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Shenzhen Branch**

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Report No.: SZEM180600544501
Page: 1 of 42

TEST REPORT

Application No.: SZEM1806005445CR
Applicant: CAPSTONE INDUSTRIES INC
Address of Applicant: SUITE 120, 350 JIM MORAN BLVD, DEERFIELD BEACH, FL 33442, USA
Manufacturer: Minwa Electronics Co., Ltd
Address of Manufacturer: 22 Floor, Far East Finance Centre, 16 Harcourt Road, Admiralty, Hong Kong
Factory: Minwa China (Huizhou) Electronics Co., Ltd
Address of Factory: Huizhou Industrial Park, Minwa(Dalian)Industrial Park, Ruhu Town, Huicheng, Huizhou, 516169 Guangdong, China

Equipment Under Test (EUT):

EUT Name: smart switch
Model No.: IPCO
Trade mark: capstone
FCC ID: 2ACN4IPCO
Standard(s) : 47 CFR Part 15, Subpart C 15.247
(only for Conducted Peak Output Power and Radiated Spurious Emissions)
Date of Receipt: 2018-06-23
Date of Test: 2018-06-25
Date of Issue: 2018-06-27

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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<i>Revision Record</i>				
<i>Version</i>	<i>Chapter</i>	<i>Date</i>	<i>Modifier</i>	<i>Remark</i>
01		2018-06-27		Original

Authorized for issue by:			
			
	<hr/>		
	Bill Chen /Project Engineer		
			
	<hr/>		
	Eric Fu /Reviewer		

2 Test Summary

Radio Spectrum Matter Part				
Item	Standard	Method	Requirement	Result
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass

Remark for SZEM161000867901:

Original model No. in report SZEM161100946801: MW WFAS01EL

The model MW WFAS01EL was only tested in report SZEM161100946801

New model No. in report SZEM161000867901: IPCO

This report was an additional report copied from the report SZEM161100946801, just changed the information of applicant, changed the model No.. Since the electrical circuit design, layout, components used and internal wiring for the model in the report ZEM161100946801 was exactly the same as the model in this report, with only difference on model name.

Remark for SZEM180600544501:

Model No.: IPCO

This test report (Ref. No.: SZEM180600544501) is only valid with the original test report (Ref. No.: SZEM1610000867901).

Compared with the original report, this report just changed the address of applicant and manufacturer.

Considering to the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report for fully retest.

Therefore in this report Conducted Peak Output Power and Radiated Spurious Emissions were fully retested on model IPCO and shown the data in this report, other tests data please refer to original report SZEM1610000867901.



3 Contents

	Page
1 COVER PAGE	1
2 TEST SUMMARY	3
3 CONTENTS	4
4 GENERAL INFORMATION	5
4.1 DETAILS OF E.U.T.	5
4.2 DESCRIPTION OF SUPPORT UNITS	6
4.3 MEASUREMENT UNCERTAINTY	6
4.4 TEST LOCATION.....	7
4.5 TEST FACILITY.....	7
4.6 DEVIATION FROM STANDARDS.....	7
4.7 ABNORMALITIES FROM STANDARD CONDITIONS	7
5 EQUIPMENT LIST	8
6 RADIO SPECTRUM MATTER TEST RESULTS	10
6.1 CONDUCTED PEAK OUTPUT POWER.....	10
6.1.1 <i>E.U.T. Operation</i>	11
6.1.2 <i>Test Setup Diagram</i>	11
6.1.3 <i>Measurement Procedure and Data</i>	11
6.2 RADIATED SPURIOUS EMISSIONS	12
6.2.1 <i>E.U.T. Operation</i>	13
6.2.2 <i>Test Setup Diagram</i>	13
6.2.3 <i>Measurement Procedure and Data</i>	14
7 PHOTOGRAPHS	35
7.1 RADIATED SPURIOUS EMISSIONS TEST SETUP	35
7.2 EUT CONSTRUCTIONAL DETAILS (EUT PHOTOS).....	36
8 APPENDIX	37
8.1 APPENDIX 15.247	37-42



4 General Information

4.1 Details of E.U.T.

Power supply:	AC120V 60Hz
Operation Frequency	802.11b/g/n(HT20): 2412MHz to 2462MHz
Number of Channels	802.11b/g/n(HT20):11
Modulation Type	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Channel Spacing	5MHz
Antenna Type	Integra
Antenna Gain	0.5dBi

Operation Frequency each of channel(802.11b/g/n HT20)							
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		

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:

For 802.11b/g/n (HT20):

Channel	Frequency
The Lowest channel	2412MHz
The Middle channel	2437MHz
The Highest channel	2462MHz

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 7.25 \times 10^{-8}$
2	Duty cycle	$\pm 0.37\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF conducted power	$\pm 0.75\text{dB}$
5	RF power density	$\pm 2.84\text{dB}$
6	Conducted Spurious emissions	$\pm 0.75\text{dB}$
7	RF Radiated power	$\pm 4.5\text{dB}$ (below 1GHz)
		$\pm 4.8\text{dB}$ (above 1GHz)
8	Radiated Spurious emission test	$\pm 4.5\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (Above 1GHz)
9	Temperature test	$\pm 1^\circ\text{C}$
10	Humidity test	$\pm 3\%$
11	Supply voltages	$\pm 1.5\%$
12	Time	$\pm 3\%$



4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.5 Test Facility

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

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.6 Deviation from Standards

None

4.7 Abnormalities from Standard Conditions

None



5 Equipment List

Conducted Peak Output Power					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2017-09-27	2018-09-26
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2018-04-02	2019-04-01
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-01	2017-07-13	2018-07-12
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2017-09-27	2018-09-26
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2017-09-27	2018-09-26

RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
2	MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies	N9038A	SEM004-05	2017-09-27	2018-09-26
3	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
4	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2018-04-02	2019-04-01
5	Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
6	Coaxial Cable	SGS	N/A	SEM025-01	2017-07-13	2018-07-12

RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12
2	EXA Signal Analyzer (10Hz-26.5GHz)	Agilent Technologies Inc	N9010A	SEM004-09	2018-04-13	2019-04-12
3	BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-01	2017-06-27	2020-06-26
4	Horn Antenna (800MHz-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-13
5	Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2017-09-27	2018-09-26
6	Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2017-09-27	2018-09-26
7	Band filter	N/A	N/A	N/A	N/A	N/A
8	Measurement	AUDIX	e3 V8.2014-6-	N/A	N/A	N/A



**SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch**

Report No.: SZEM180600544501

Page: 9 of 42

	Software		27			
9	Coaxial Cable	SGS	N/A	SEM026-01	2017-07-13	2018-07-12

General used equipment

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2017-09-29	2018-09-28
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2017-09-29	2018-09-28
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2017-09-29	2018-09-28
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2018-04-08	2019-04-07



6 Radio Spectrum Matter Test Results

6.1 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3)
Test Method: ANSI C63.10 (2013) Section 11.9.1
Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq$ hopping channels < 50
	1 for digital modulation
2400-2483.5	1 for ≥ 75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

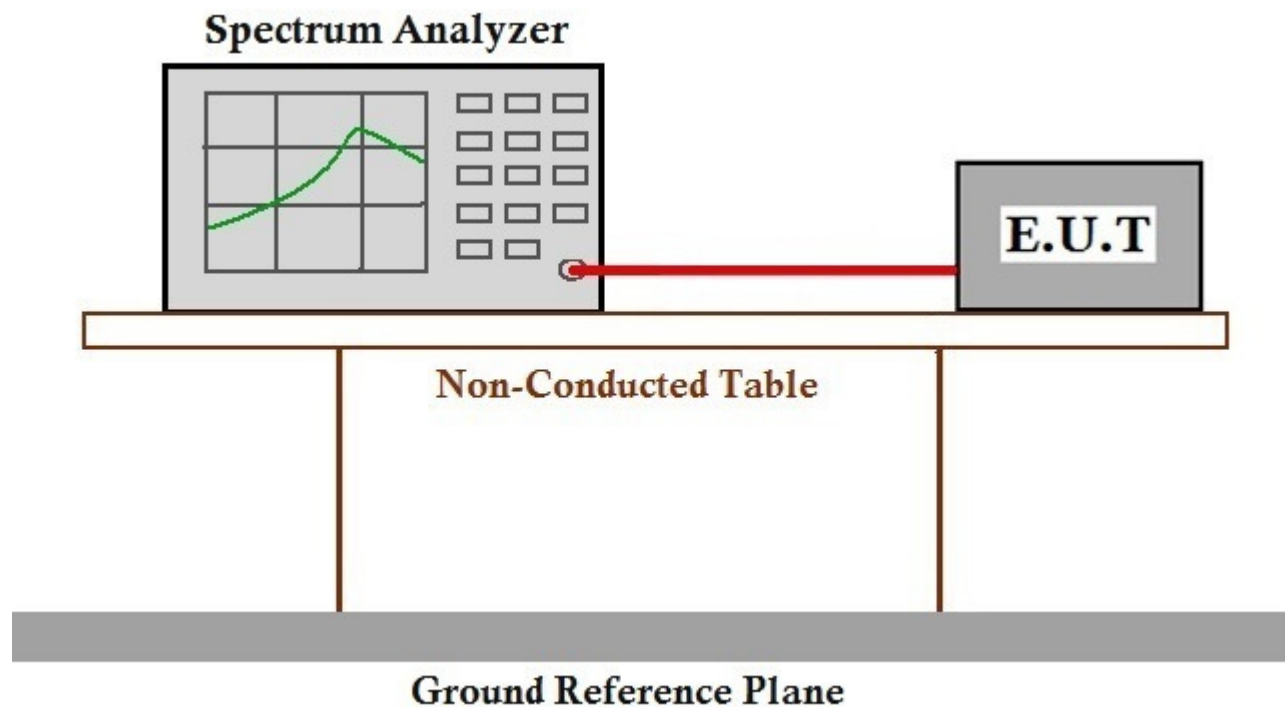
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 23.4 °C Humidity: 51 % RH Atmospheric Pressure: 1010 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

6.1.2 Test Setup Diagram



6.1.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



6.2 Radiated Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.247(d)

Test Method: ANSI C63.10 (2013) Section 6.4,6.5,6.6

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

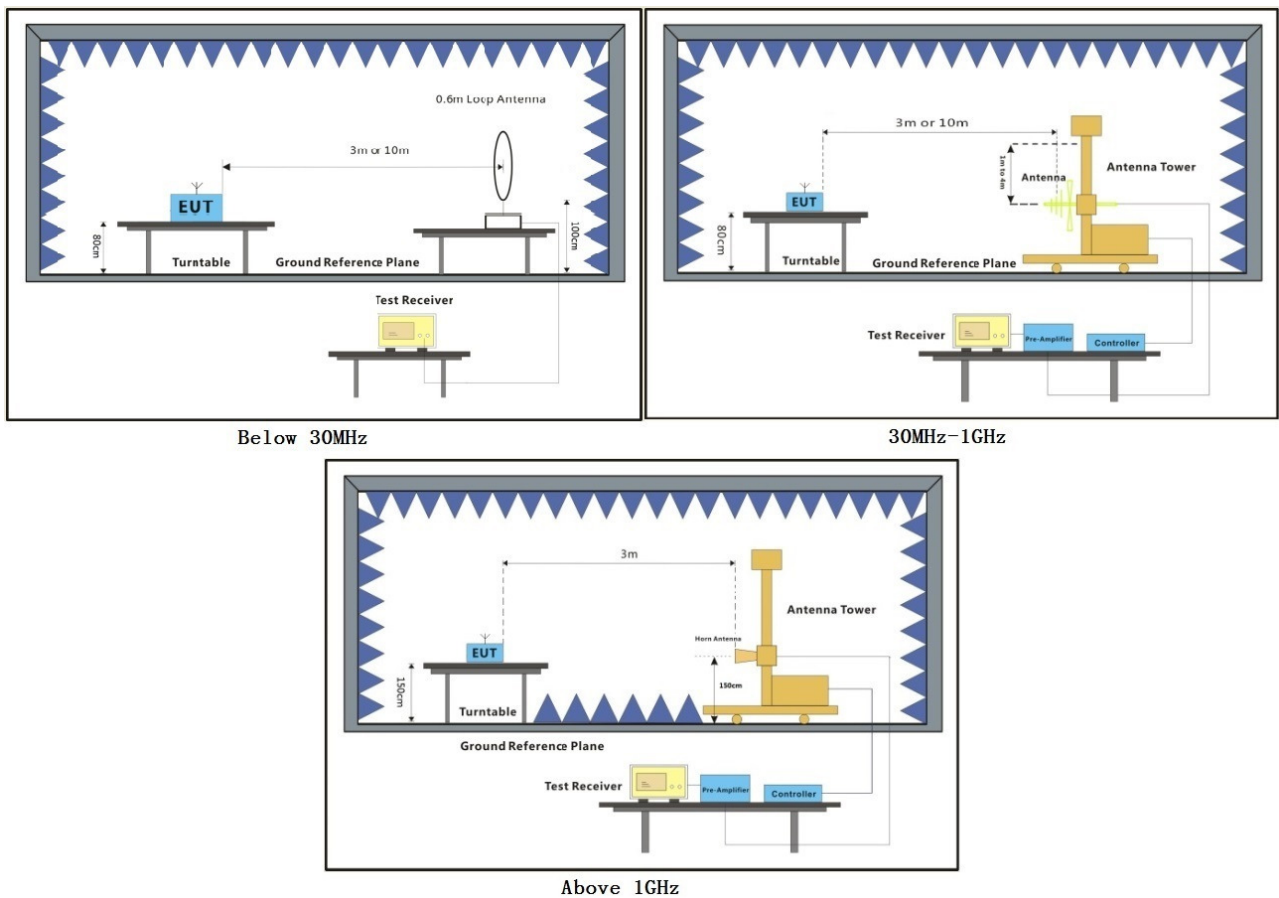
6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 24.9 °C Humidity: 55.5 % RH Atmospheric Pressure: 1010 mbar

Test mode a:TX mode_Keep the EUT in continuously transmitting mode with all modulation types. All data rates for each modulation type have been tested and found the data rate @ 1Mbps is the worst case of IEEE 802.11b; data rate @ 6Mbps is the worst case of IEEE 802.11g; data rate @ 6.5Mbps is the worst case of IEEE 802.11n(HT20); data rate @ 13.5Mbps is the worst case of IEEE 802.11n(HT40). Only the data of worst case is recorded in the report.

6.2.2 Test Setup Diagram



6.2.3 Measurement Procedure and Data

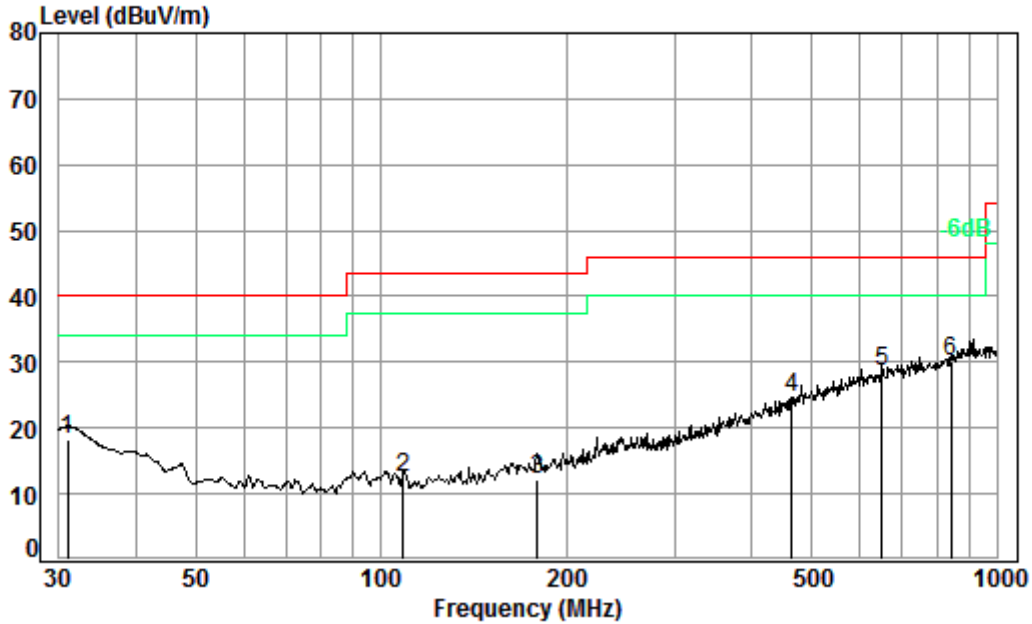
- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height 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.
- e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor
- 3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Radiated emission below 1GHz (QP) :

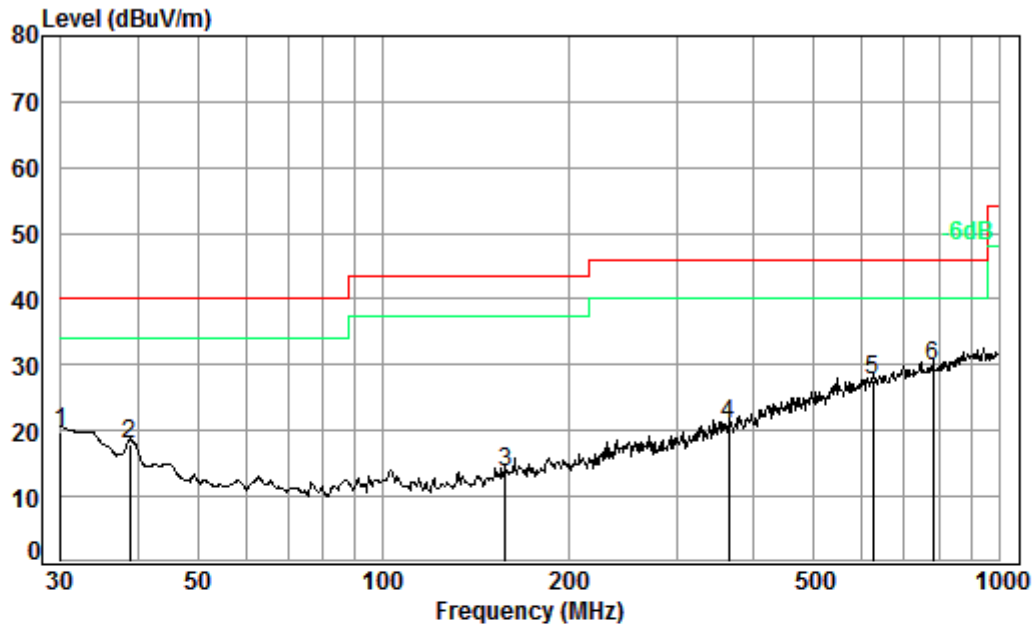
Mode:a; Polarization:Horizontal



Condition: 3m HORIZONTAL
 Job No. : 05445CR
 Test mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.96	0.60	21.95	27.67	23.44	18.32	40.00	-21.68
2	108.65	1.22	13.59	27.51	25.20	12.50	43.50	-31.00
3	179.39	1.37	15.89	27.53	22.35	12.08	43.50	-31.42
4	463.97	2.47	23.86	27.83	26.15	24.65	46.00	-21.35
5	649.66	2.80	27.27	27.62	26.25	28.70	46.00	-17.30
6 pp	842.13	3.38	29.07	27.27	24.97	30.15	46.00	-15.85

Mode:a; Polarization:Vertical



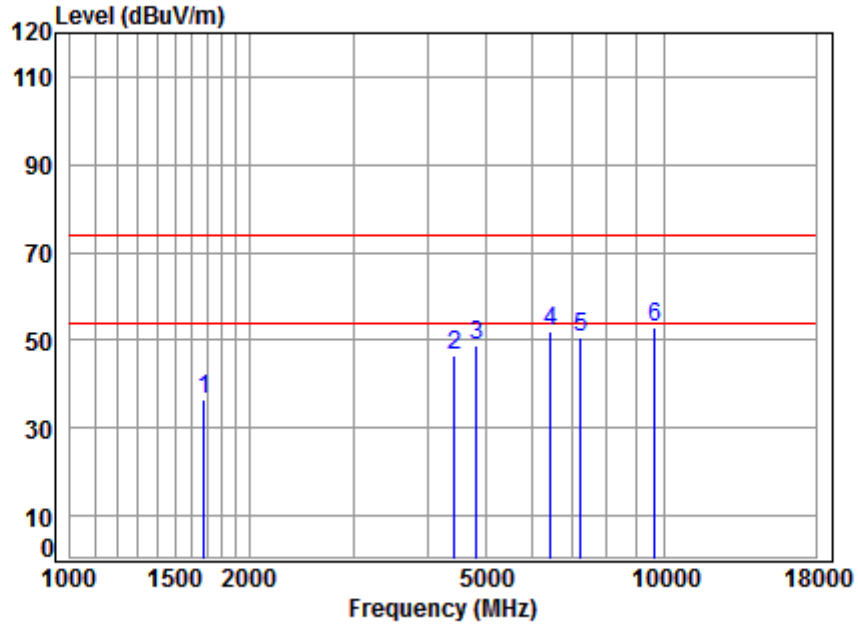
Condition: 3m VERTICAL
 Job No. : 05445CR
 Test mode: a

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Limit Level	Limit Line	Over Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.00	0.60	22.50	27.67	24.35	19.78	40.00	-20.22
2	38.75	0.60	18.05	27.63	26.82	17.84	40.00	-22.16
3	158.11	1.33	15.34	27.52	24.49	13.64	43.50	-29.86
4	364.26	2.10	21.49	27.67	25.13	21.05	46.00	-24.95
5	625.08	2.75	26.95	27.66	25.66	27.70	46.00	-18.30
6 pp	782.35	3.15	28.40	27.44	25.76	29.87	46.00	-16.13



Transmitter emission above 1GHz

Mode:a; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:Low

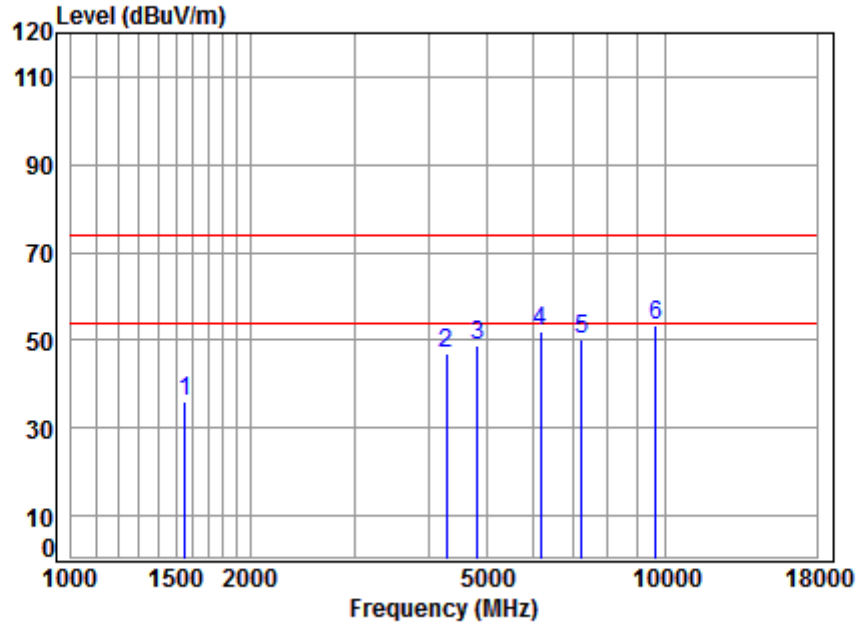


Site : chamber
Condition: 3m HORIZONTAL
Job No : 05445CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1677.621	5.25	26.58	41.52	46.40	36.71	74.00	-37.29	peak
2	4443.453	7.50	33.50	42.41	48.12	46.71	74.00	-27.29	peak
3	4824.000	7.91	34.00	42.47	49.55	48.99	74.00	-25.01	peak
4	6451.353	11.45	35.55	41.25	46.31	52.06	74.00	-21.94	peak
5	7236.000	10.07	36.09	40.69	45.37	50.84	74.00	-23.16	peak
6 pp	9648.000	10.77	37.69	37.68	42.19	52.97	74.00	-21.03	peak



Mode:a; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:Low

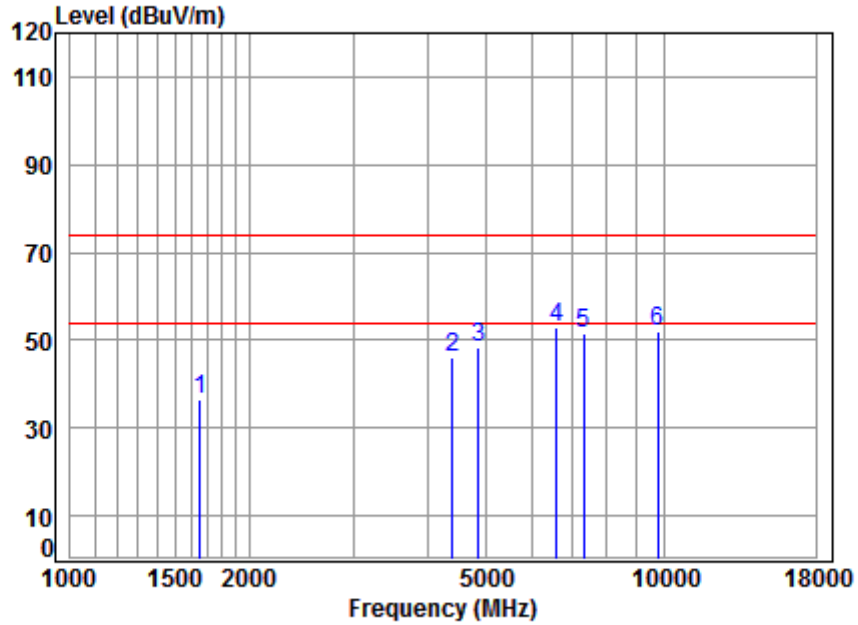


Site : chamber
Condition: 3m VERTICAL
Job No : 05445CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1551.677	5.41	26.04	41.44	46.12	36.13	74.00	-37.87	peak
2	4291.977	7.33	33.24	42.38	48.79	46.98	74.00	-27.02	peak
3	4824.000	7.91	34.00	42.47	49.33	48.77	74.00	-25.23	peak
4	6159.797	10.89	35.26	41.48	47.36	52.03	74.00	-21.97	peak
5	7236.000	10.07	36.09	40.69	44.91	50.38	74.00	-23.62	peak
6 pp	9648.000	10.77	37.69	37.68	42.49	53.27	74.00	-20.73	peak



Mode:a; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:middle

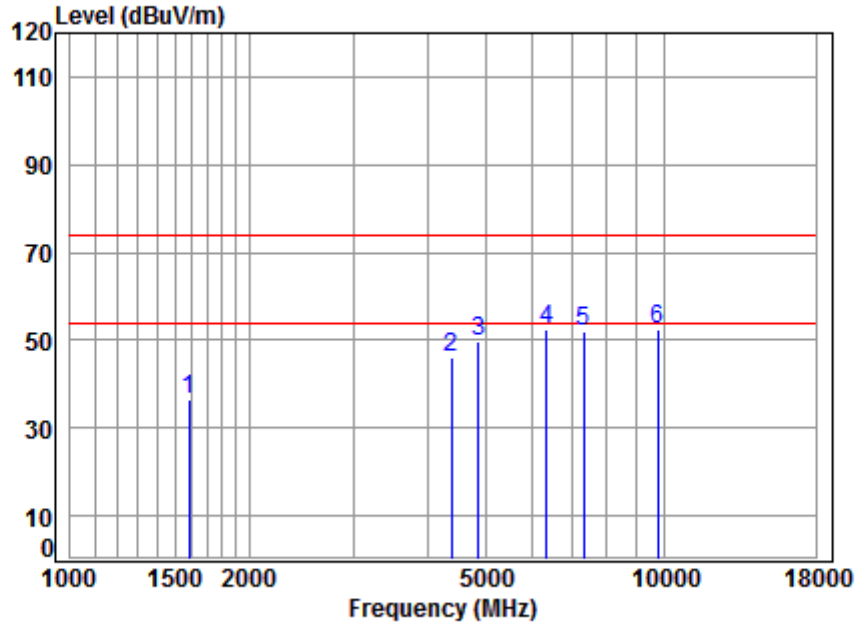


Site : chamber
Condition: 3m HORIZONTAL
Job No : 05445CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1653.550	5.28	26.48	41.50	46.24	36.50	74.00	-37.50	peak
2	4405.090	7.46	33.44	42.40	47.40	45.90	74.00	-28.10	peak
3	4874.000	7.96	34.05	42.48	48.66	48.19	74.00	-25.81	peak
4	pp 6583.209	11.30	35.65	41.15	46.95	52.75	74.00	-21.25	peak
5	7311.000	10.05	36.15	40.64	45.99	51.55	74.00	-22.45	peak
6	9748.000	10.82	37.75	37.54	41.06	52.09	74.00	-21.91	peak



Mode:a; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:middle

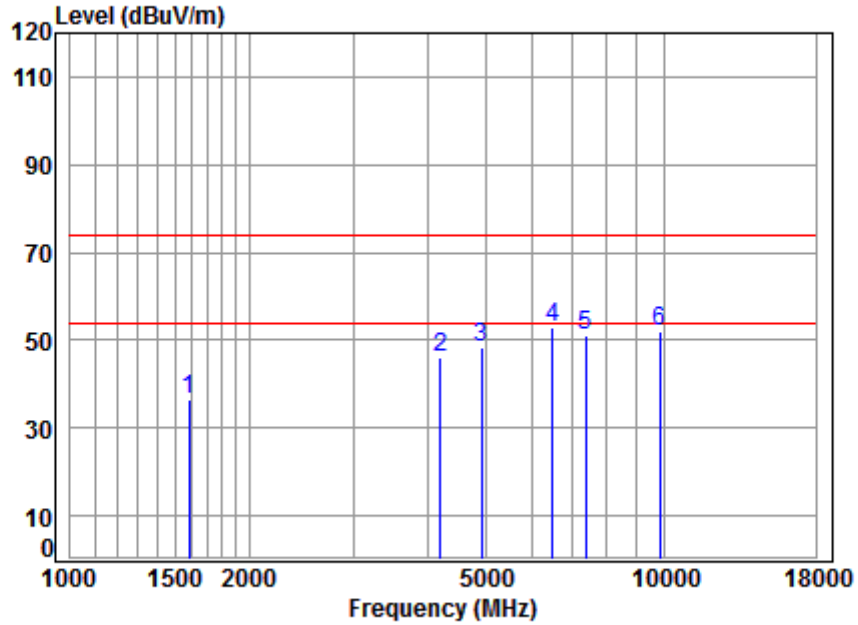


Site : chamber
 Condition: 3m VERTICAL
 Job No : 05445CR
 Mode : 2437 TX RSE
 Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1587.975	5.37	26.20	41.46	46.62	36.73	74.00	-37.27	peak
2	4392.376	7.44	33.42	42.40	47.74	46.20	74.00	-27.80	peak
3	4874.000	7.96	34.05	42.48	50.31	49.84	74.00	-24.16	peak
4	6340.436	11.24	35.44	41.34	47.21	52.55	74.00	-21.45	peak
5	7311.000	10.05	36.15	40.64	46.43	51.99	74.00	-22.01	peak
6 pp	9748.000	10.82	37.75	37.54	41.67	52.70	74.00	-21.30	peak



Mode:a; Polarization:Horizontal; Modulation:802.11b; bandwidth:20MHz; Channel:High

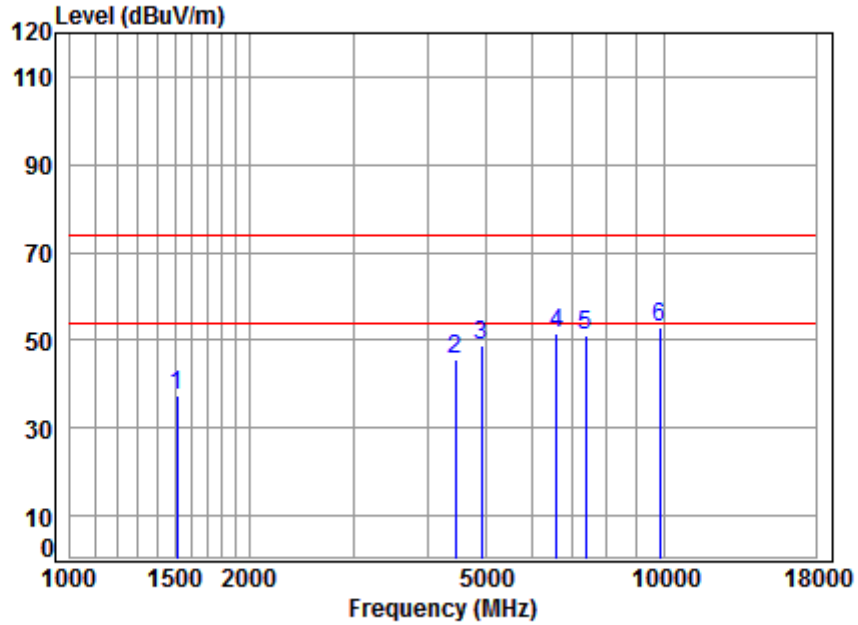


Site : chamber
Condition: 3m HORIZONTAL
Job No : 05445CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1583.392	5.37	26.18	41.46	46.56	36.65	74.00	-37.35	peak
2	4206.011	7.23	33.08	42.36	48.04	45.99	74.00	-28.01	peak
3	4924.000	8.01	34.11	42.49	48.84	48.47	74.00	-25.53	peak
4	pp 6488.754	11.52	35.59	41.22	46.88	52.77	74.00	-21.23	peak
5	7386.000	10.03	36.21	40.59	45.37	51.02	74.00	-22.98	peak
6	9848.000	10.87	37.81	37.41	40.59	51.86	74.00	-22.14	peak



Mode:a; Polarization:Vertical; Modulation:802.11b; bandwidth:20MHz; Channel:High

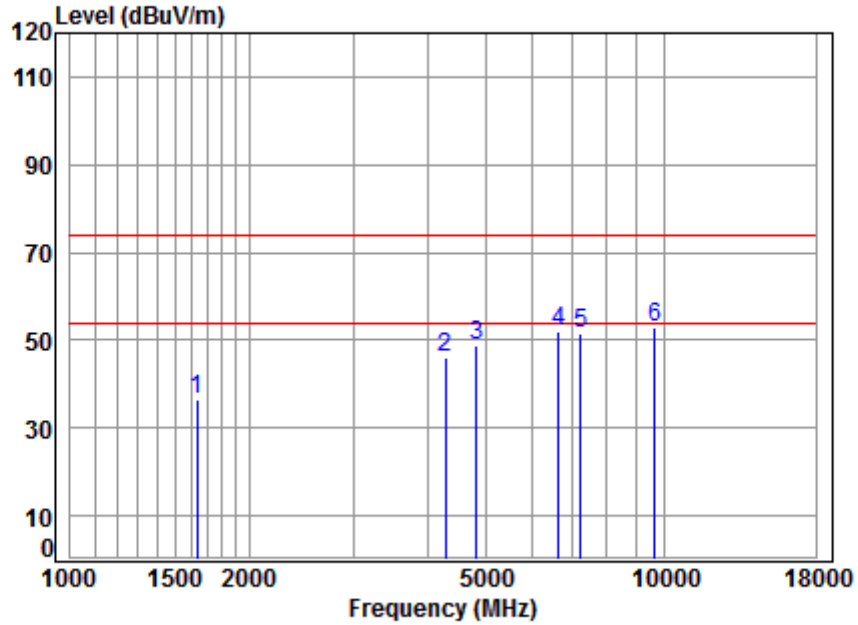


Site : chamber
 Condition: 3m VERTICAL
 Job No : 05445CR
 Mode : 2462 TX RSE
 Note : 2.4G WIFI 11B

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1511.833	5.46	25.85	41.41	47.38	37.28	74.00	-36.72	peak
2	4456.315	7.51	33.53	42.41	47.02	45.65	74.00	-28.35	peak
3	4924.000	8.01	34.11	42.49	49.07	48.70	74.00	-25.30	peak
4	6583.209	11.30	35.65	41.15	45.63	51.43	74.00	-22.57	peak
5	7386.000	10.03	36.21	40.59	45.54	51.19	74.00	-22.81	peak
6 pp	9848.000	10.87	37.81	37.41	41.71	52.98	74.00	-21.02	peak



Mode:a; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:Low

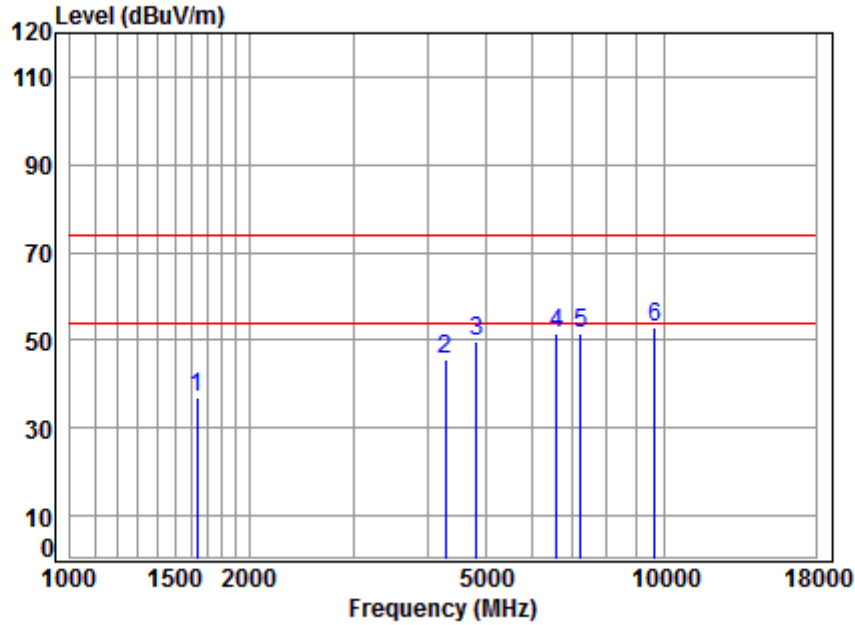


Site : chamber
Condition: 3m HORIZONTAL
Job No : 05445CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1634.543	5.31	26.40	41.49	46.35	36.57	74.00	-37.43	peak
2	4291.977	7.33	33.24	42.38	47.88	46.07	74.00	-27.93	peak
3	4824.000	7.91	34.00	42.47	49.24	48.68	74.00	-25.32	peak
4	6640.542	11.13	35.69	41.11	46.37	52.08	74.00	-21.92	peak
5	7236.000	10.07	36.09	40.69	46.14	51.61	74.00	-22.39	peak
6 pp	9648.000	10.77	37.69	37.68	42.10	52.88	74.00	-21.12	peak



Mode:a; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:Low

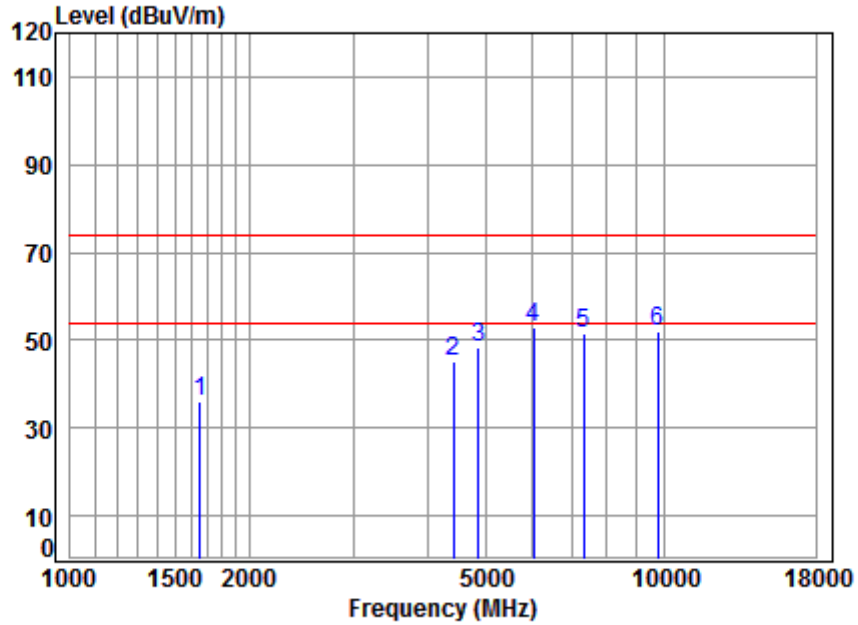


Site : chamber
Condition: 3m VERTICAL
Job No : 05445CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1634.543	5.31	26.40	41.49	46.71	36.93	74.00	-37.07	peak
2	4291.977	7.33	33.24	42.38	47.32	45.51	74.00	-28.49	peak
3	4824.000	7.91	34.00	42.47	50.27	49.71	74.00	-24.29	peak
4	6602.265	11.24	35.66	41.14	45.76	51.52	74.00	-22.48	peak
5	7236.000	10.07	36.09	40.69	46.26	51.73	74.00	-22.27	peak
6 pp	9648.000	10.77	37.69	37.68	42.17	52.95	74.00	-21.05	peak



Mode:a; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:middle

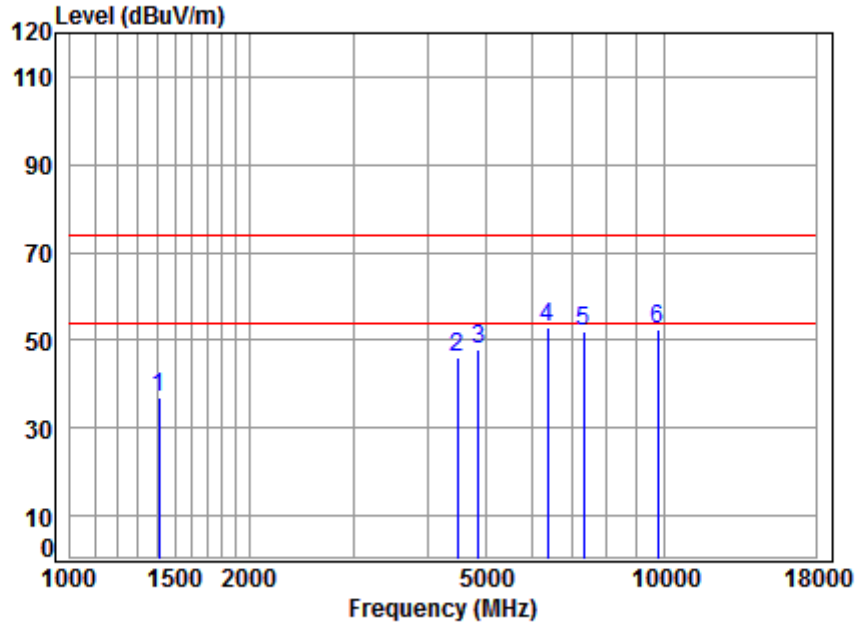


Site : chamber
Condition: 3m HORIZONTAL
Job No : 05445CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1653.550	5.28	26.48	41.50	45.57	35.83	74.00	-38.17	peak
2	4417.841	7.47	33.46	42.40	46.75	45.28	74.00	-28.72	peak
3	4874.000	7.96	34.05	42.48	48.96	48.49	74.00	-25.51	peak
4	pp 6036.421	10.64	35.14	41.58	48.68	52.88	74.00	-21.12	peak
5	7311.000	10.05	36.15	40.64	46.04	51.60	74.00	-22.40	peak
6	9748.000	10.82	37.75	37.54	41.03	52.06	74.00	-21.94	peak



Mode:a; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:middle

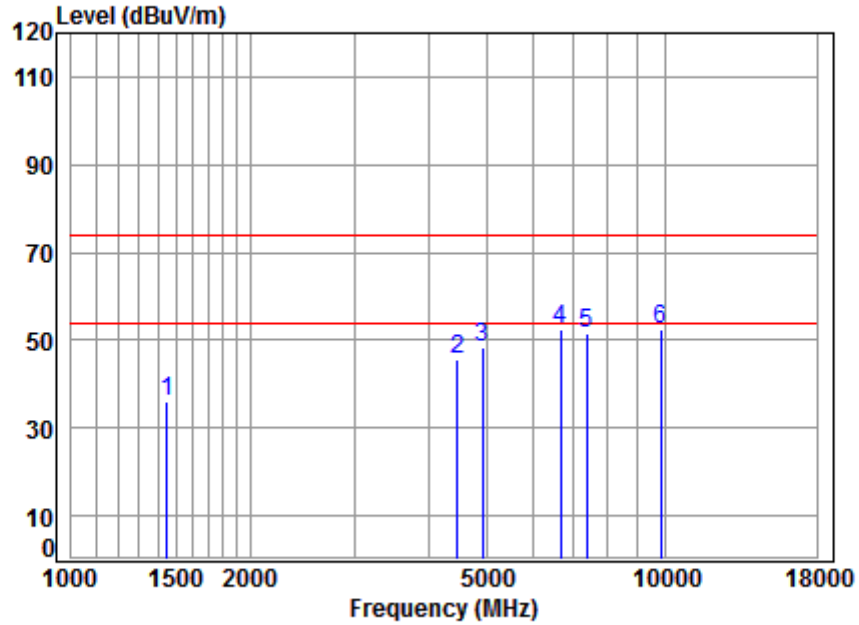


Site : chamber
Condition: 3m VERTICAL
Job No : 05445CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1410.514	5.19	25.47	41.34	47.72	37.04	74.00	-36.96	peak
2	4495.125	7.55	33.59	42.42	47.42	46.14	74.00	-27.86	peak
3	4874.000	7.96	34.05	42.48	48.49	48.02	74.00	-25.98	peak
4	pp 6358.789	11.27	35.46	41.32	47.63	53.04	74.00	-20.96	peak
5	7311.000	10.05	36.15	40.64	46.30	51.86	74.00	-22.14	peak
6	9748.000	10.82	37.75	37.54	41.30	52.33	74.00	-21.67	peak



Mode:a; Polarization:Horizontal; Modulation:802.11g; bandwidth:20MHz; Channel:High

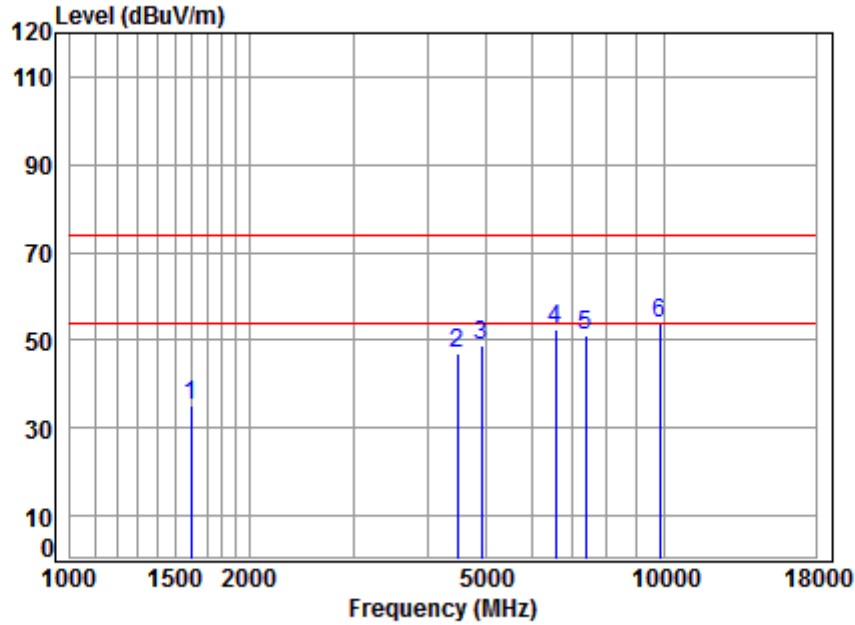


Site : chamber
Condition: 3m HORIZONTAL
Job No : 05445CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1451.878	5.32	25.62	41.37	46.41	35.98	74.00	-38.02	peak
2	4469.214	7.53	33.55	42.41	46.99	45.66	74.00	-28.34	peak
3	4924.000	8.01	34.11	42.49	48.96	48.59	74.00	-25.41	peak
4	pp 6659.763	11.08	35.70	41.10	46.90	52.58	74.00	-21.42	peak
5	7386.000	10.03	36.21	40.59	45.83	51.48	74.00	-22.52	peak
6	9848.000	10.87	37.81	37.41	41.05	52.32	74.00	-21.68	peak



Mode:a; Polarization:Vertical; Modulation:802.11g; bandwidth:20MHz; Channel:High

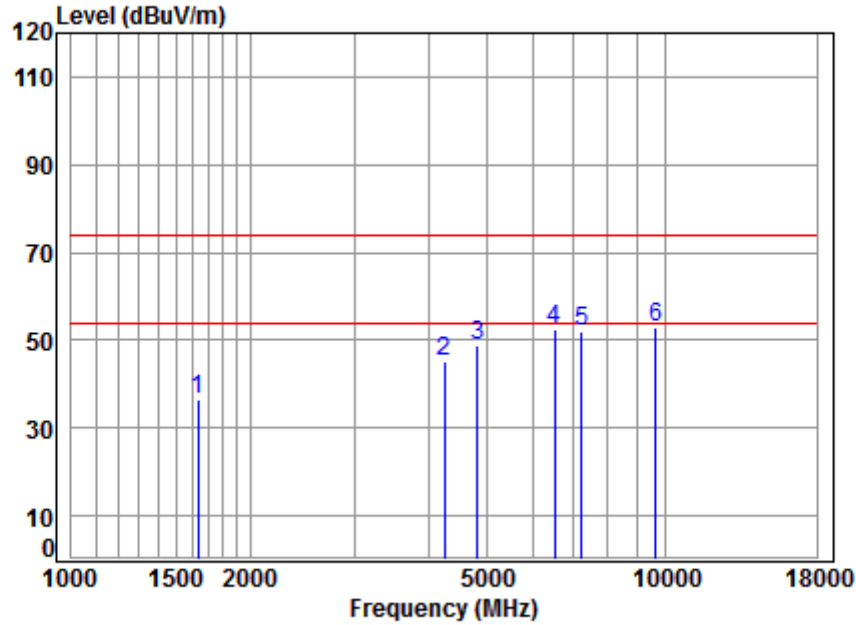


Site : chamber
 Condition: 3m VERTICAL
 Job No : 05445CR
 Mode : 2462 TX RSE
 Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1597.181	5.35	26.24	41.47	45.13	35.25	74.00	-38.75	peak
2	4495.125	7.55	33.59	42.42	48.18	46.90	74.00	-27.10	peak
3	4924.000	8.01	34.11	42.49	49.35	48.98	74.00	-25.02	peak
4	6564.209	11.35	35.64	41.17	46.72	52.54	74.00	-21.46	peak
5	7386.000	10.03	36.21	40.59	45.44	51.09	74.00	-22.91	peak
6 pp	9848.000	10.87	37.81	37.41	42.55	53.82	74.00	-20.18	peak



Mode:a; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:Low

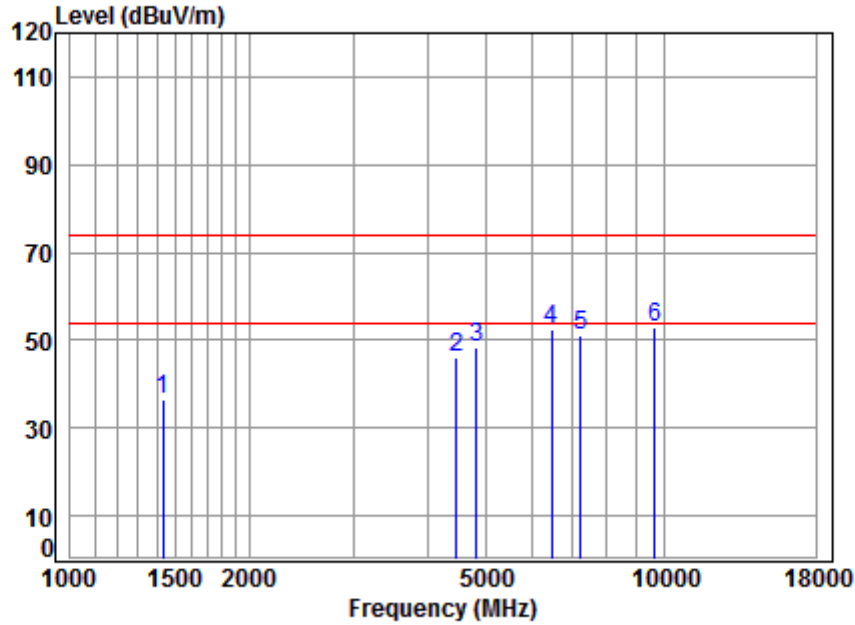


Site : chamber
Condition: 3m HORIZONTAL
Job No : 05445CR
Mode : 2412 TX RSE
Note : 2.4G WIFI 11N 20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1634.543	5.31	26.40	41.49	46.23	36.45	74.00	-37.55	peak
2	4254.921	7.28	33.17	42.37	47.10	45.18	74.00	-28.82	peak
3	4824.000	7.91	34.00	42.47	49.35	48.79	74.00	-25.21	peak
4	6507.536	11.52	35.60	41.21	46.63	52.54	74.00	-21.46	peak
5	7236.000	10.07	36.09	40.69	46.51	51.98	74.00	-22.02	peak
6 pp	9648.000	10.77	37.69	37.68	42.15	52.93	74.00	-21.07	peak



Mode:a; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:Low

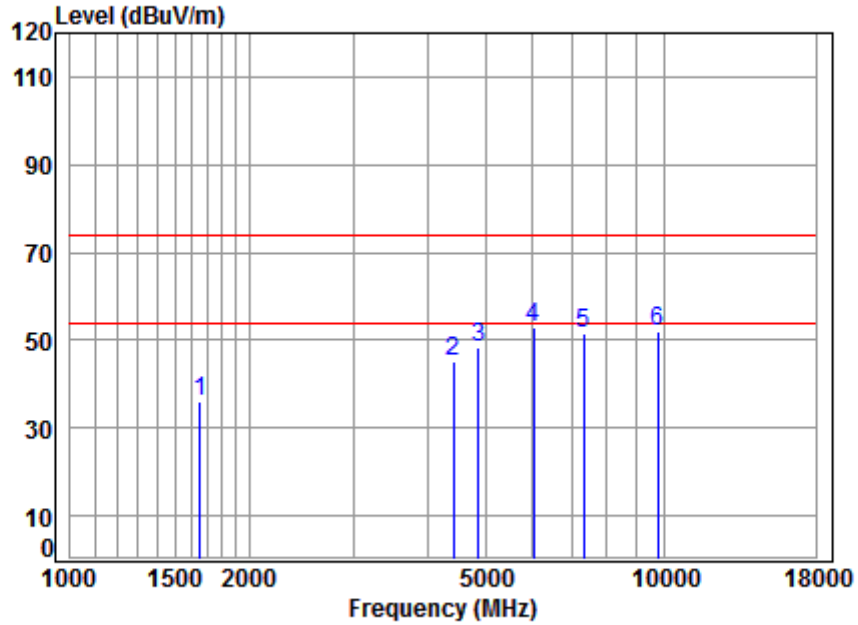


Site : chamber
 Condition: 3m VERTICAL
 Job No : 05445CR
 Mode : 2412 TX RSE
 Note : 2.4G WIFI 11N 20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1431.047	5.26	25.54	41.36	46.96	36.40	74.00	-37.60	peak
2	4469.214	7.53	33.55	42.41	47.20	45.87	74.00	-28.13	peak
3	4824.000	7.91	34.00	42.47	48.72	48.16	74.00	-25.84	peak
4	6470.026	11.48	35.57	41.24	46.71	52.52	74.00	-21.48	peak
5	7236.000	10.07	36.09	40.69	45.75	51.22	74.00	-22.78	peak
6 pp	9648.000	10.77	37.69	37.68	42.05	52.83	74.00	-21.17	peak



Mode:a; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:middle

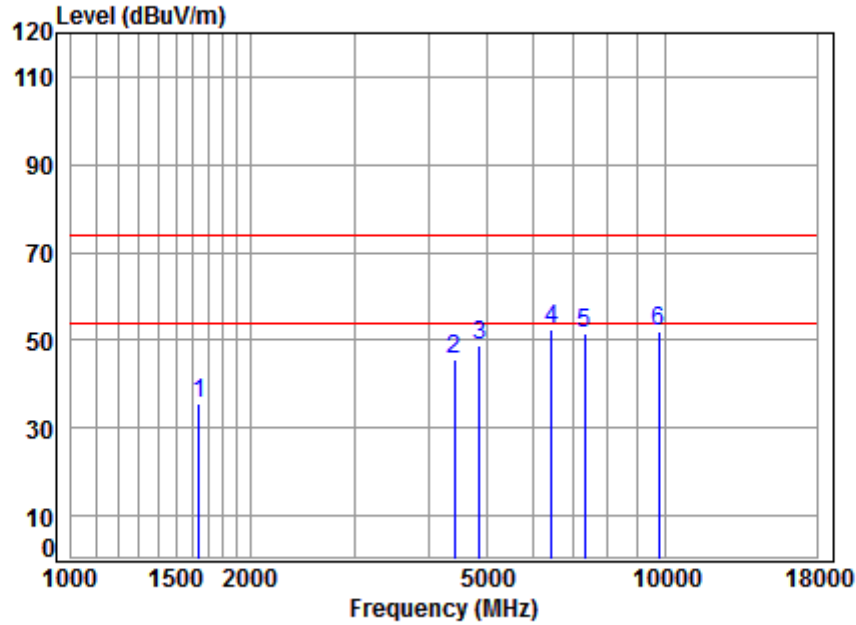


Site : chamber
Condition: 3m HORIZONTAL
Job No : 05445CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11G

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1653.550	5.28	26.48	41.50	45.57	35.83	74.00	-38.17	peak
2	4417.841	7.47	33.46	42.40	46.75	45.28	74.00	-28.72	peak
3	4874.000	7.96	34.05	42.48	48.96	48.49	74.00	-25.51	peak
4	pp 6036.421	10.64	35.14	41.58	48.68	52.88	74.00	-21.12	peak
5	7311.000	10.05	36.15	40.64	46.04	51.60	74.00	-22.40	peak
6	9748.000	10.82	37.75	37.54	41.03	52.06	74.00	-21.94	peak



Mode:a; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:middle

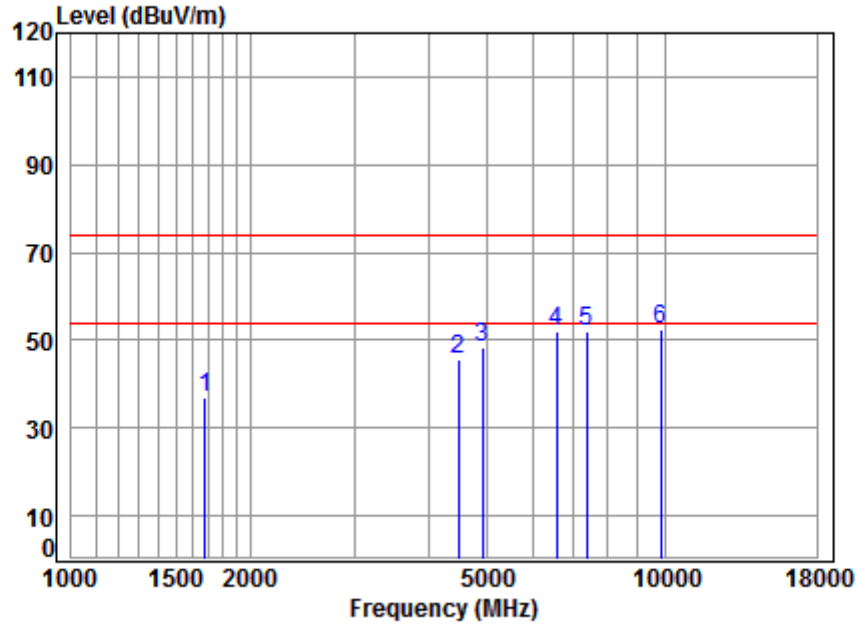


Site : chamber
Condition: 3m VERTICAL
Job No : 05445CR
Mode : 2437 TX RSE
Note : 2.4G WIFI 11N 20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1639.274	5.30	26.42	41.49	45.32	35.55	74.00	-38.45	peak
2	4417.841	7.47	33.46	42.40	46.97	45.50	74.00	-28.50	peak
3	4874.000	7.96	34.05	42.48	49.29	48.82	74.00	-25.18	peak
4	pp 6451.353	11.45	35.55	41.25	46.74	52.49	74.00	-21.51	peak
5	7311.000	10.05	36.15	40.64	46.15	51.71	74.00	-22.29	peak
6	9748.000	10.82	37.75	37.54	41.02	52.05	74.00	-21.95	peak



Mode:a; Polarization:Horizontal; Modulation:802.11n; bandwidth:20MHz; Channel:High

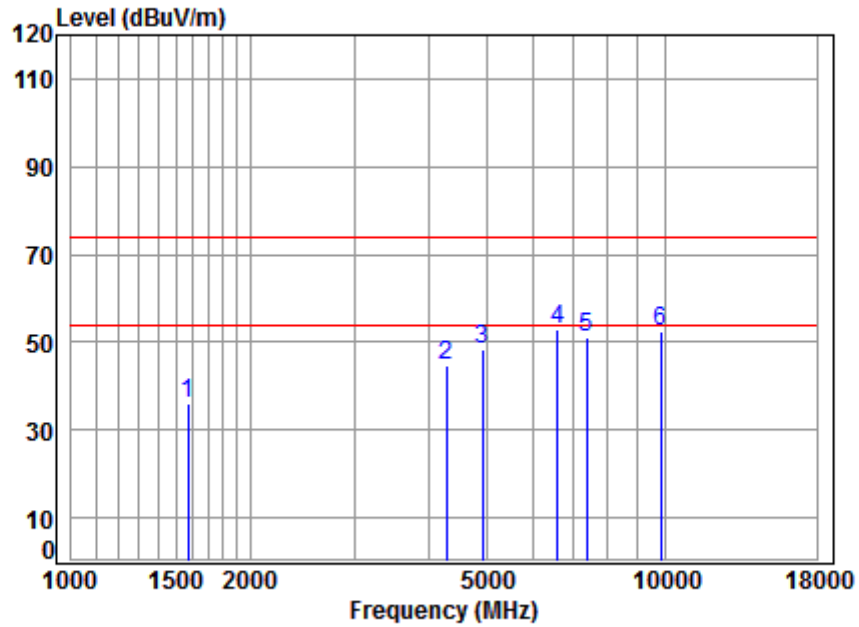


Site : chamber
Condition: 3m HORIZONTAL
Job No : 05445CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11N 20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1682.477	5.25	26.60	41.52	46.84	37.17	74.00	-36.83	peak
2	4495.125	7.55	33.59	42.42	46.81	45.53	74.00	-28.47	peak
3	4924.000	8.01	34.11	42.49	48.95	48.58	74.00	-25.42	peak
4	6564.209	11.35	35.64	41.17	46.20	52.02	74.00	-21.98	peak
5	7386.000	10.03	36.21	40.59	46.18	51.83	74.00	-22.17	peak
6 pp	9848.000	10.87	37.81	37.41	41.11	52.38	74.00	-21.62	peak



Mode:a; Polarization:Vertical; Modulation:802.11n; bandwidth:20MHz; Channel:High



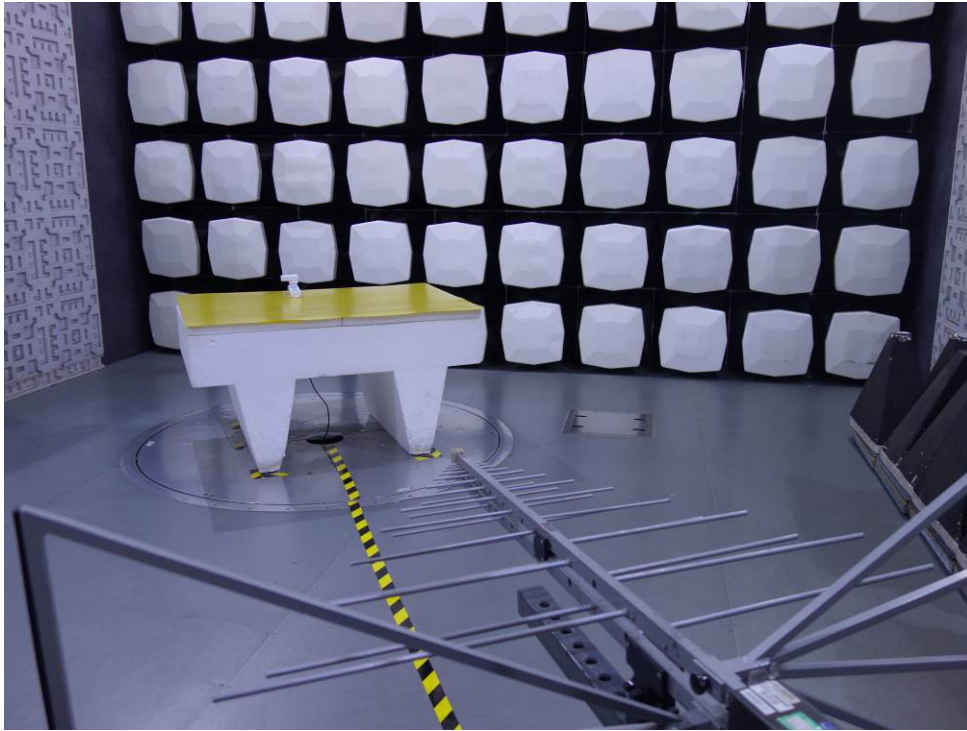
Site : chamber
Condition: 3m VERTICAL
Job No : 05445CR
Mode : 2462 TX RSE
Note : 2.4G WIFI 11N 20

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1574.265	5.38	26.14	41.45	46.12	36.19	74.00	-37.81	peak
2	4291.977	7.33	33.24	42.38	46.59	44.78	74.00	-29.22	peak
3	4924.000	8.01	34.11	42.49	48.56	48.19	74.00	-25.81	peak
4	pp 6602.265	11.24	35.66	41.14	47.14	52.90	74.00	-21.10	peak
5	7386.000	10.03	36.21	40.59	45.66	51.31	74.00	-22.69	peak
6	9848.000	10.87	37.81	37.41	41.12	52.39	74.00	-21.61	peak

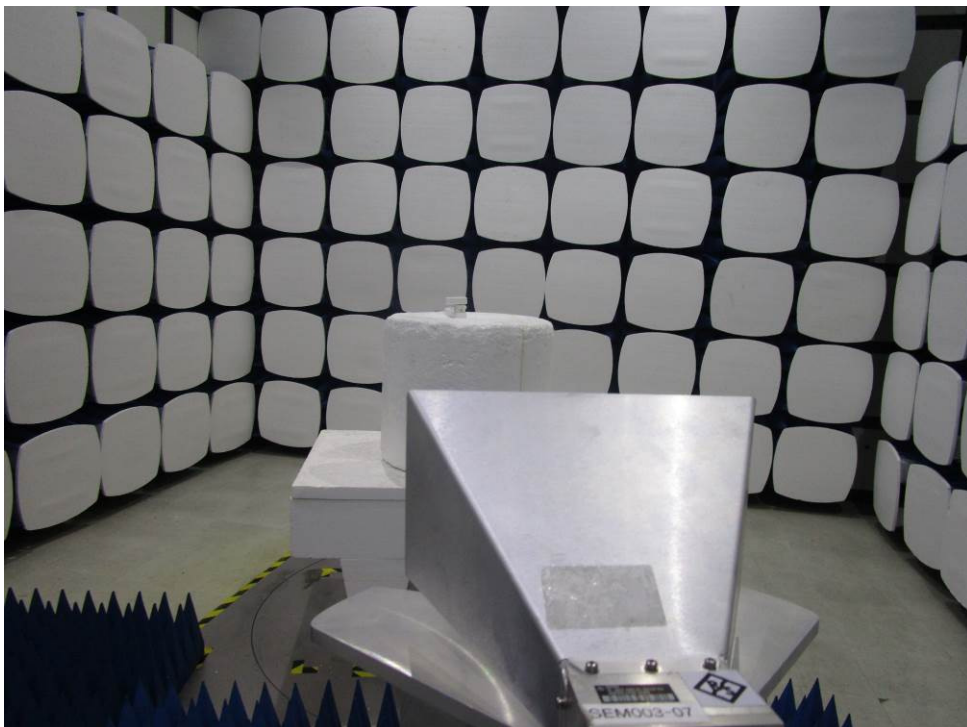
7 Photographs

7.1 Radiated Spurious Emissions Test Setup

Below 1GHz:



Above 1GHz





7.2 EUT Constructional Details (EUT Photos)

Refer to EUT external and internal photos.

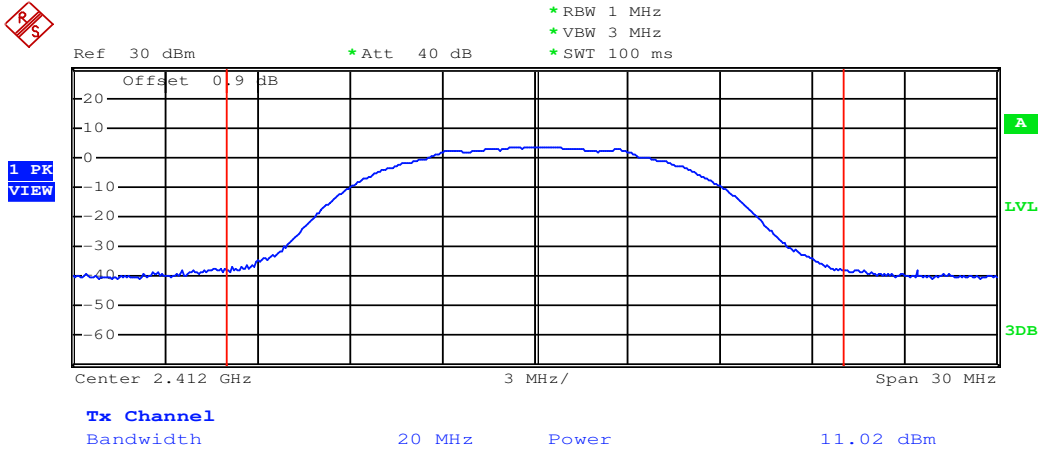
8 Appendix

8.1 Appendix 15.247

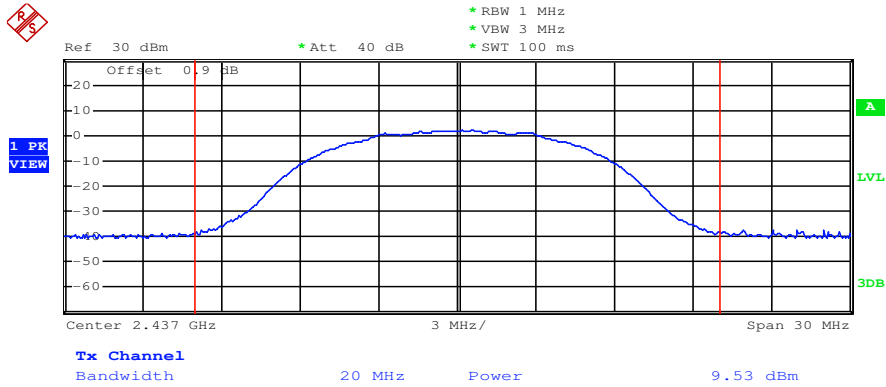
1.Maximum peak conducted output power

Test Mode	Test Channel	Ant	Power[dBm]	Limit[dBm]	Verdict
11B	2412	Ant1	11.02	<30	PASS
11B	2437	Ant1	9.53	<30	PASS
11B	2462	Ant1	9.09	<30	PASS
11G	2412	Ant1	13.84	<30	PASS
11G	2437	Ant1	12.95	<30	PASS
11G	2462	Ant1	11.58	<30	PASS
11N20SISO	2412	Ant1	13.83	<30	PASS
11N20SISO	2437	Ant1	12.32	<30	PASS
11N20SISO	2462	Ant1	11.4	<30	PASS

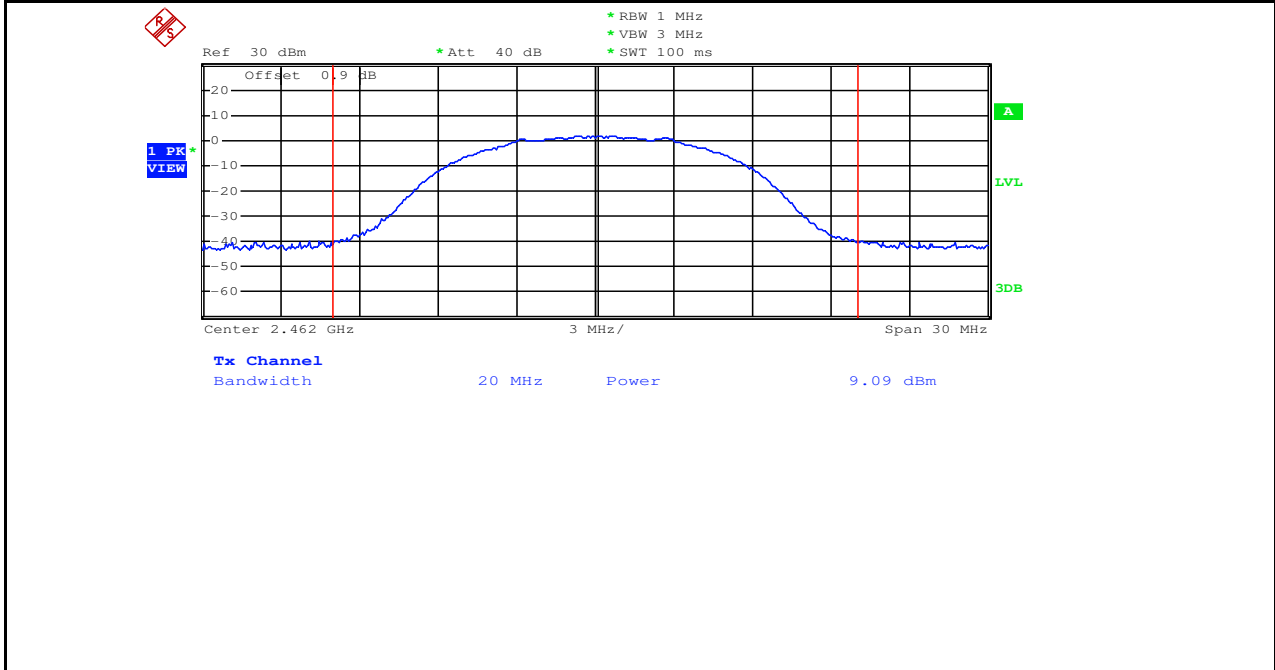
Maximum peak conducted output power_11B_2412_Ant1



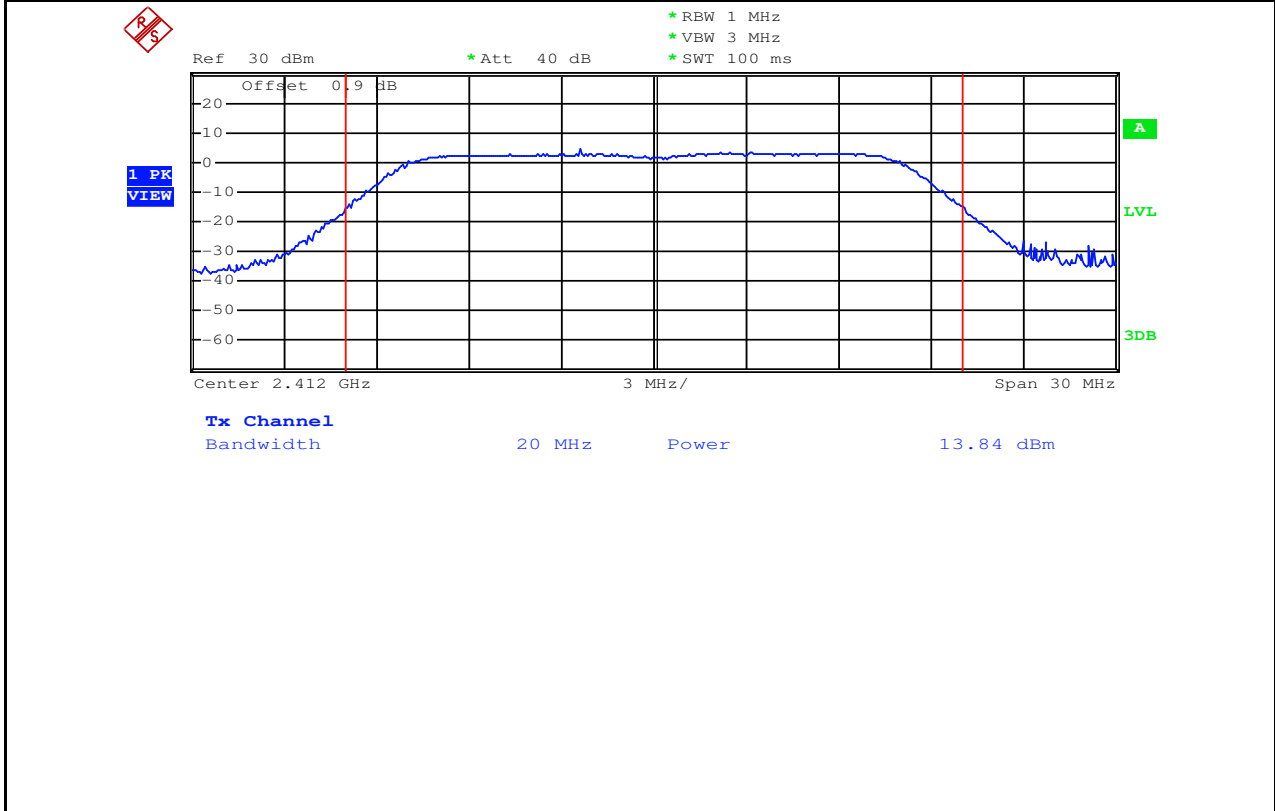
Maximum peak conducted output power_11B_2437_Ant1



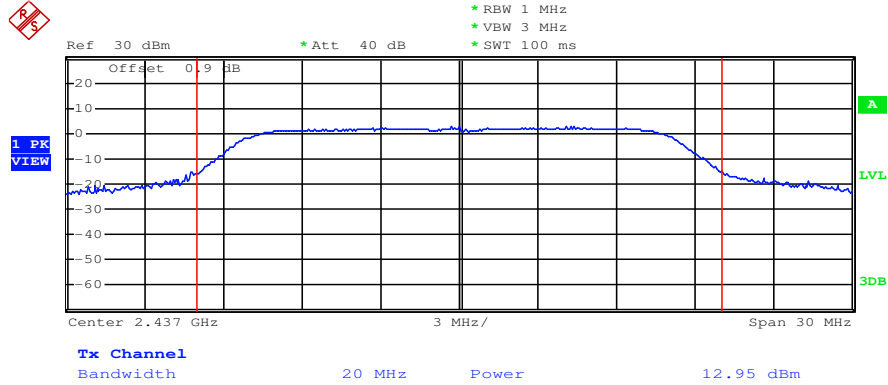
Maximum peak conducted output power_11B_2462_Ant1



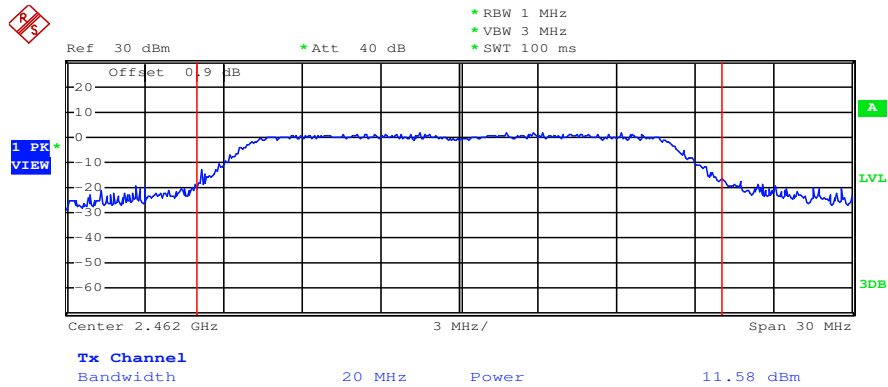
Maximum peak conducted output power_11G_2412_Ant1



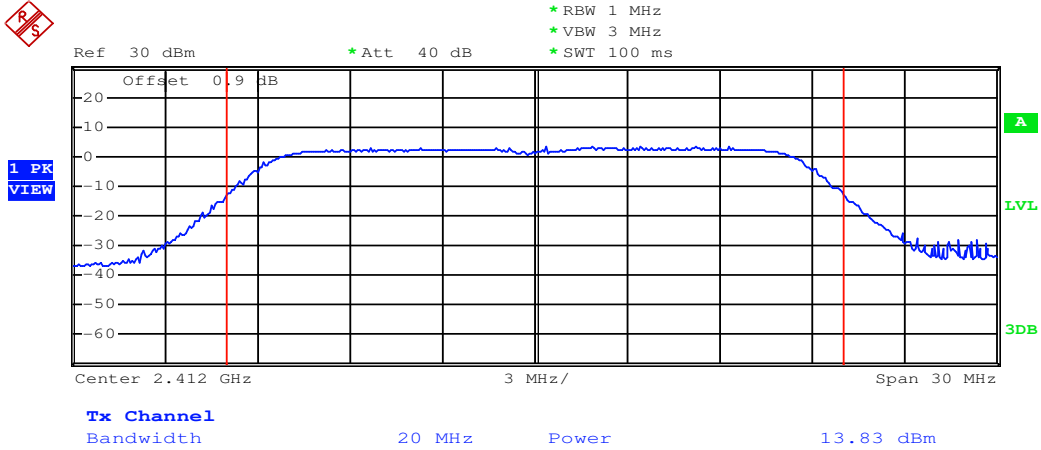
Maximum peak conducted output power_11G_2437_Ant1



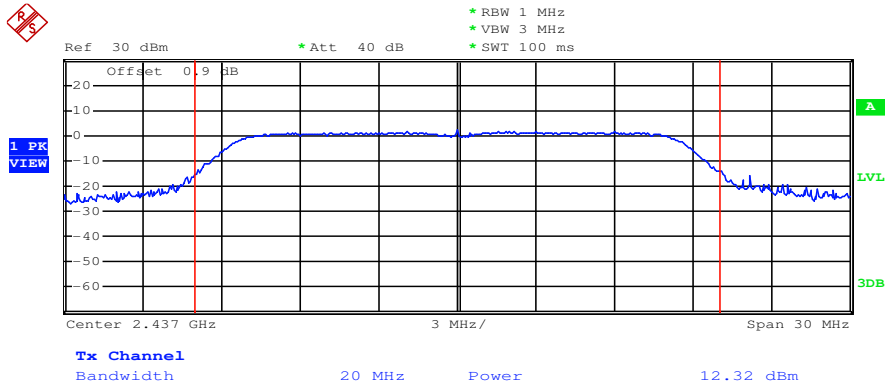
Maximum peak conducted output power_11G_2462_Ant1

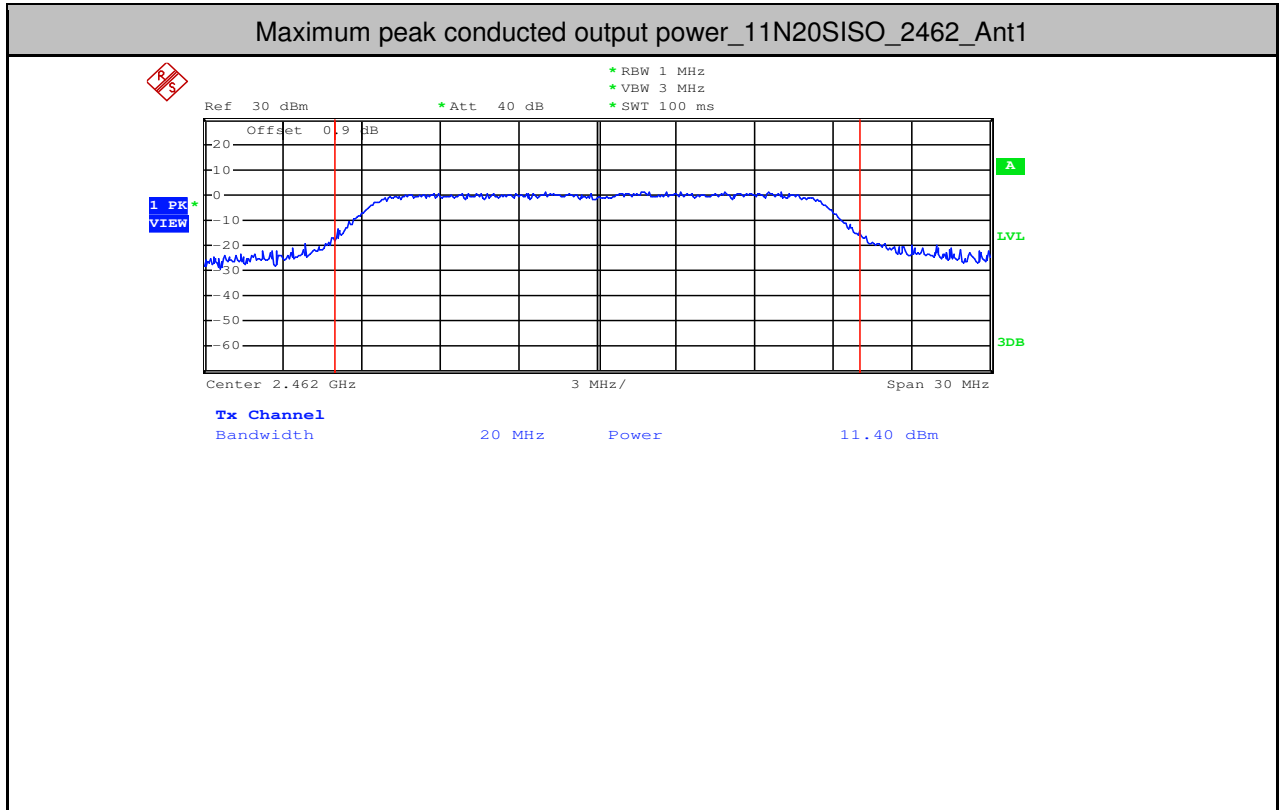


Maximum peak conducted output power_11N20SISO_2412_Ant1



Maximum peak conducted output power_11N20SISO_2437_Ant1





- End of the Report -