrial Park,Bantian,Longgang,Shenzhen

Issued By:

Shenzhen Microtest Technology Co.,Ltd

6F, Zhongbao Building, Gushu, Bao ’ an District, Shenzhen, P.R.China

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1. Test Certification

Product:	IP Camera
Model No.:	625GA
Applicant:	Shenzhen Smart-eye Digital Electronics Co.,Ltd
Address:	#6 Northern Area,Shangxue S&t Industrial Park,Bantian,Longgang,Shenzhen
Manufacturer:	Shenzhen Smart-eye Digital Electronics Co.,Ltd
Address:	#6 Northern Area,Shangxue S&t Industrial Park,Bantian,Longgang,Shenzhen
Date of Test:	May. 17 – Aug. 01, 2015
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247 KDB 558074 D01 DTS Meas Guidance v03r03

The above equipment has been tested by Shenzhen Microtest Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:	David Chen	***Date:***	**Sep. 14, 2015**
Reviewed By:	Bill Chen	***Date:***	**Sep. 14, 2015**
Approved By:	Tim zhang	***Date:***	**Sep. 14, 2015**

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2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203/§15.247 (c)	PASS
AC Power Line Conducted Emission	§15.207	PASS
Conducted Peak Output Power	§15.247 (b)(3)	PASS
6dB Emission Bandwidth	§15.247 (a)(2)	PASS
Power Spectral Density	§15.247 (e)	PASS
Band Edge	1§5.247(d)	PASS
Spurious Emission	§15.205/§15.209	PASS

Note:

1. PASS: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

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3. EUT Description

Product Name:	IP Camera
Model :	625GA
Additional Model:	620GA,621GA,622GA,624GA,626GA,628GA,629GA,631GA,750GA,751GA,780GA,781GA
Trade Mark:	N/A
Operation Frequency:	2412MHz~2462MHz (802.11b/802.11g/802.11n(H20)) 2422MHz~2452MHz (802.11n(H40))
Channel Separation:	5MHz
Number of Channel:	11 for 802.11b/802.11g/802.11n(H20) 7 for 802.11n(H40)
Modulation Technology: (IEEE 802.11b)	Direct Sequence Spread Spectrum (DSSS)
Modulation Technology: (IEEE 802.11g/802.11n)	Orthogonal Frequency Division Multiplexing(OFDM)
Data speed (IEEE 802.11b):	1Mbps, 2Mbps, 5.5Mbps, 11Mbps
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps, 54Mbps
Data speed (IEEE 802.11n):	Up to 150Mbps
Antenna Type:	Dipole Antenna
Antenna Gain:	3dBi
Power Supply:	DC 5V from AC to DC adapter Adapter information: Model: PCC075N005AGMAA Input: 100~240VAC 50/60Hz 0.2A Output: 5VDC 1500mA
Remark:	All the models above are identical in interior structure, electrical circuits and components; just model names are different for marking requirement.

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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		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

802.11b/802.11g/802.11n (H20)

Channel	Frequency
The lowest channel	2412MHz
The middle channel	2437MHz
The Highest channel	2462MHz

802.11n (H40)

Channel	Frequency
The lowest channel	2422MHz
The middle channel	2437MHz
The Highest channel	2452MHz

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4. Genera Information

4.1. Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation
The sample was placed 0.8m above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:	
Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.	
Mode	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(H20)	6.5Mbps
802.11n(H40)	13.5Mbps
Final Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation
According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup” 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n(H20) and 13.5 Mbps for 802.11n(H40). Duty cycle setting during the transmission is 98.5% with maximum power setting for all modulations.	

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4.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

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5. Facilities and Accreditations

5.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 572331
  Shenzhen Tongce Testing Lab
  The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.
- IC - Registration No.: 10668A-1
  The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing
- CNAS - Registration No.: CNAS L6165
  Shenzhen TCT Testing Technology Co., Ltd. is accredited to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L6165.

5.2. Location

Shenzhen Tongce Testing Lab
Address: 1F, Leinuo Watch Building, Fuyong Town, Baoan Dist, Shenzhen, China
Tel: 86-755-36638142

5.3. Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	±2.56dB
2	RF power, conducted	±0.12dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1G)	±3.92dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%

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6. Test Results and Measurement Data

6.1. Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
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.	
E.U.T Antenna:	
The EUT transmitting antennas belongs an antenna used a unique coupling connector, and the best case gain of the antenna is 3dBi.	

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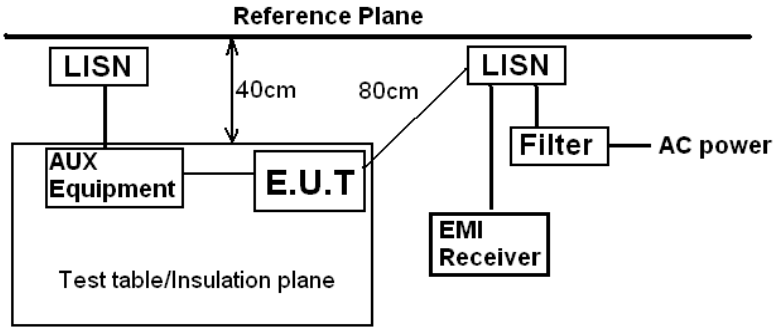
6.2. Conducted Emission

6.2.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4: 2003</td></tr>
<tr><td>Frequency Range:</td><td>150 kHz to 30 MHz</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9 kHz, VBW=30 kHz, Sweep time=auto</td></tr>
<tr><td>Limits:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
</td></tr>
<tr><td>Test Setup:</td><td>


Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m
</td></tr>
<tr><td>Test Mode:</td><td>Continuous transmitting mode</td></tr>
<tr><td>Test Procedure:</td><td>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
</table>

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6.2.2. Test Instruments

Conducted Emission Shielding Room Test Site (843)				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
EMI Test Receiver	R&S	ESCI	100321	2015-08-09
50Ω Coaxial Switch	Anritsu	MP59B	X10321	2015-08-09
L.I.S.N	R&S	ENV216	101131	2015-08-09
L.I.S.N	SCHWARZBZCK	NNBL 8226-2	8226-2/164	2015-08-09

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

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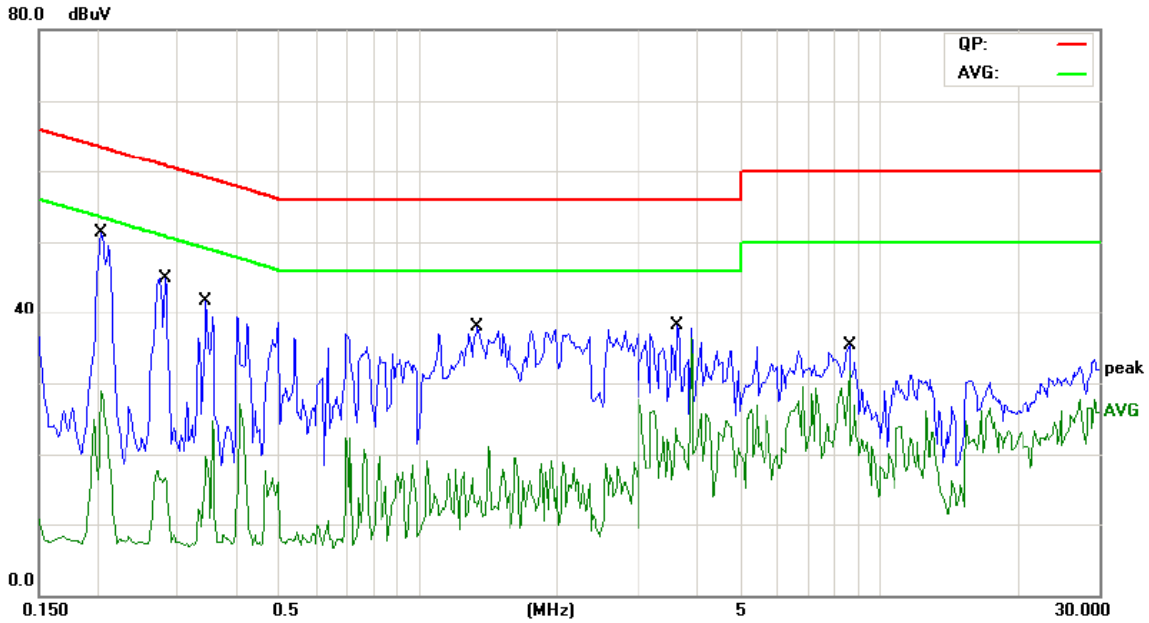
6.2.3. Test data

Please refer to following diagram for individual

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



Site Chamber #2	Phase:	*L1*	Temperature:	22 (C)
Limit: FCC PART15 Conduction(QP)	Power:	AC 120V/60Hz	Humidity:	54 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.2047	35.06	11.46	46.52	63.41	-16.89	QP	
2		0.2047	14.90	11.46	26.36	53.41	-27.05	AVG	
3		0.2828	27.86	11.42	39.28	60.73	-21.45	QP	
4		0.2828	8.88	11.42	20.30	50.73	-30.43	AVG	
5		0.3453	23.68	11.39	35.07	59.07	-24.00	QP	
6		0.3453	7.87	11.39	19.26	49.07	-29.81	AVG	
7		1.3414	18.73	11.35	30.08	56.00	-25.92	QP	
8		1.3414	1.35	11.35	12.70	46.00	-33.30	AVG	
9		3.6563	16.72	11.09	27.81	56.00	-28.19	QP	
10		3.6563	1.78	11.09	12.87	46.00	-33.13	AVG	
11		8.6055	18.24	11.14	29.38	60.00	-30.62	QP	
12		8.6055	4.28	11.14	15.42	50.00	-34.58	AVG	

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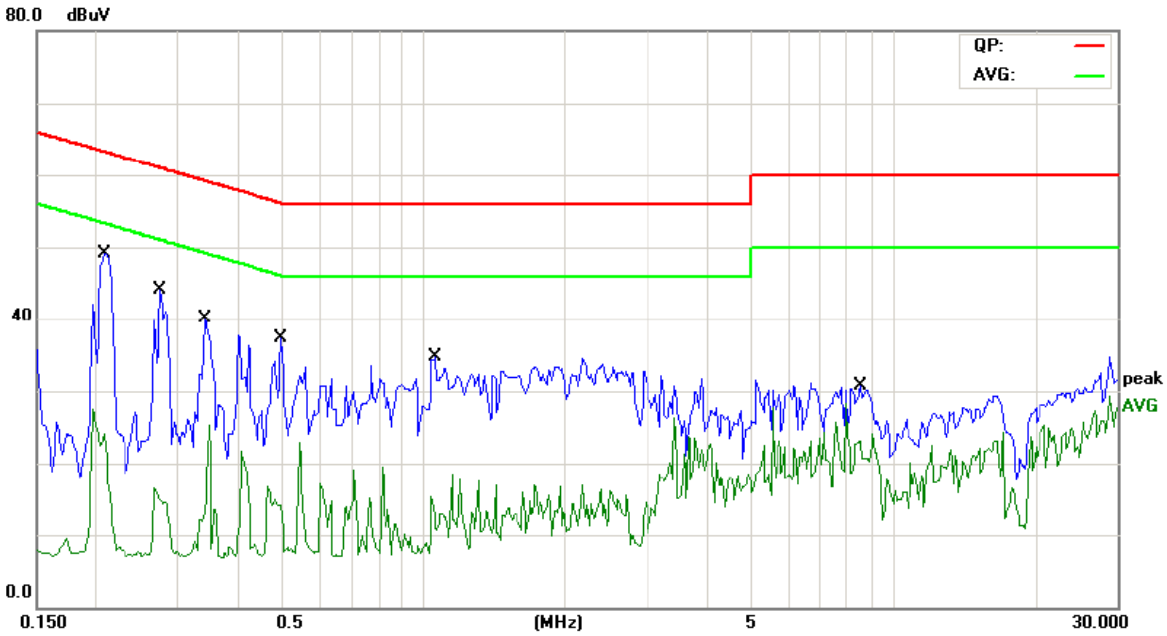
Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Site Chamber #2 Phase: N Temperature: 22 (C)

Limit: FCC PART15 Conduction(QP) Power: AC 120V/60Hz Humidity: 54 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.2086	32.59	11.48	44.07	63.26	-19.19	QP	
2		0.2086	14.43	11.48	25.91	53.26	-27.35	AVG	
3		0.2750	27.48	11.44	38.92	60.96	-22.04	QP	
4		0.2750	10.04	11.44	21.48	50.96	-29.48	AVG	
5		0.3414	22.82	11.41	34.23	59.17	-24.94	QP	
6		0.3414	6.58	11.41	17.99	49.17	-31.18	AVG	
7		0.4977	18.39	11.31	29.70	56.04	-26.34	QP	
8		0.4977	1.53	11.31	12.84	46.04	-33.20	AVG	
9		1.0641	15.99	11.22	27.21	56.00	-28.79	QP	
10		1.0641	-0.22	11.22	11.00	46.00	-35.00	AVG	
11		8.5039	13.23	11.15	24.38	60.00	-35.62	QP	
12		8.5039	0.84	11.15	11.99	50.00	-38.01	AVG	

Note:

Freq. = Emission frequency in MHz
Reading level (dBµV) = Receiver reading
Corr. Factor (dB) = Antenna factor + Cable loss
Measurement (dBµV) = Reading level (dBµV) + Corr. Factor (dB)
Limit (dBµV) = Limit stated in standard
Margin (dB) = Measurement (dBµV) – Limits (dBµV)
Q.P. =Quasi-Peak
AVG =average
** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.*

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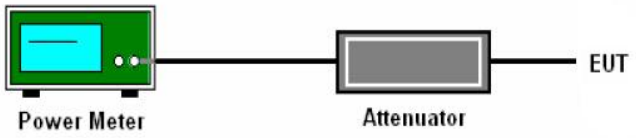
6.3. Conducted Output Power

6.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB558074
Limit:	30dBm
Test Setup:	
Test Mode:	Continuous transmitting mode
Test Procedure:	1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v03r03. 2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Measure the conducted output power and record the results in the test report.
Test Result:	PASS

6.3.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	Anritsu	ML2495A	1005002	Dec. 11, 2015
Pulse Power Senor	Anritsu	MA2411B	0917070	Dec. 11, 2015

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

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6.3.3. Test Data

802.11b mode			
Test channel	Maximum Peak Conducted Output Power (dBm)	Limit (dBm)	Result
Lowest	13.04	30.00	PASS
Middle	13.15	30.00	PASS
Highest	13.31	30.00	PASS

802.11g mode			
Test channel	Maximum Peak Conducted Output Power (dBm)	Limit (dBm)	Result
Lowest	9.36	30.00	PASS
Middle	11.83	30.00	PASS
Highest	9.97	30.00	PASS

802.11n(H20) mode			
Test channel	Maximum Peak Conducted Output Power (dBm)	Limit (dBm)	Result
Lowest	9.17	30.00	PASS
Middle	11.60	30.00	PASS
Highest	9.88	30.00	PASS

802.11n(H40) mode			
Test channel	Maximum Peak Conducted Output Power (dBm)	Limit (dBm)	Result
Lowest	8.25	30.00	PASS
Middle	10.10	30.00	PASS
Highest	8.38	30.00	PASS

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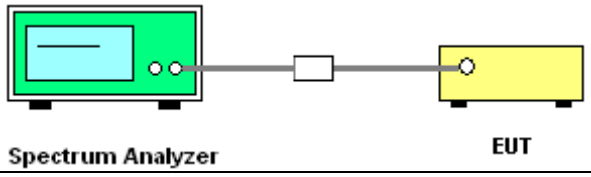
6.4. Emission Bandwidth

6.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	KDB558074
Limit:	>500kHz
Test Setup:	
Test Mode:	Continuous transmitting mode
Test Procedure:	1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v03r03. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3 Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz. 4. Measure and record the results in the test report.
Test Result:	PASS

6.4.2. Test Instruments

RF Test Room				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	ROHDE&SCHWARZ	FSU3	200054	Sep.16, 2015

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

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6.4.3. Test data

Test channel	6dB Emission Bandwidth (MHz)			
	802.11b	802.11g	802.11n(H20)	802.11n(H40)
Lowest	10.05	15.72	17.07	35.38
Middle	10.05	15.58	15.96	35.38
Highest	10.05	15.10	15.96	35.13
Limit:	>500k			
Test Result:	PASS			

Test plots as follows:

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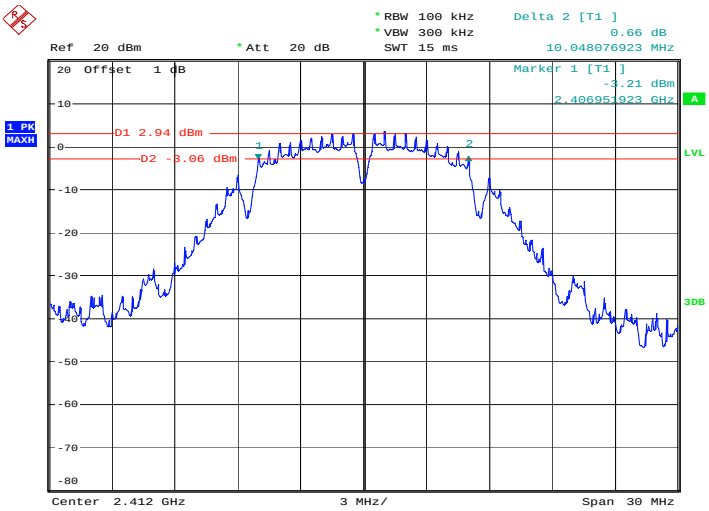
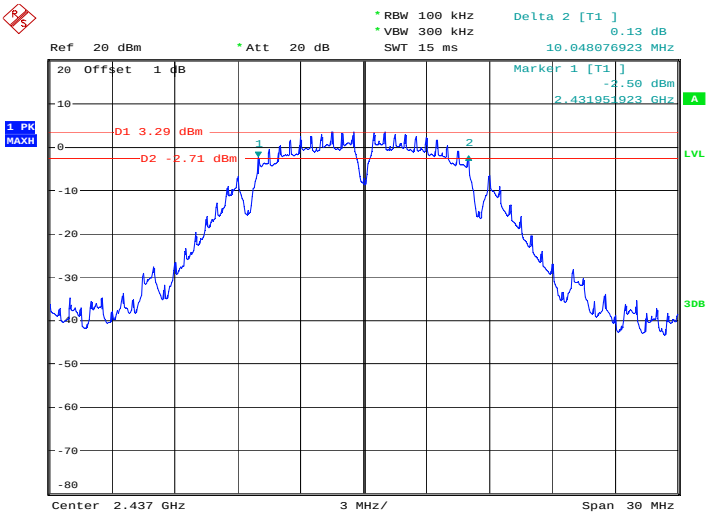
802.11b Modulation

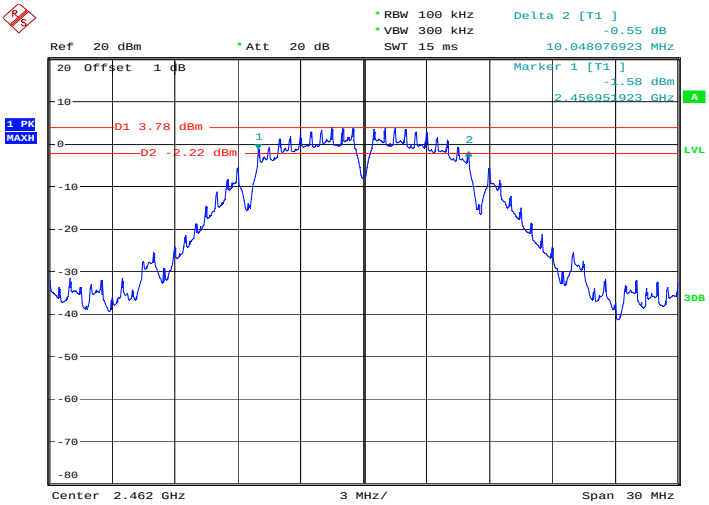
Lowest channel



Middle channel



Highest channel



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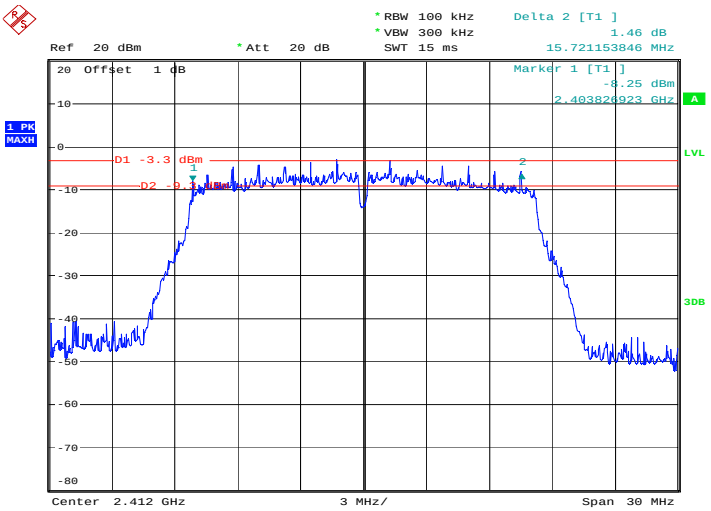
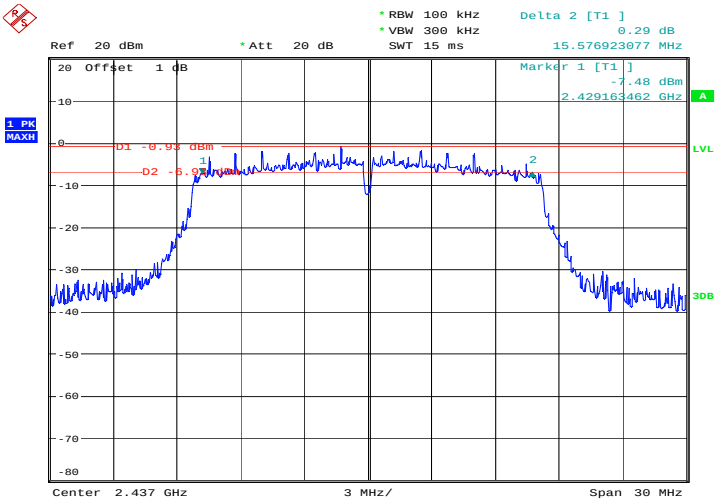
802.11g Modulation

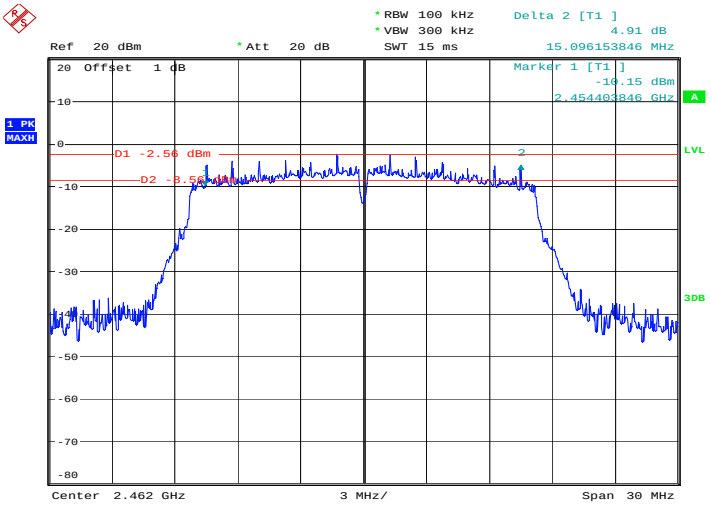
Lowest channel



Middle channel



Highest channel



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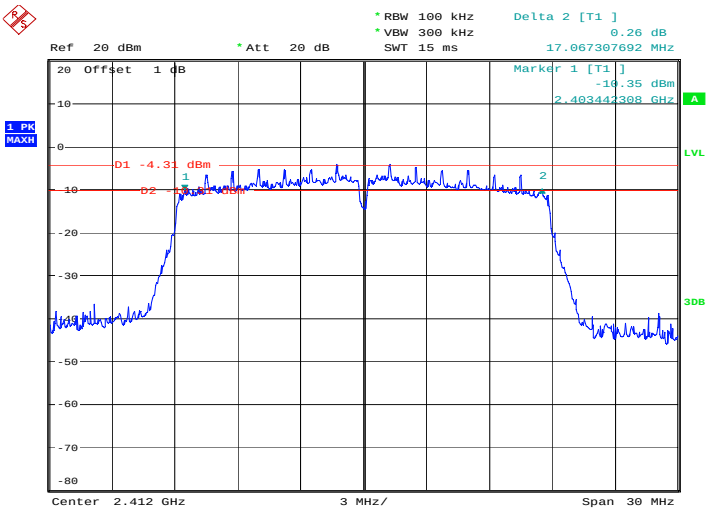
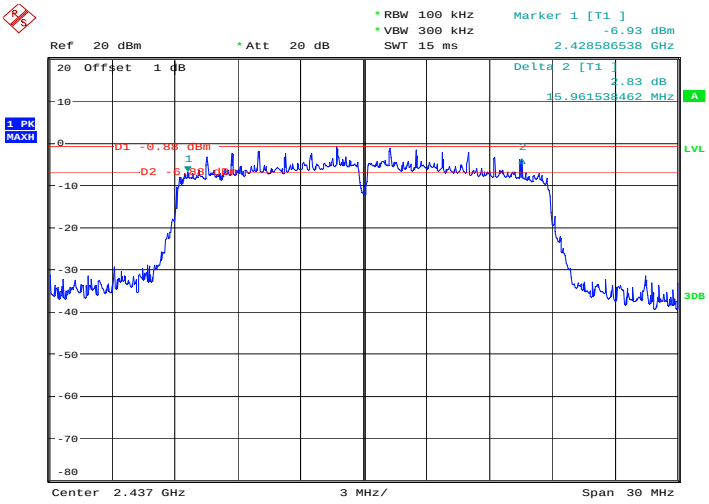
802.11n (HT20) Modulation

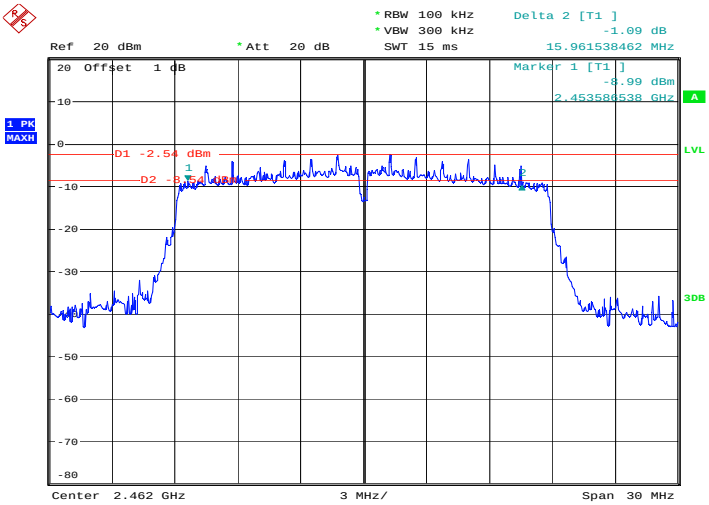
Lowest channel



Middle channel



Highest channel



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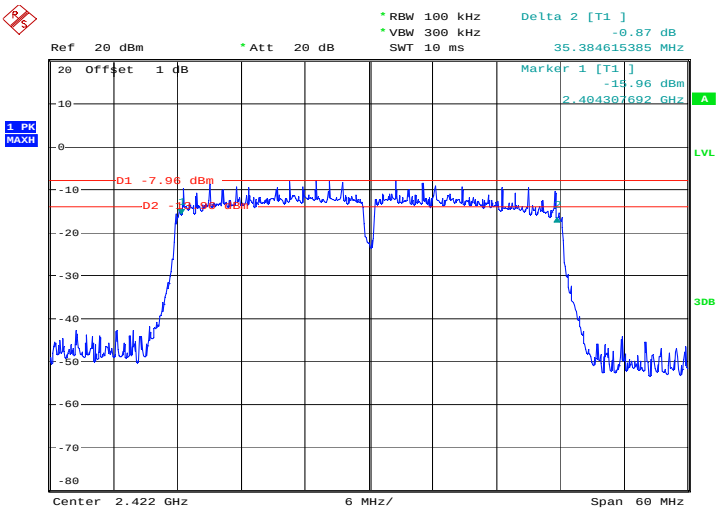
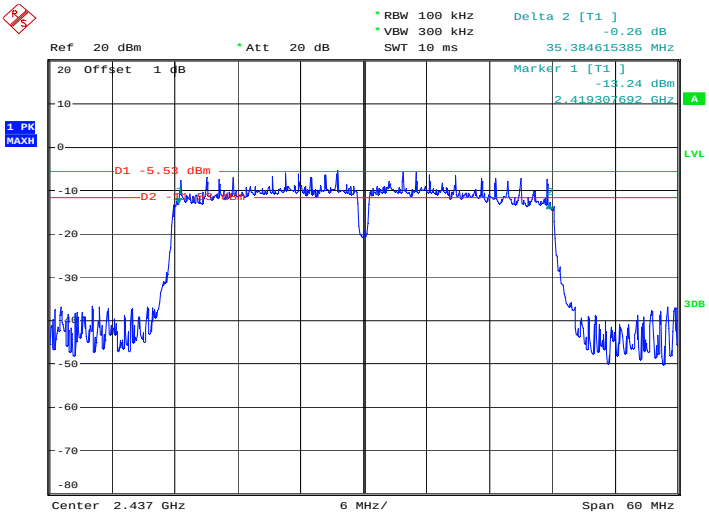
802.11n (HT40) Modulation

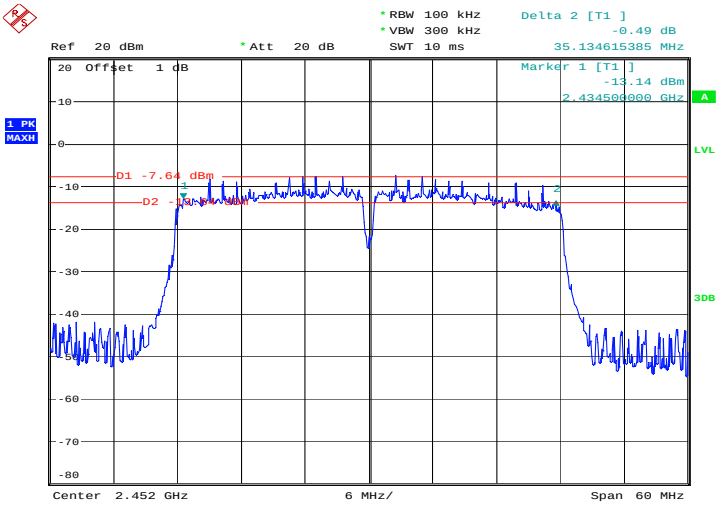
Lowest channel



Middle channel



Highest channel



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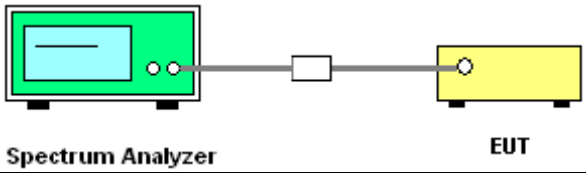
6.5. Power Spectral Density

6.6. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074
Limit:	The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.
Test Setup:	
Test Mode:	Continuous transmitting mode
Test Procedure:	1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No.558074 D01 DTS Meas. Guidance v03r03 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW) 5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level. 6. Measure and record the results in the test report.
Test Result:	PASS

6.6.1. Test Instruments

RF Test Room				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	ROHDE&SCHWARZ	FSU3	200054	Sep.16, 2015

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

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6.6.2. Test data

Test channel	Power Spectral Density (dBm/3kHz)			
	802.11b	802.11g	802.11n(H20)	802.11n(H40)
Lowest	-11.69	-17.91	-19.33	-22.89
Middle	-9.39	-13.92	-15.17	-21.27
Highest	-11.75	-15.72	-18.26	-21.86
Limit:	8dBm/3kHz			
Test Result:	PASS			

Test plots as follows:

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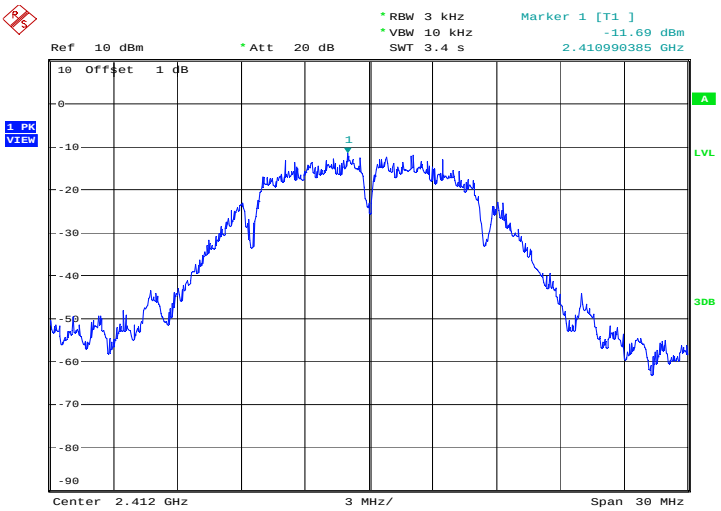
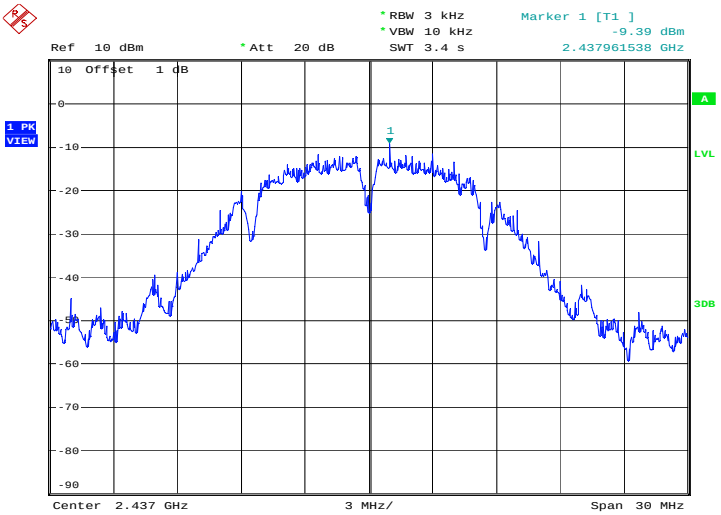
802.11b Modulation

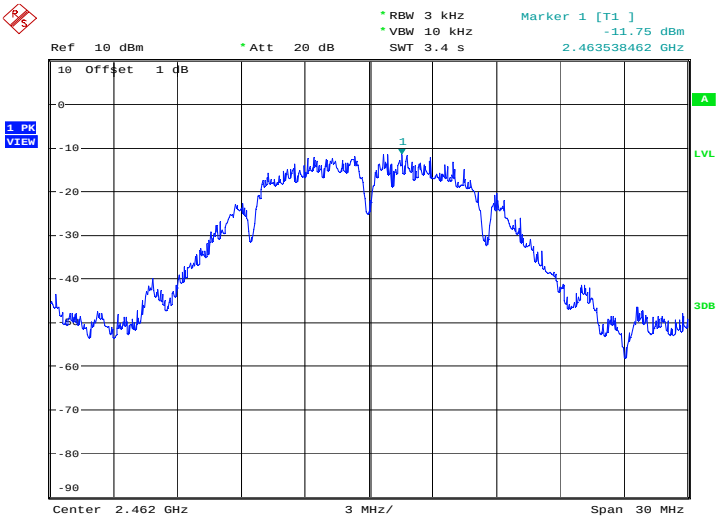
Lowest channel



Middle channel



Highest channel



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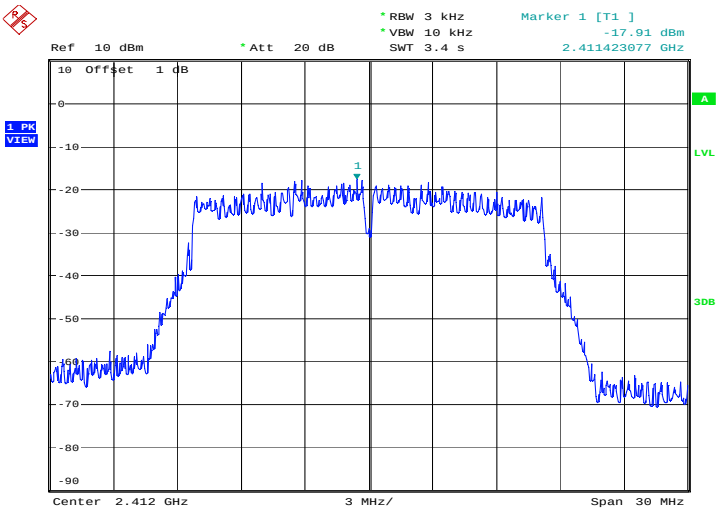
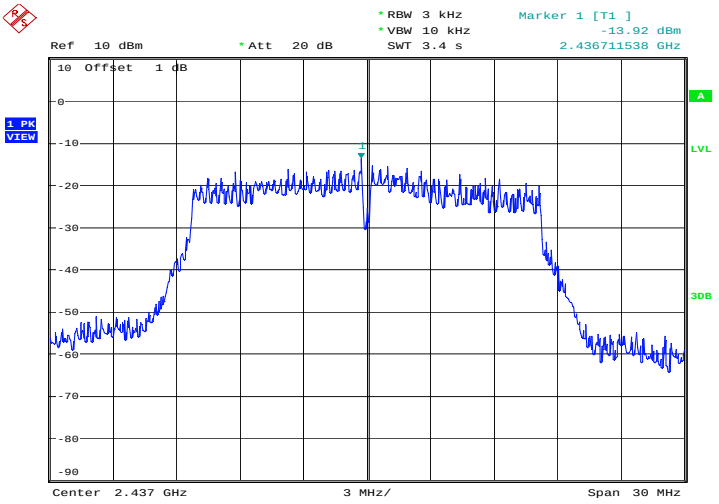
802.11g Modulation

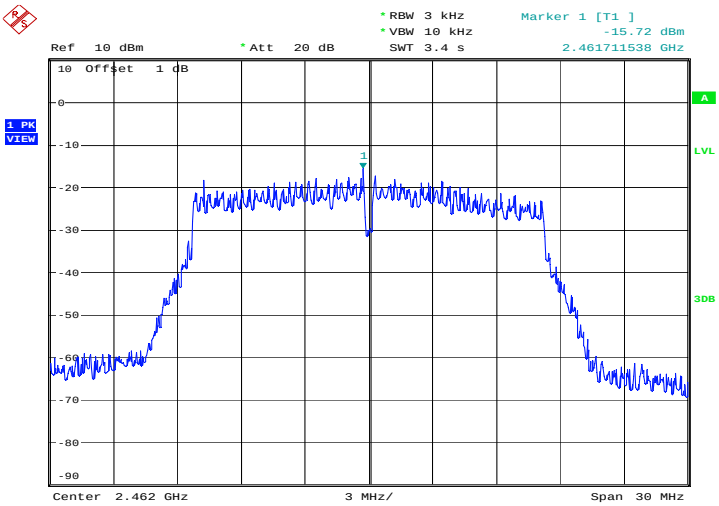
Lowest channel



Middle channel



Highest channel



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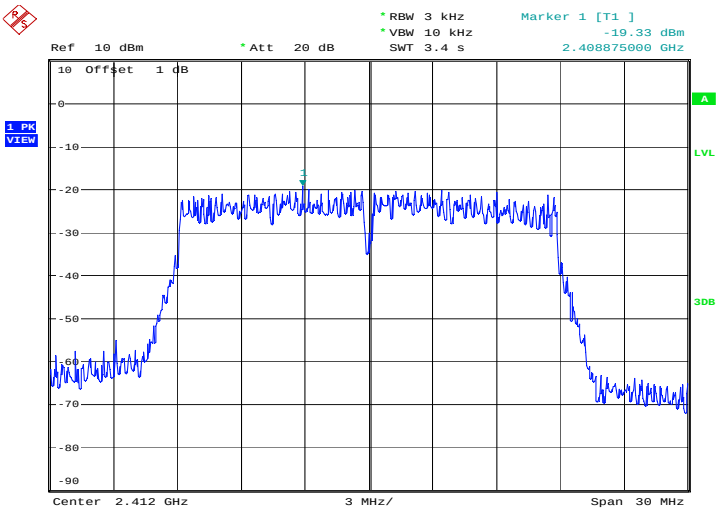
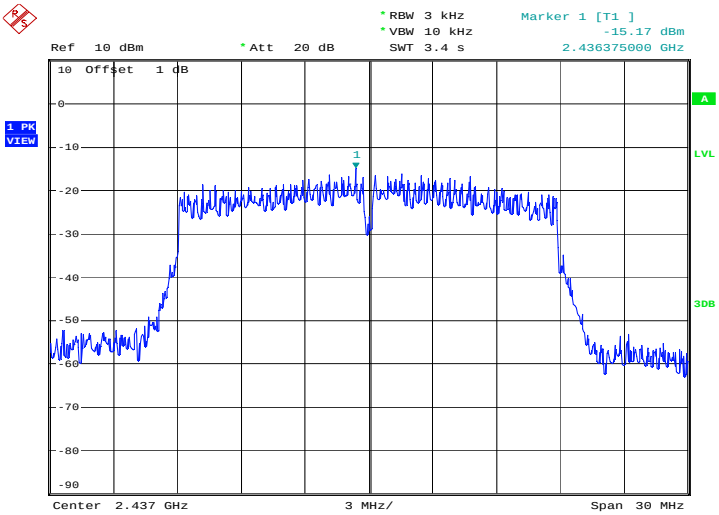
802.11n (HT20) Modulation

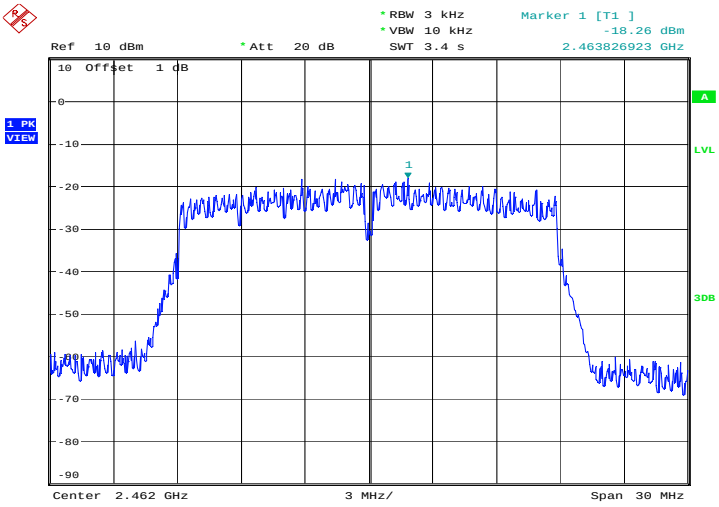
Lowest channel



Middle channel



Highest channel



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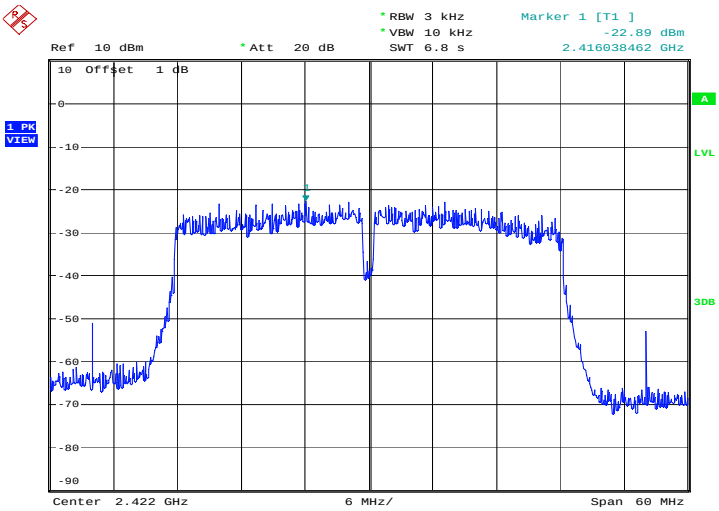
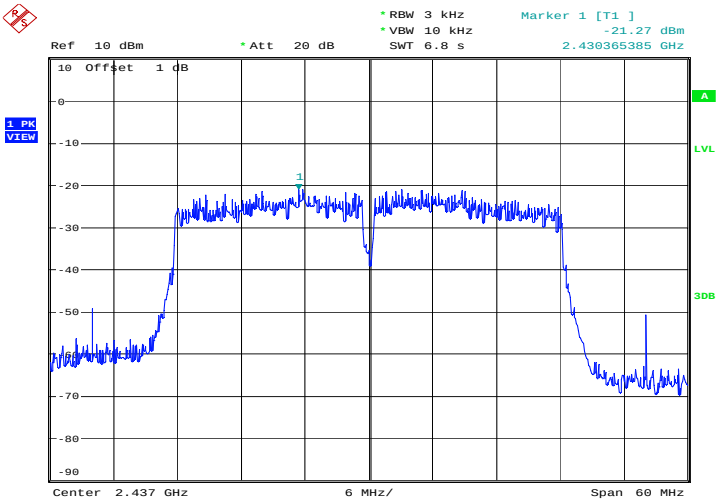
http://www.mtitest.com

802.11n (HT40) Modulation

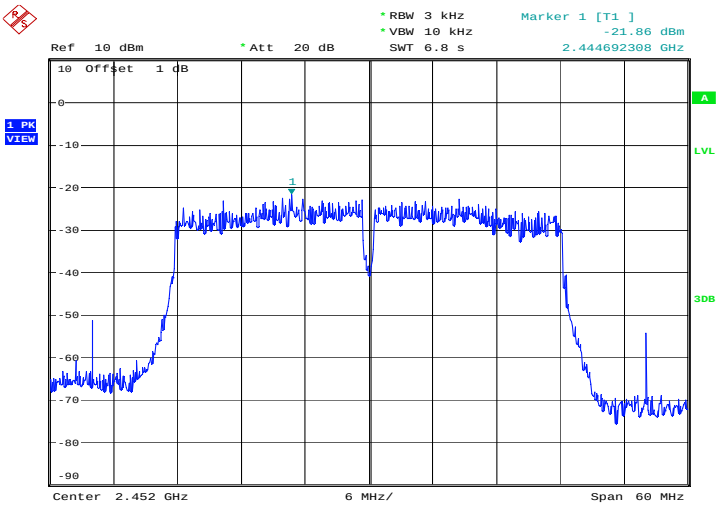
Lowest channel



Middle channel



Highest channel



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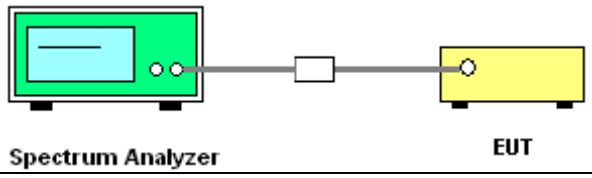
6.7. Conducted Band Edge and Spurious Emission Measurement

6.7.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074
Limit:	In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).
Test Setup:	
Test Mode:	Continuous transmitting mode
Test Procedure:	1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r03. 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d). 5. Measure and record the results in the test report. 6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
Test Result:	PASS

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6.7.2. Test Instruments

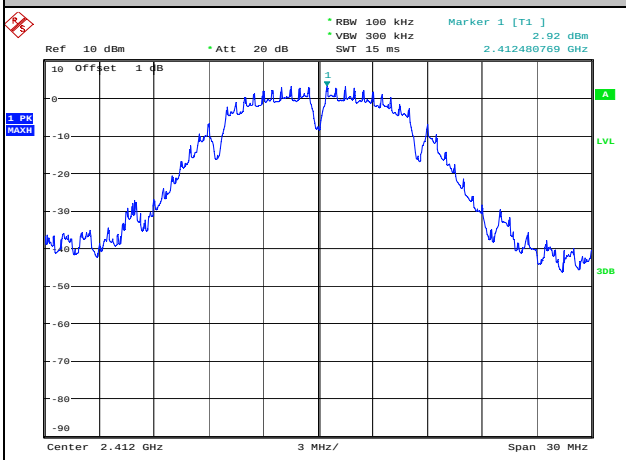
RF Test Room				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	ROHDE&SCHWARZ	FSU3	200054	Sep.16, 2015
Spectrum Analyzer	Agilent	N9020A	MY49100060	Oct. 22, 2015

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

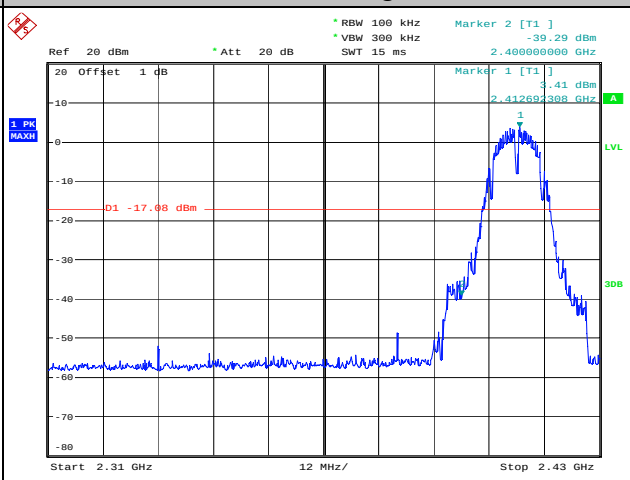
6.7.3. Test Data

802.11b Modulation

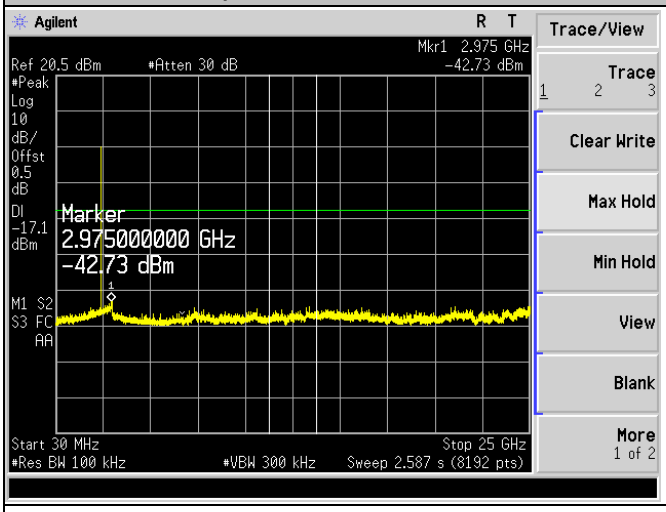
100kHz PSD reference Level



Band Edge



Spurious emission



Lowest Channel

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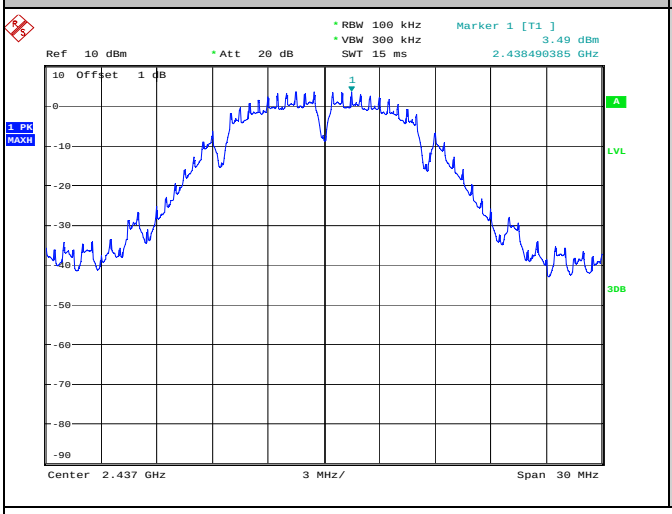
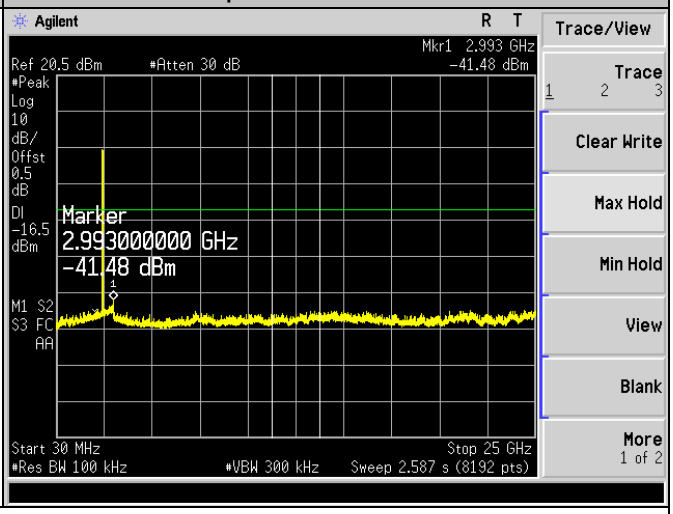
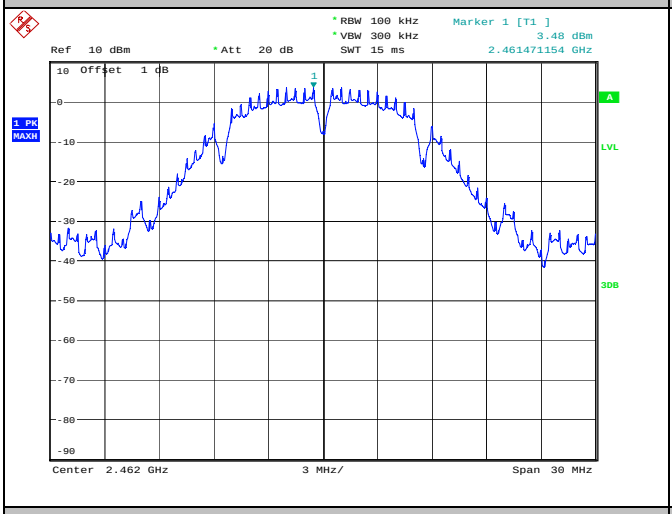
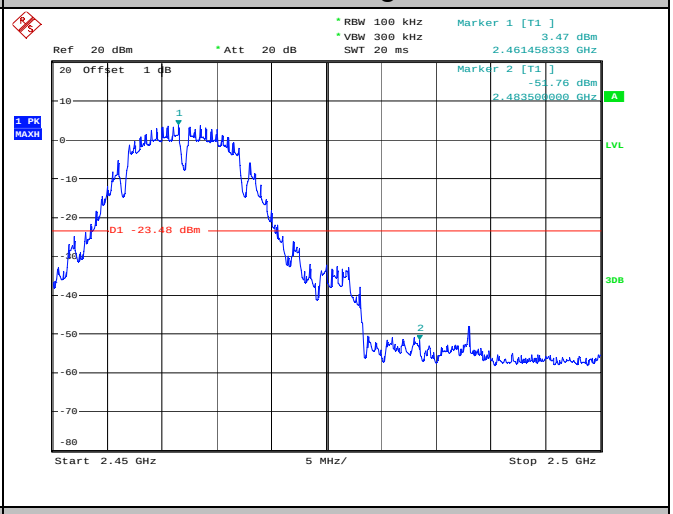
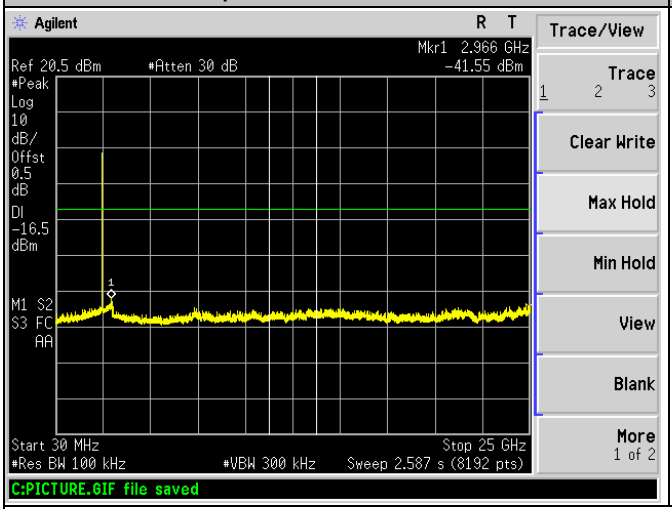
100kHz PSD reference Level	Spurious emission
	

Middle Channel

100kHz PSD reference Level	Band Edge
	

Spurious emission	
	

Highest Channel

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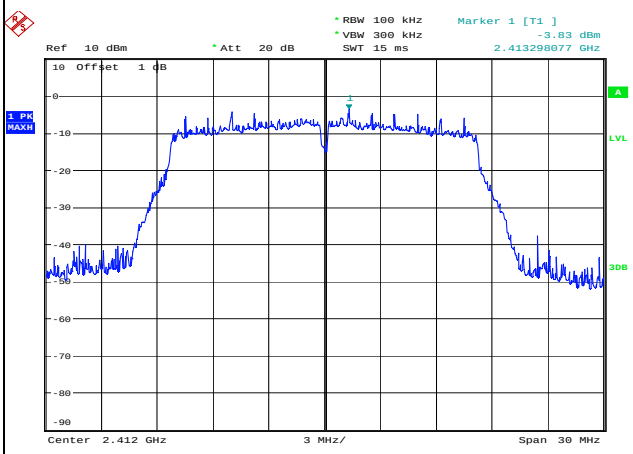
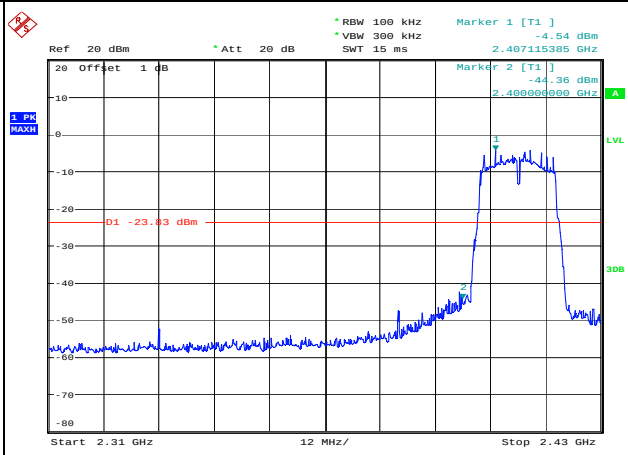
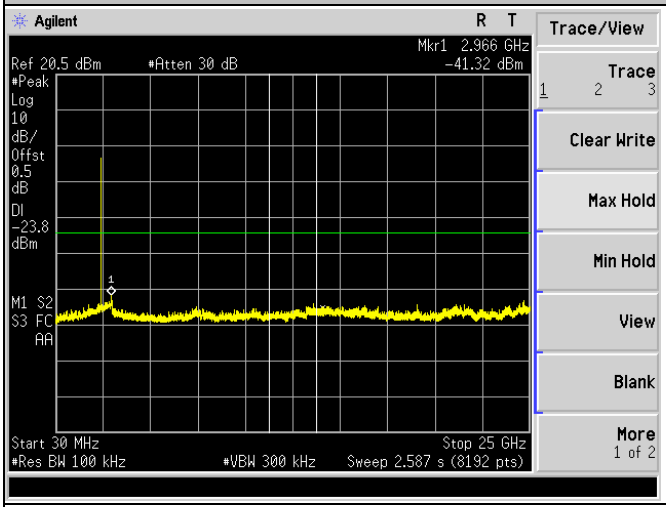
802.11g Modulation

100kHz PSD reference Level	Band Edge
	
Spurious emission	
	
Lowest Channel	

Hotline: 400-666-1678 Tel: 86-755-8885 0135 Fax: 86-755-8885 0136
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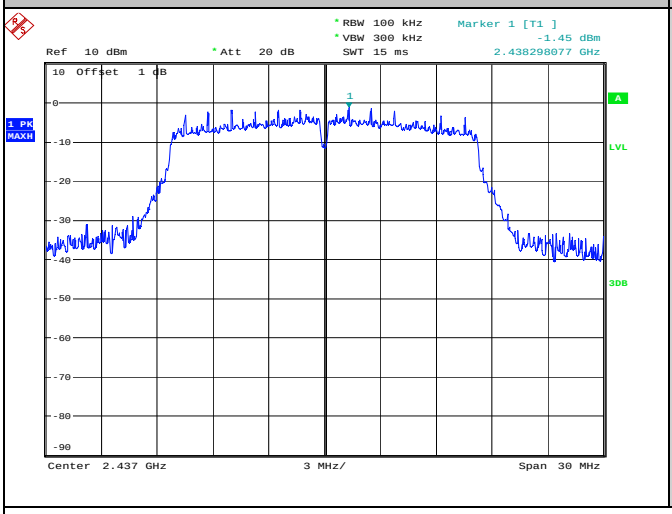
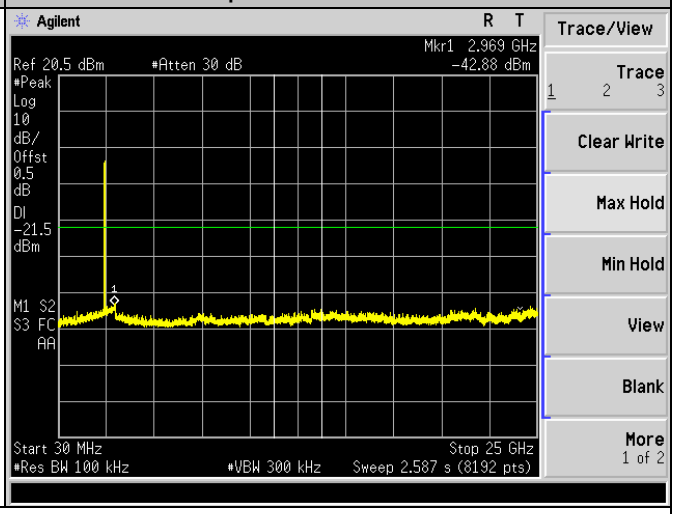
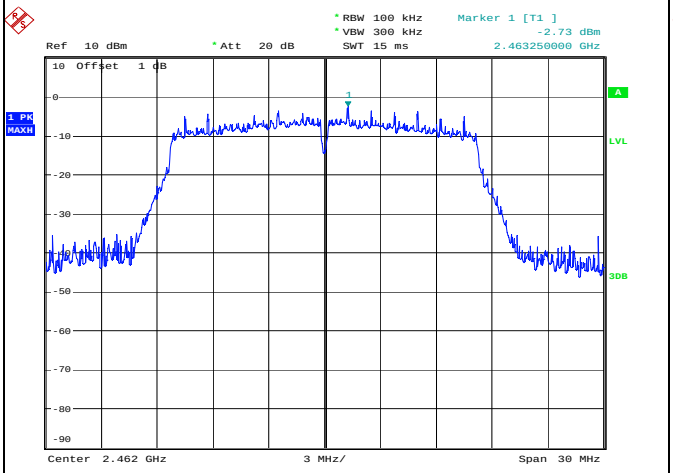
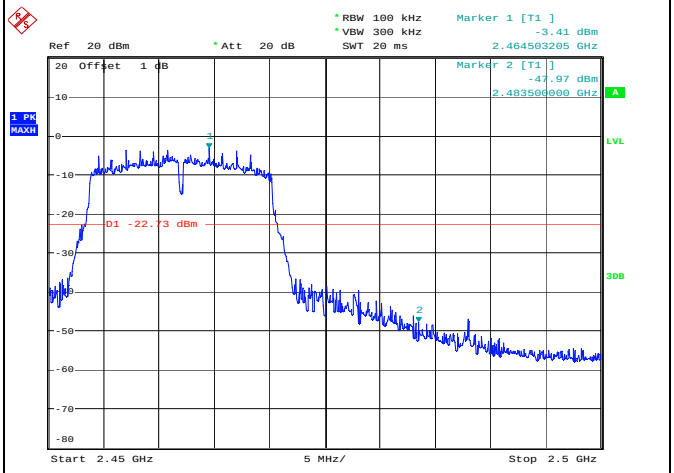
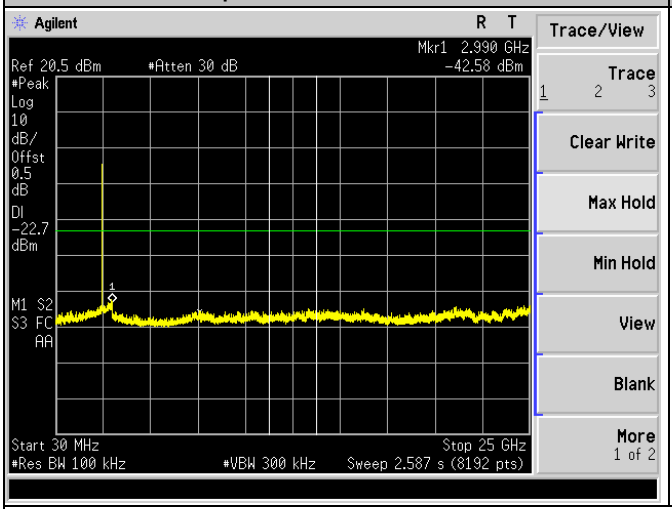
100kHz PSD reference Level	Spurious emission
	

Middle Channel

100kHz PSD reference Level	Band Edge
	

Spurious emission	
	

Highest Channel

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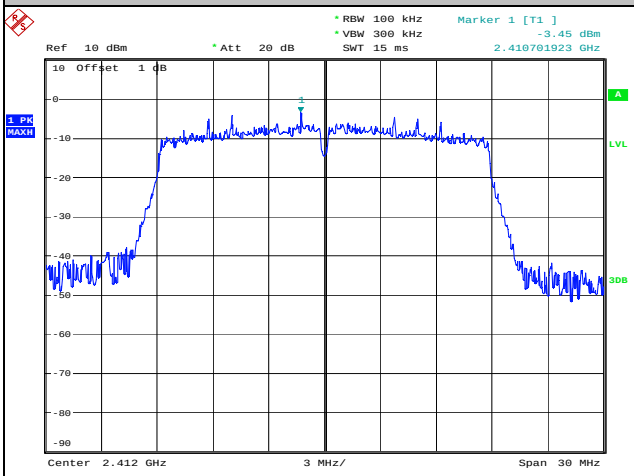
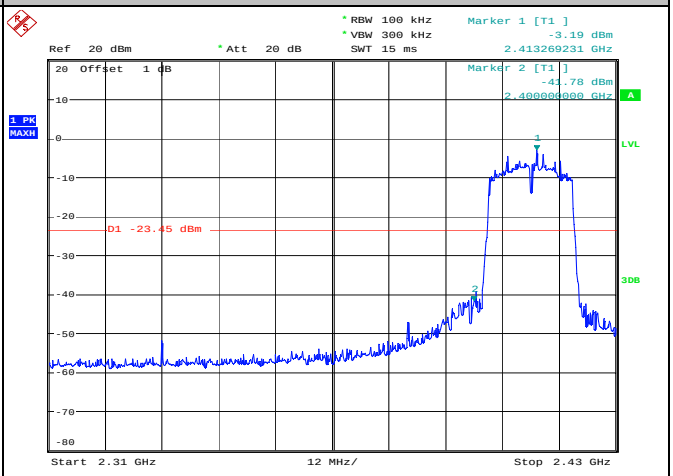
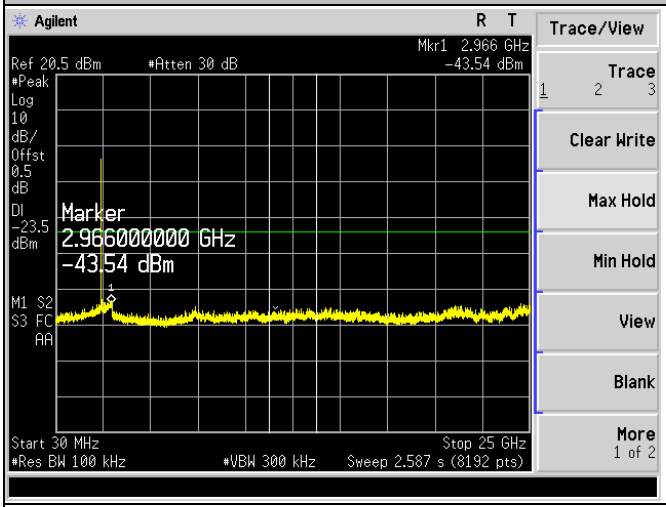
http://www.mtitest.com

802.11n (HT20) Modulation

100kHz PSD reference Level	Band Edge
	
Spurious emission	
	
Lowest Channel	

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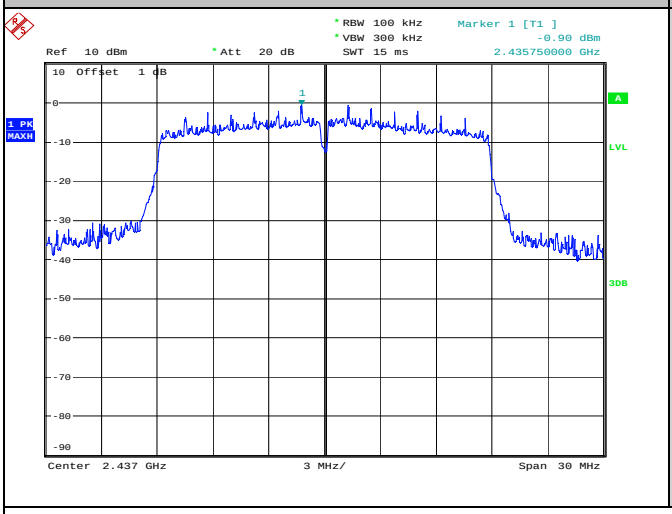
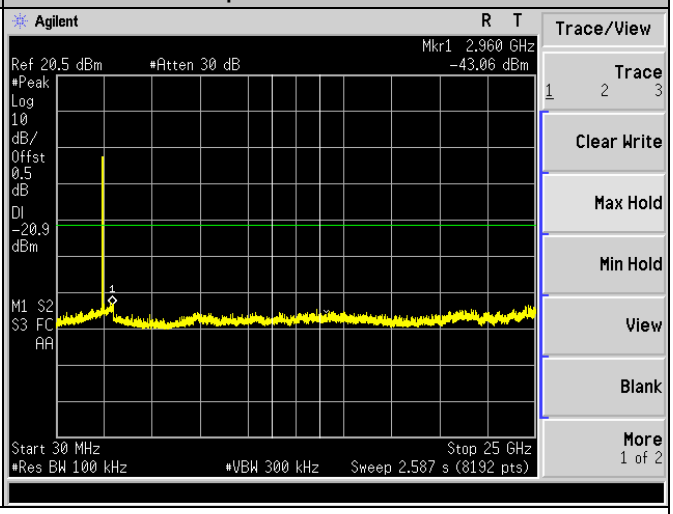
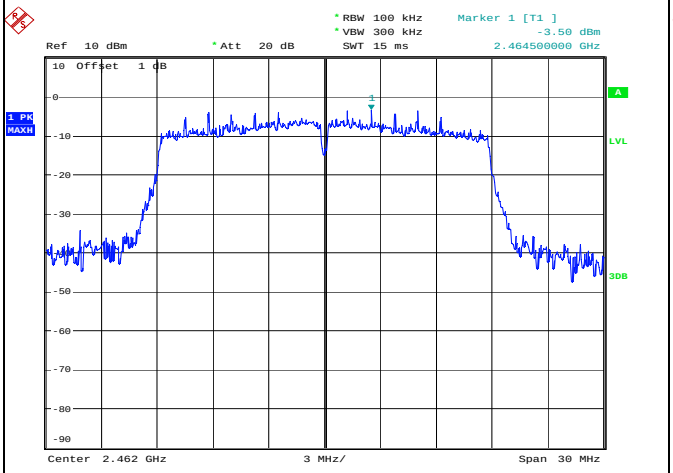
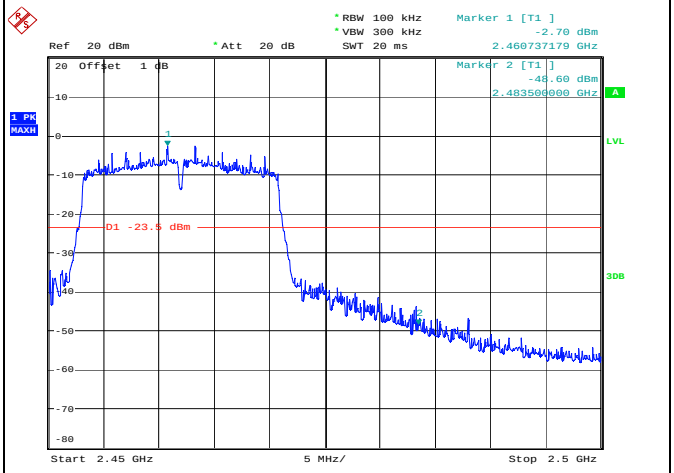
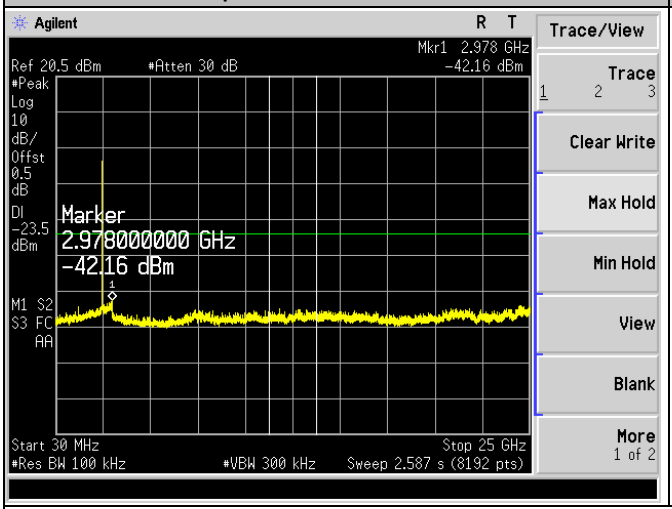
100kHz PSD reference Level	Spurious emission
	

Middle Channel

100kHz PSD reference Level	Band Edge
	

Spurious emission	
	

Highest Channel

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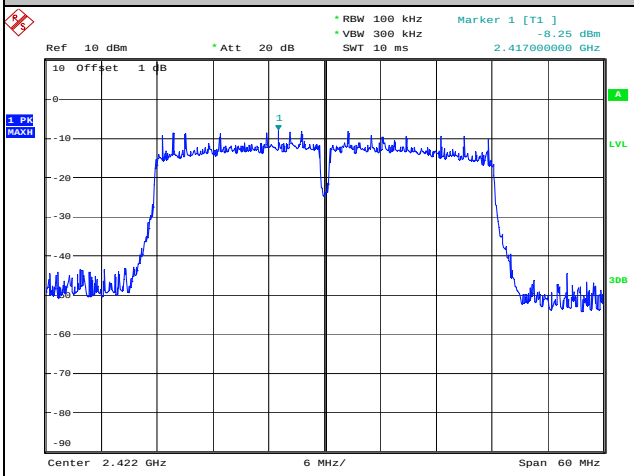
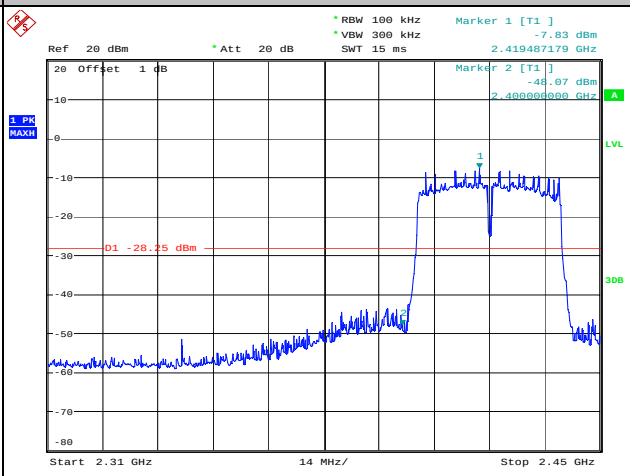
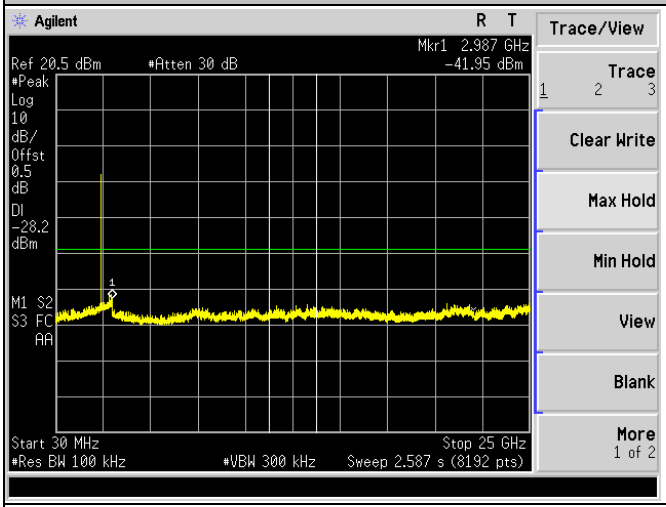
802.11n (HT40) Modulation

100kHz PSD reference Level	Band Edge
	
Spurious emission	
	

Lowest Channel

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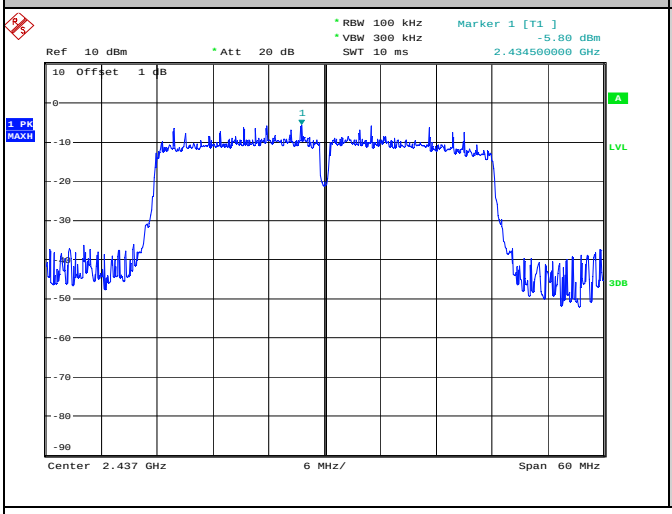
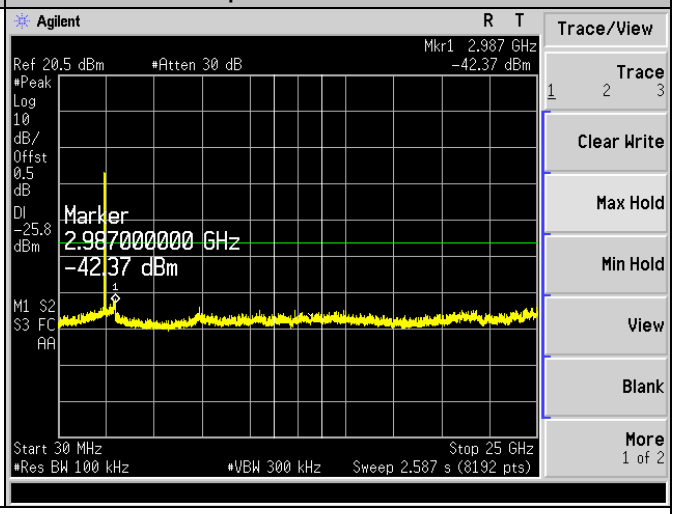
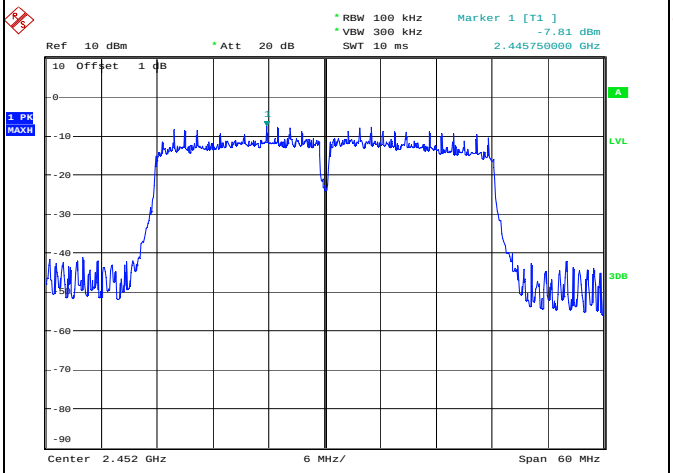
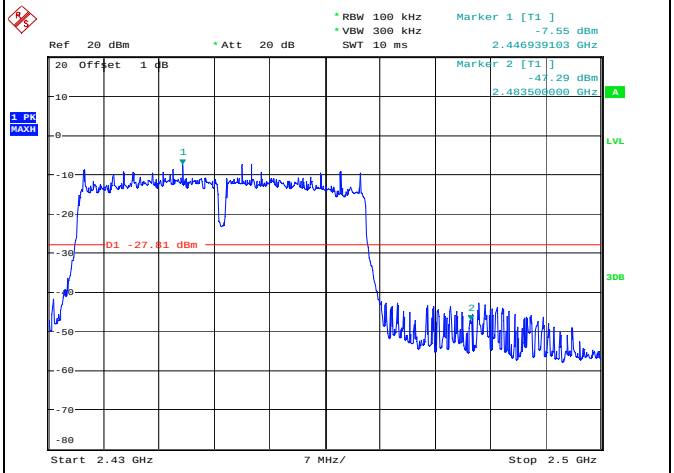
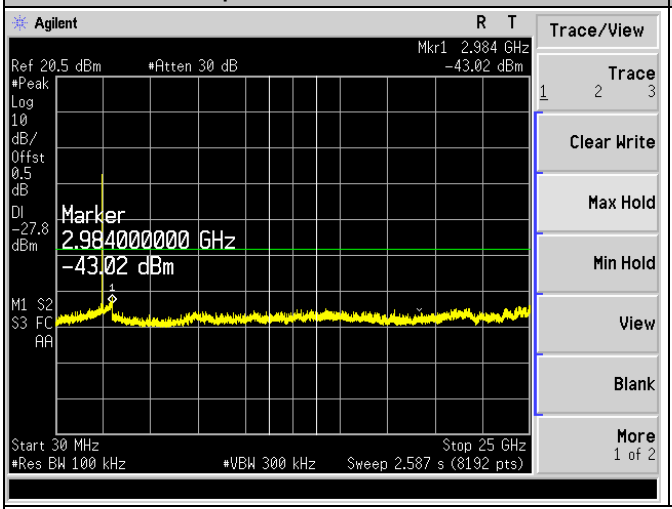
100kHz PSD reference Level	Spurious emission
	

Middle Channel

100kHz PSD reference Level	Band Edge
	

Spurious emission	
	

Highest Channel

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6.8. Radiated Spurious Emission Measurement

6.8.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209
Test Method:	ANSI C63.4: 2003
Frequency Range:	9 kHz to 25 GHz
Measurement Distance:	3 m
Antenna Polarization:	Horizontal & Vertical

Receiver Setup:

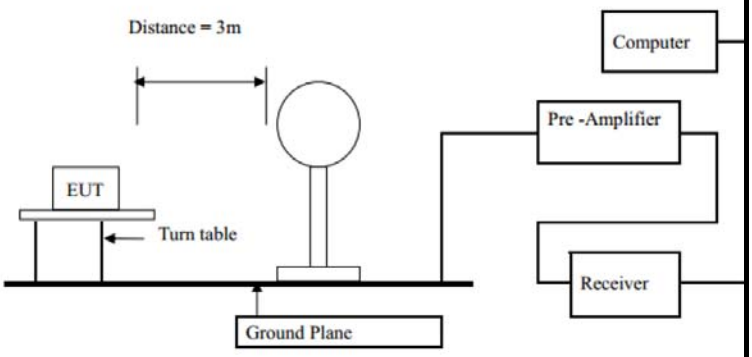
Frequency	Detector	RBW	VBW	Remark
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	Peak	1MHz	10Hz	Average Value

Limit:

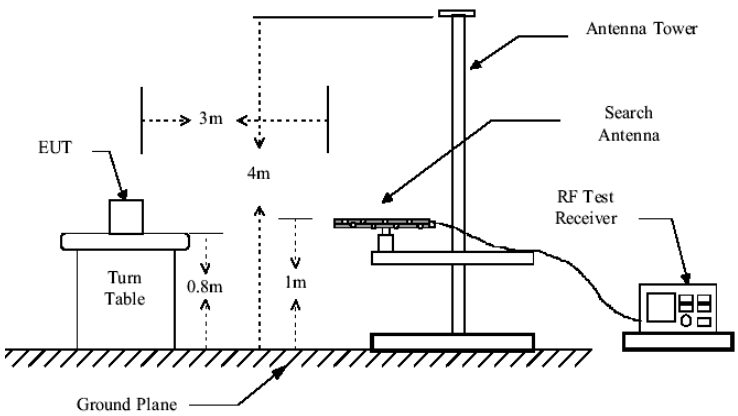
Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
	74.0	Peak Value

Test setup:

For radiated emissions below 30MHz



30MHz to 1GHz



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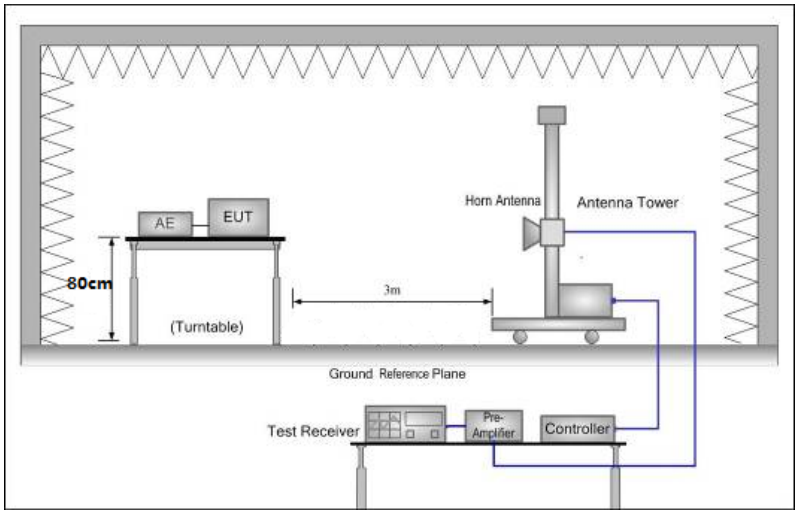
	Above 1GHz 
Test Procedure:	1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r03. 2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. 3. The EUT was placed on a turntable with 0.8 meter above ground. 4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. 5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level 6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported. 7. Use the following spectrum analyzer settings: (1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥RBW; Sweep = auto; Detector function = peak; Trace = max hold; (3) Set RBW = 1 MHz, VBW= 3MHz for f > 1 GHz for peak measurement. For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the

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	transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
Test results:	PASS

6.8.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
ESPI Test Receiver	ROHDE&SCHWARZ	ESVD	100008	Sep.16 , 2015
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	Sep.16 , 2015
Spectrum Analyzer	Agilent	N9020A	MY49100060	Oct. 21, 2015
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep.16 , 2015
Pre-amplifier	HP	8447D	2727A05017	Sep.16 , 2015
Loop antenna	ZHINAN	ZN30900A	12024	Dec.14 , 2015
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep.16 , 2015
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep.16 , 2015
Horn Antenna	Schwarzbeck	BBHA 9170	373	Sep.16 , 2015
Coax cable	TOBY	RE-low-01	N/A	Sep.15 , 2015
Coax cable	TOBY	RE-high-02	N/A	Sep.15 , 2015
Coax cable	TOBY	RE-low-03	N/A	Sep.15 , 2015
Coax cable	TOBY	RE-High-04	N/A	Sep.15 , 2015
EMI Test Software	Shurple Technology	EZ-EMC	N/A	N/A

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

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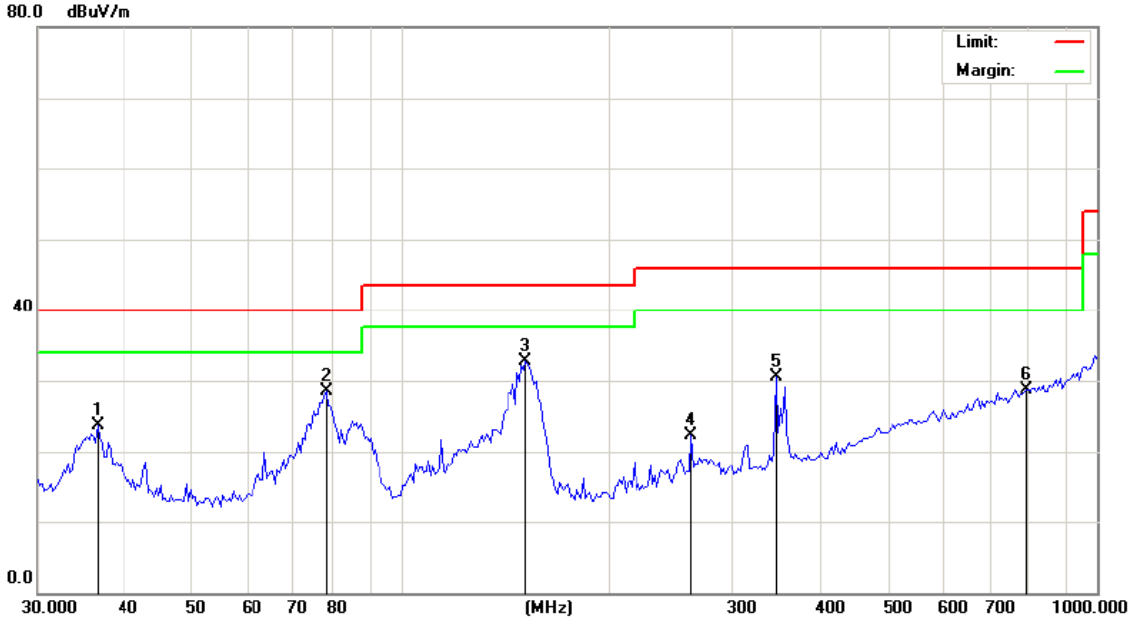
6.8.3. Test Data

Please refer to following diagram for individual

Below 1GHz

Horizontal:



Site	Polarization: ***Horizontal***	Temperature:	23℃
Limit: FCC Part 15B Class B RE_3 m	Power: AC 120V/60Hz	Humidity:	53 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		36.5236	36.65	-12.90	23.75	40.00	-16.25	peak		0	
2		78.0143	44.78	-16.37	28.41	40.00	-11.59	peak		0	
3	*	151.0252	47.72	-15.07	32.65	43.50	-10.85	peak		0	
4		261.2730	31.84	-9.57	22.27	46.00	-23.73	peak		0	
5		346.0740	37.79	-7.30	30.49	46.00	-15.51	peak		0	
6		793.0281	27.39	1.37	28.76	46.00	-17.24	peak		0	

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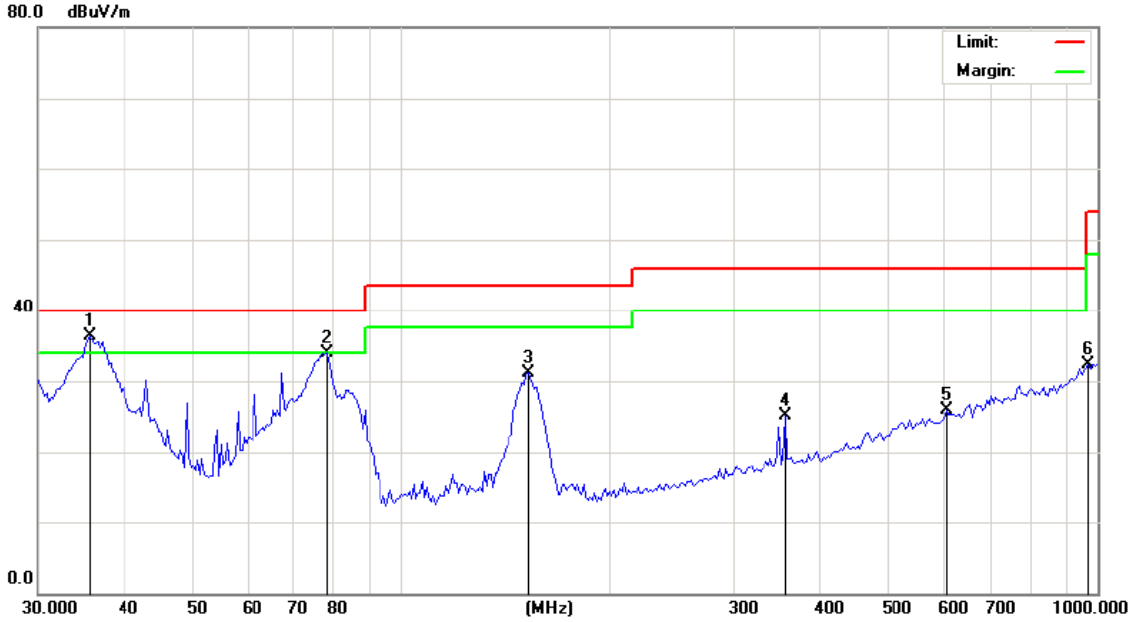
Vertical:



Site	Polarization: ***Vertical***	Temperature:	23℃
Limit: FCC Part 15B Class B RE_3 m	Power: AC 120V/60Hz	Humidity:	53 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	*	35.5112	49.31	-13.03	36.28	40.00	-3.72	peak		0	
2		78.0143	50.24	-16.37	33.87	40.00	-6.13	peak		0	
3		152.0902	46.12	-15.00	31.12	43.50	-12.38	peak		0	
4		355.9397	32.28	-7.10	25.18	46.00	-20.82	peak		0	
5		607.1806	27.64	-1.78	25.86	46.00	-20.14	peak		0	
6		972.2827	27.25	5.12	32.37	54.00	-21.63	peak		0	

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Test Result of Radiated Spurious at Band edges

Modulation Type: 802.11b

Low channel: 2412 MHz						
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	Correction Factor (dB/m)	Peak Final Emission Level	Peak limit (dBμV/m)	AV limit (dBμV/m)
2310	H	48.52	-4.20	44.32	74.00	54.00
2387.50	H	50.26	-4.10	46.16	74.00	54.00
2390	H	52.41	-3.94	48.47	74.00	54.00
2310	V	49.18	-4.20	44.98	74.00	54.00
2387.50	V	51.32	-4.10	47.22	74.00	54.00
2390	V	51.78	-3.94	47.84	74.00	54.00

Modulation Type: 802.11b

Low channel: 2462 MHz						
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	Correction Factor (dB/m)	Peak Final Emission Level	Peak limit (dBμV/m)	AV limit (dBμV/m)
2483.5	H	49.78	-3.60	46.18	74.00	54.00
2486.58	H	53.99	-3.50	50.49	74.00	54.00
2500	H	51.59	-3.34	48.25	74.00	54.00
2483.5	V	46.65	-3.60	43.05	74.00	54.00
2489.36	V	47.49	-3.46	44.03	74.00	54.00
2500	V	51.32	-3.34	47.98	74.00	54.00

Modulation Type: 802.11g

Low channel: 2412 MHz						
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	Correction Factor (dB/m)	Peak Final Emission Level	Peak limit (dBμV/m)	AV limit (dBμV/m)
2310	H	47.63	-4.20	43.43	74.00	54.00
2389.98	H	50.12	-4.12	46.00	74.00	54.00
2390	H	51.35	-3.94	47.41	74.00	54.00
2310	V	48.23	-4.20	44.03	74.00	54.00
2386.72	V	52.10	-4.32	47.78	74.00	54.00
2390	V	50.38	-3.94	46.44	74.00	54.00

Modulation Type: 802.11g

Low channel: 2462 MHz						
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	Correction Factor (dB/m)	Peak Final Emission Level	Peak limit (dBμV/m)	AV limit (dBμV/m)
2483.5	H	48.65	-3.60	45.05	74.00	54.00
2487.46	H	52.58	-3.52	49.06	74.00	54.00
2500	H	51.39	-3.34	48.05	74.00	54.00
2483. 5	V	48.93	-3.60	45.33	74.00	54.00
2489.36	V	48.39	-3.45	44.94	74.00	54.00
2500	V	50.32	-3.34	46.98	74.00	54.00

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Modulation Type: 802.11n(20MHz)

Low channel: 2412 MHz						
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	Correction Factor (dB/m)	Peak Final Emission Level	Peak limit (dBμV/m)	AV limit (dBμV/m)
2310	H	47.63	-4.20	43.43	74.00	54.00
2388.01	H	48.59	-4.10	44.49	74.00	54.00
2390	H	52.49	-3.94	48.55	74.00	54.00
2310	V	48.63	-4.20	44.43	74.00	54.00
2388.01	V	48.55	-4.10	44.45	74.00	54.00
2390	V	51.26	-3.94	47.32	74.00	54.00

Modulation Type: 802.11n(20MHz)

Low channel: 2462 MHz						
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	Correction Factor (dB/m)	Peak Final Emission Level	Peak limit (dBμV/m)	AV limit (dBμV/m)
2483.5	H	49.43	-3.60	45.83	74.00	54.00
2493.51	H	51.62	-3.50	48.12	74.00	54.00
2500	H	50.35	-3.34	47.01	74.00	54.00
2493. 51	V	47.69	-3.60	44.09	74.00	54.00
2489.36	V	49.59	-3.46	46.13	74.00	54.00
2500	V	50.16	-3.34	46.82	74.00	54.00

Modulation Type: 802.11n(40MHz)

Low channel: 2422 MHz						
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	Correction Factor (dB/m)	Peak Final Emission Level	Peak limit (dBμV/m)	AV limit (dBμV/m)
2310	H	49.52	-4.20	45.32	74.00	54.00
2389.98	H	51.38	-4.10	47.28	74.00	54.00
2390	H	52.55	-3.94	48.61	74.00	54.00
2310	V	50.95	-4.20	46.75	74.00	54.00
2389.98	V	52.92	-4.10	48.82	74.00	54.00
2390	V	53.89	-3.94	49.95	74.00	54.00

Modulation Type: 802.11n(40MHz)

Low channel: 2452 MHz						
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	Correction Factor (dB/m)	Peak Final Emission Level	Peak limit (dBμV/m)	AV limit (dBμV/m)
2483.5	H	50.95	-3.60	47.35	74.00	54.00
2493.51	H	52.83	-3.50	49.33	74.00	54.00
2500	H	51.85	-3.34	48.51	74.00	54.00
2493.51	V	55.79	-3.60	52.19	74.00	54.00
2489.36	V	54.62	-3.46	51.16	74.00	54.00
2500	V	52.45	-3.34	49.11	74.00	54.00

Note:

1. *Peak Final Emission Level=Peak Reading + Correction Factor;*
2. *Correction Factor= Antenna Factor + Cable loss – Pre-amplifier*

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Test Result of Radiated Spurious Emission above 1GHz (1GHz~10th Harmonic)

Modulation Type: 802.11b

Low channel: 2412 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4824.00	H	46.20	---	-3.94	42.26	---	74.00	54.00	-11.74
7236.00	H	45.00	---	0.52	45.52	---	74.00	54.00	-8.48
---	---	---	---	---	---	---	---	---	---
4824.00	V	48.42	---	-3.94	44.48	---	74.00	54.00	-9.52
7236.00	V	45.47	---	0.52	45.99	---	74.00	54.00	-8.01
---	---	---	---	---	---	---	---	---	---

Middle channel: 2437MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4874.00	H	48.17	---	-3.98	44.19	---	74.00	54.00	-9.81
7311.00	H	45.61	---	0.57	46.18	---	74.00	54.00	-7.82
---	---	---	---	---	---	---	---	---	---
---	H	---	---	---	---	---	---	---	---
---	H	---	---	---	---	---	---	---	---
4874.00	V	49.07	---	-3.98	45.09	---	74.00	54.00	-8.91
7311.00	V	47.55	---	0.57	48.12	---	74.00	54.00	-5.88
---	V	---	---	---	---	---	---	---	---
---	V	---	---	---	---	---	---	---	---
---	---	---	---	---	---	----	---	---	---

High channel: 2462 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4924.00	H	50.76	---	-3.98	46.78	---	74.00	54.00	-7.22
7386.00	H	47.42	---	0.57	47.99	---	74.00	54.00	-6.01
---	---	---	---	---	---	---	---	---	---
4924.00	V	50.97	---	-3.98	46.99	---	74.00	54.00	-7.01
7386.00	V	46.29	---	0.57	46.86	---	74.00	54.00	-7.14
---	---	---	---	---	---	---	---	---	---

Note:

1. *Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier*
2. *Margin (dB) = Emission Level (Peak) (dBμV/m)-Average limit (dBμV/m)*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.*
5. *Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.*

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Modulation Type: 802.11g

Low channel: 2412 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4824.00	H	51.32	---	-3.94	47.38	---	74.00	54.00	-6.62
7236.00	H	49.64	---	0.52	50.16	---	74.00	54.00	-3.84
---	---	---	---	---	---	---	---	---	---
4824.00	V	50.78	---	-3.94	46.84	---	74.00	54.00	-7.16
7236.00	V	44.32	---	0.52	44.84	---	74.00	54.00	-9.16
---	---	---	---	---	---	---	---	---	---

Middle channel: 2437MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4874.00	H	51.45	---	-3.98	47.47	---	74.00	54.00	-6.53
7311.00	H	44.78	---	0.57	45.35	---	74.00	54.00	-8.65
---	---	---	---	---	---	---	---	---	---
---	H	---	---	---	---	---	---	---	---
---	H	---	---	---	---	---	---	---	---
4874.00	V	51.63	---	-3.98	47.65	---	74.00	54.00	-6.35
7311.00	V	48.21	---	0.57	48.78	---	74.00	54.00	-5.22
---	V	---	---	---	---	---	---	---	---
---	V	---	---	---	---	---	---	---	---
---	---	---	---	---	---	----	---	---	---

High channel: 2462 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4924.00	H	51.56	---	-3.98	47.58	---	74.00	54.00	-6.42
7386.00	H	45.72	---	0.57	46.29	---	74.00	54.00	-7.71
---	---	---	---	---	---	---	---	---	---
4924.00	V	50.72	---	-3.98	46.74	---	74.00	54.00	-7.26
7386.00	V	45.32	---	0.57	45.89	---	74.00	54.00	-8.11
---	---	---	---	---	---	---	---	---	---

Note:

1. *Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier*
2. *Margin (dB) = Emission Level (Peak) (dBμV/m)-Average limit (dBμV/m)*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.*
5. *Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.*

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Modulation Type: 802.11n (HT20)

Low channel: 2412 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4824.00	H	48.52	---	-3.94	44.58	---	74.00	54.00	-9.42
7236.00	H	46.46	---	0.52	46.98	---	74.00	54.00	-7.02
---	---	---	---	---	---	---	---	---	---
4824.00	V	49.59	---	-3.94	45.65	---	74.00	54.00	-8.35
7236.00	V	45.50	---	0.52	46.02	---	74.00	54.00	-7.98
---	---	---	---	---	---	---	---	---	---

Middle channel: 2437MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4874.00	H	49.70	---	-3.98	45.72	---	74.00	54.00	-8.28
7311.00	H	45.88	---	0.57	46.45	---	74.00	54.00	-7.55
---	---	---	---	---	---	---	---	---	---
---	H	---	---	---	---	---	---	---	---
---	H	---	---	---	---	---	---	---	---
4874.00	V	50.82	---	-3.98	46.84	---	74.00	54.00	-7.16
7311.00	V	46.06	---	0.57	46.63	---	74.00	54.00	-7.37
---	V	---	---	---	---	---	---	---	---
---	V	---	---	---	---	---	---	---	---
---	---	---	---	---	---	----	---	---	---

High channel: 2462 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4924.00	H	51.34	---	-3.98	47.36	---	74.00	54.00	-6.64
7386.00	H	46.53	---	0.57	47.1	---	74.00	54.00	-6.90
---	---	---	---	---	---	---	---	---	---
4924.00	V	50.97	---	-3.98	46.99	---	74.00	54.00	-7.01
7386.00	V	46.29	---	0.57	46.86	---	74.00	54.00	-7.14
---	---	---	---	---	---	---	---	---	---

Note:

1. *Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier*
2. *Margin (dB) = Emission Level (Peak) (dBμV/m)-Average limit (dBμV/m)*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.*
5. *Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.*

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Modulation Type: 802.11n (HT40)

Low channel: 2422 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBuV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4844.00	H	50.06	---	-3.94	46.12	---	74.00	54.00	-7.88
7266.00	H	45.37	---	0.52	45.89	---	74.00	54.00	-8.11
---	H	---	---	---	---	---	---	---	---
4844.00	V	50.34	---	-3.94	46.40	---	74.00	54.00	-7.60
7266.00	V	45.65	---	0.52	46.17	---	74.00	54.00	-7.83
---	V	---	---	---	---	---	---	---	---

Middle channel: 2437MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4874.00	H	50.29	---	-3.98	46.31	---	74.00	54.00	-7.69
7311.00	H	45.97	---	0.57	46.54	---	74.00	54.00	-7.46
---	---	---	---	---	---	---	---	---	---
---	H	---	---	---	---	---	---	---	---
---	H	---	---	---	---	---	---	---	---
4874.00	V	49.09	---	-3.98	45.11	---	74.00	54.00	-8.89
7311.00	V	44.01	---	0.57	44.58	---	74.00	54.00	-9.42
---	V	---	---	---	---	---	---	---	---
---	V	---	---	---	---	---	---	---	---
---	---	---	---	---	---	----	---	---	---

High channel: 2452 MHz									
Frequency (MHz)	Ant. Pol. H/V	Peak reading (dBμV)	AV reading (dBμV)	Correction Factor (dB/m)	Emission Level		Peak limit (dBμV/m)	AV limit (dBμV/m)	Margin (dB)
					Peak (dBμV/m)	AV (dBμV/m)			
4904.00	H	50.22	---	-3.98	46.24	---	74.00	54.00	-7.76
7356.00	H	45.19	---	0.57	45.76	---	74.00	54.00	-8.24
---	H	---	---	---	---	---	---	---	---
4904.00	V	49.92	---	-3.98	45.94	---	74.00	54.00	-8.06
7356.00	V	44.68	---	0.57	45.25	---	74.00	54.00	-8.75
---	V	---	---	---	---	---	---	---	---

Note:

1. *Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier*
2. *Margin (dB) = Emission Level (Peak) (dBμV/m)-Average limit (dBμV/m)*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
4. *Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.*
5. *Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.*

********END OF REPORT********

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