JAPAN MIC

TEST REPORT

For

Shenzhen Amarang Technology Co.,Ltd.

Apt.32B,Building 7, Yasongju, No.1008, Haitian Road, Fuzhong Community,
Lianhua Street, Futian District, Shenzhen, China

Model: Pro1

This Report Concerns: ☒ Original Report	**Equipment Type:** Sports & Action Video Cameras
Report Number:	RDG180919007-07
Report Date:	2018-10-08
Reviewed By:	Robin Zheng RF Engineer Robin Zheng
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

Equipment Name	Sports & Action Video Cameras
EUT Model:	Pro1
Rated Input Voltage:	3.85VDC from battery and 5VDC from adapter
External Dimension:	59mm(L)*41mm(W)*32mm(H)
Serial Number:	180919007
EUT Received Date:	2018.09.19

Objective

The objective of the manufacturer is to demonstrate compliance with Radio Law of Japan item 19 of Article 2 Paragraph 1.

Related Submittal(s)/Grant(s)

No related submittal.

Test Methodology

All measurements contained in this report were conducted with technical regulations of the Radio Law of Japan.

EUT TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode which was selected by manufacturer.

For 2.4G band, 13 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	12	2467
6	2437	13	2472
7	2442	/	/

For 802.11b/g/n ht20 modes channel 1, 7 and 13 were tested.

The extreme voltage test conditions which were declared by the manufacturer and the normal conditions are as below:
NV: Normal Voltage 3.85V_{DC}
LV: Low Voltage 3.5V_{DC}
HV: High Voltage 4.2V_{DC}

EUT Exercise Software

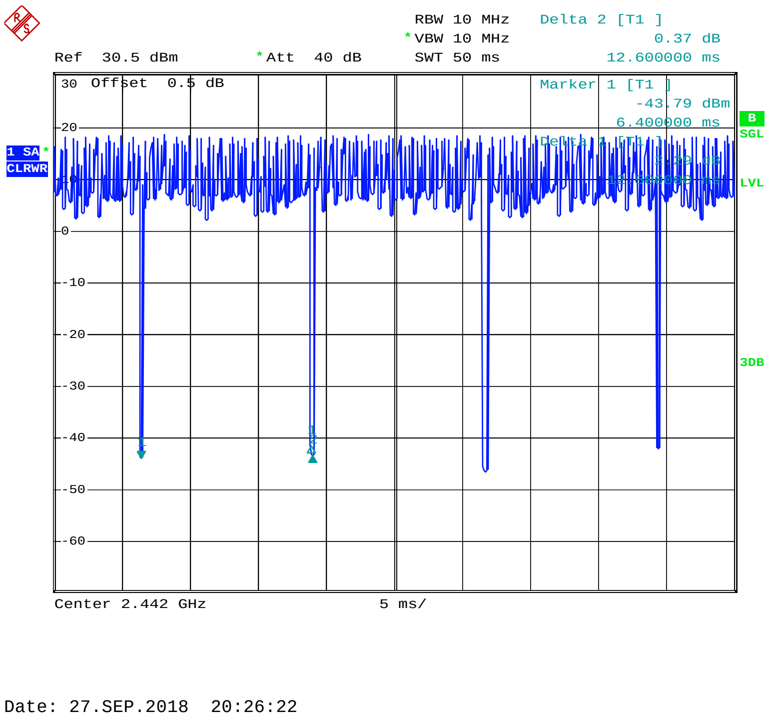
The 'Engineering Mode' was used for testing. The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring PSD across all data rates bandwidths, and modulations. The worst condition (maximum power) was setting by the software as following table:

Test Mode	Test Software Version	Engineering Mode		
802.11b	Test Frequency	2412MHz	2442MHz	2472MHz
	Data Rate	1Mbps	1Mbps	1Mbps
	Power Level Setting	17	17	17
802.11g	Test Frequency	2412MHz	2442MHz	2472MHz
	Data Rate	6Mbps	6Mbps	6Mbps
	Power Level Setting	12	13	13
802.11n ht20	Test Frequency	2412MHz	2442MHz	2472MHz
	Data Rate	MCS0	MCS0	MCS0
	Power Level Setting	15	15	15

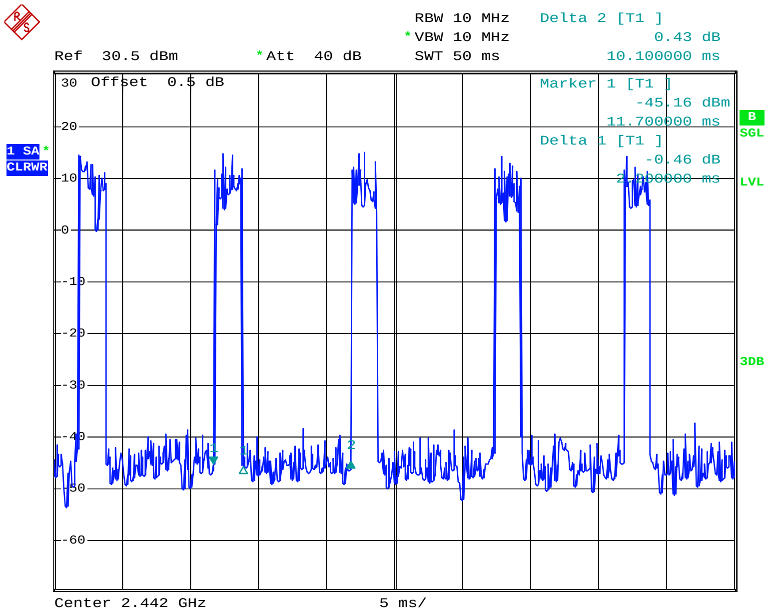
The duty cycle as below:

Mode	T_{on} (ms)	T_{on+off} (ms)	Duty Cycle (%)	Duty Cycle Factor (dB)
802.11 b	12.5	12.6	99.21	0.03
802.11 g	2.2	10.1	21.78	6.62
802.11n ht20	2.0	10.0	20.00	6.99

802.11b

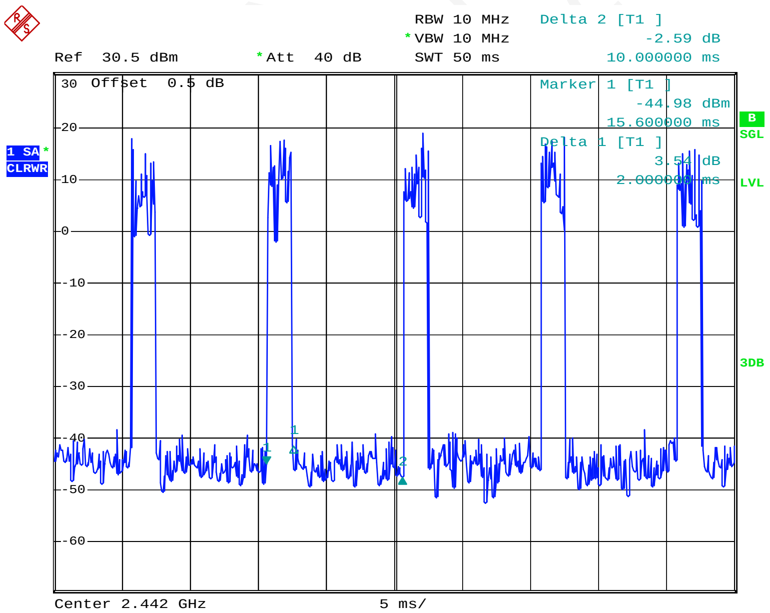


802.11 g



Date: 27.SEP.2018 20:27:21

802.11n ht20



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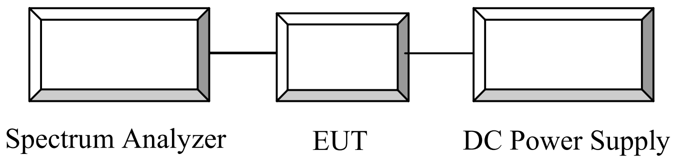
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Pro instrument	DC Power Supply	pps3300	3300012

Configuration of Test Setup



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
Agilent	USB Wideband Power Sensor	U2022XA	MY5417006	2017-12-11	2018-12-11
UNI-T	Multimeter	UT39A	M130199938	2018-05-09	2019-05-09
Pro instrument	DC Power Supply	pps3300	pps3300	N/A	N/A
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

SUMMARY OF TEST RESULTS

MIC Notice No.88 Appendix No.43 Article 2, Paragraph 1, Item 19 Rules Section	Description of Test	Result
3	Frequency Error	Compliance
4	Occupied Bandwidth and Spreading Bandwidth	Compliance
5	Transmitter Spurious Emission and Unwanted Emission Intensity	Compliance
6	Antenna Output Power and Output Power Tolerance	Compliance
7	Receiver Spurious Emission and Unwanted Emission Intensity	Compliance
8	Transmission Antenna Gain	Not Applicable
9	Transmission Radiation Angle Width	Not Applicable
10	Carrier sense capability	Not Applicable**
11	Frequency Hopping Dwell Time	Not Applicable*
12	Interference Prevention Function	Compliance
Note 1	Construction Protection Confirmation	Compliance

Note:
Not Applicable: Please refer to 'Note 3' of Antenna Output Power and Output Power Tolerance section.
Not Applicable*: Testing is only required for FHSS system devices.
Not Applicable**: Testing is only required for bandwidth which more than 26MHz and less than 38MHz.

FREQUENCY ERROR

Limit

50ppm or below

Test Procedure

Set the EUT to the measurement frequency without modulation.
Setting of SA is following as: RB: 300 kHz / VB: 300 kHz / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold.
Record the peak spot frequency.

If the EUT can`t set at un-modulation mode, measure the 10dBc center frequency.

Test Data

Environmental Conditions

Temperature:	26.4°C
Relative Humidity:	63 %
ATM Pressure:	100.4 kPa

The testing was performed by Harry yang on 2018-09-27.

Test Result: Compliance

Test Mode: Transmitting

802.11b mode

Frequency		Measure Frequency (MHz)		Result	Tolerance	Limit
Voltage		F1	F2	MHz	ppm	
2412	**V-10%**	2406.80	10.46	2412.03	12.44	<50ppm
	Normal	2406.80	10.48	2412.04	16.58	
	V+10%	2406.80	10.45	2412.03	12.44	
2442	**V-10%**	2436.00	12.08	2442.04	16.38	
	Normal	2436.00	12.08	2442.04	16.38	
	V+10%	2436.00	12.06	2442.03	12.29	
2472	**V-10%**	2466.00	12.02	2472.01	4.05	
	Normal	2466.00	12.00	2472.00	0.00	
	V+10%	2466.00	12.00	2472.00	0.00	

802.11g mode

Frequency		Measure Frequency (MHz)		Result	Tolerance	Limit
Voltage		F1	F2	MHz	ppm	
2412	**V-10%**	2403.44	17.20	2412.04	16.58	<50ppm
	Normal	2403.52	17.04	2412.04	16.58	
	V+10%	2403.52	17.02	2412.03	12.44	
2442	**V-10%**	2433.36	17.18	2441.95	-20.48	
	Normal	2433.36	17.20	2441.96	-16.38	
	V+10%	2433.36	17.20	2441.96	-16.38	
2472	**V-10%**	2463.44	17.13	2472.01	4.05	
	Normal	2463.44	17.12	2472.00	0.00	
	V+10%	2463.44	17.12	2472.00	0.00	

802.11n20 mode

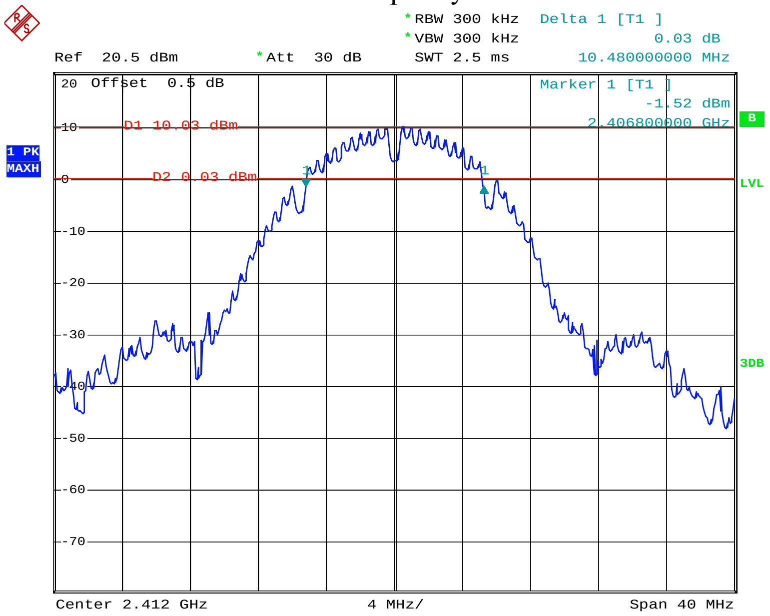
Frequency		Measure Frequency (MHz)		Result	Tolerance	Limit
Voltage		F1	F2	MHz	ppm	
2412	**V-10%**	2403.04	18.08	2412.08	33.17	<50ppm
	Normal	2403.04	18.08	2412.08	33.17	
	V+10%	2403.04	18.06	2412.07	29.02	
2442	**V-10%**	2432.96	18.24	2442.08	32.76	
	Normal	2432.96	18.24	2442.08	32.76	
	V+10%	2432.96	18.22	2442.07	28.67	
2472	**V-10%**	2462.88	18.22	2471.99	-4.05	
	Normal	2462.88	18.24	2472.00	0.00	
	V+10%	2462.88	18.24	2472.00	0.00	

Note: Result=F1+F2/2

Please refer to the following plots for normal voltage:

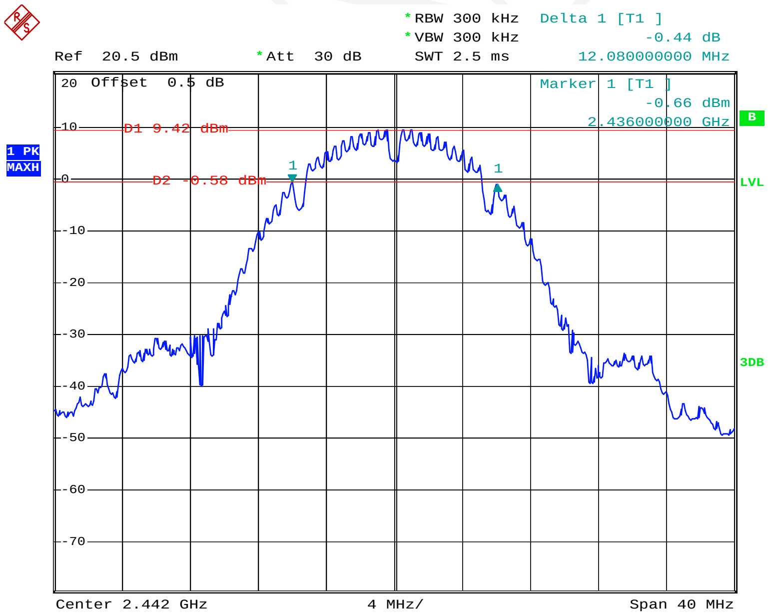
802.11b mode

Test Frequency:2412MHz



Date: 27.SEP.2018 21:47:59

Test Frequency:2442MHz



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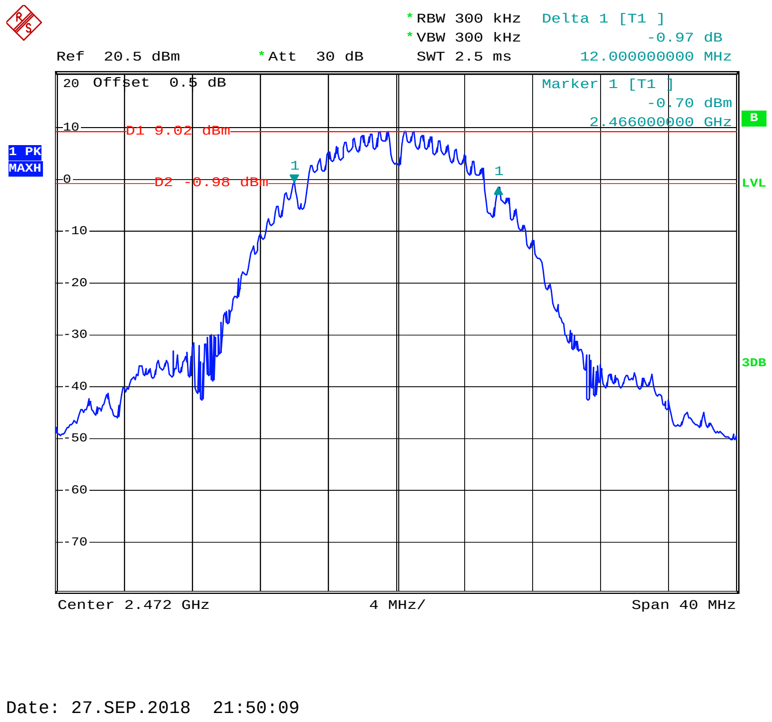
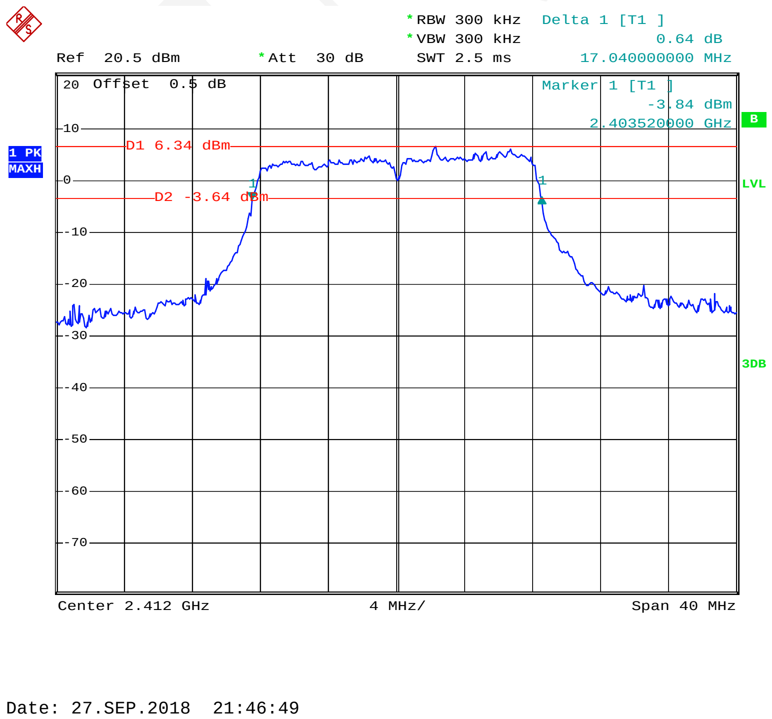
Test Frequency:2472MHz

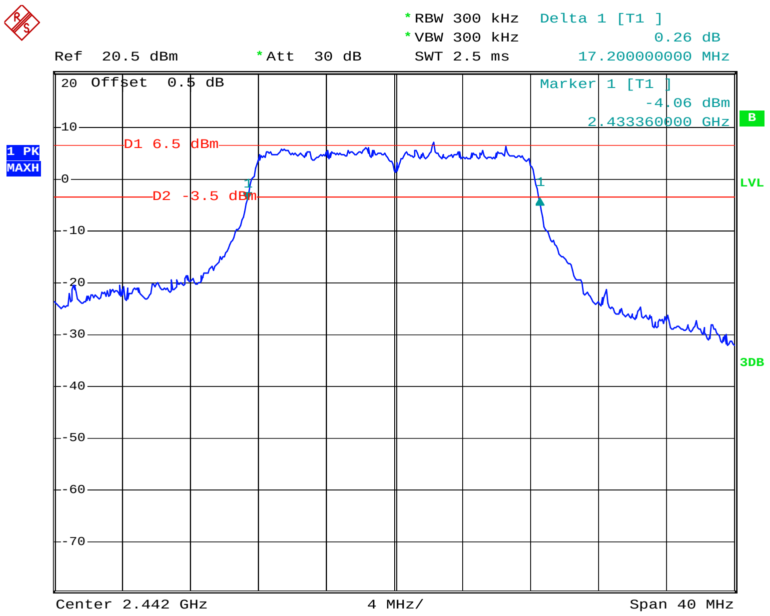


802.11g mode

Test Frequency:2412MHz



Test Frequency:2442MHz



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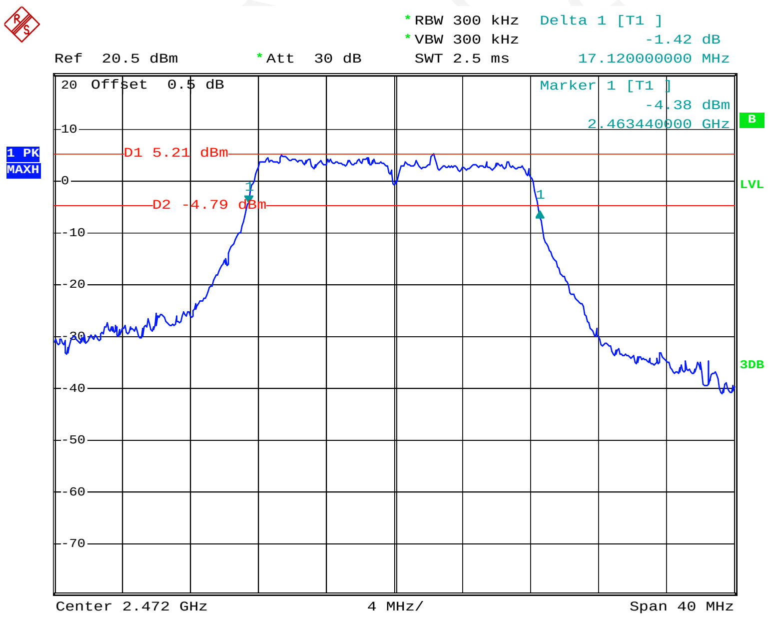
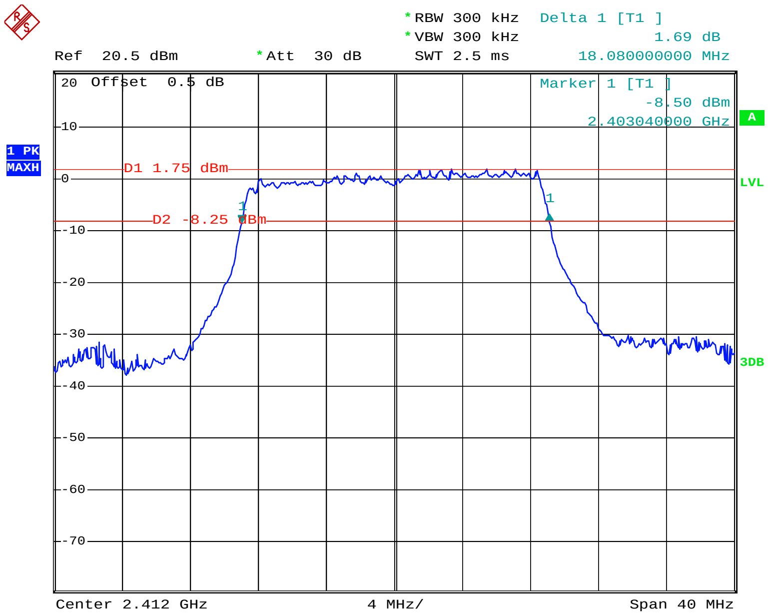
Test Frequency:2472MHz



Date: 27.SEP.2018 21:44:43

802.11n20 mode

Test Frequency:2412MHz



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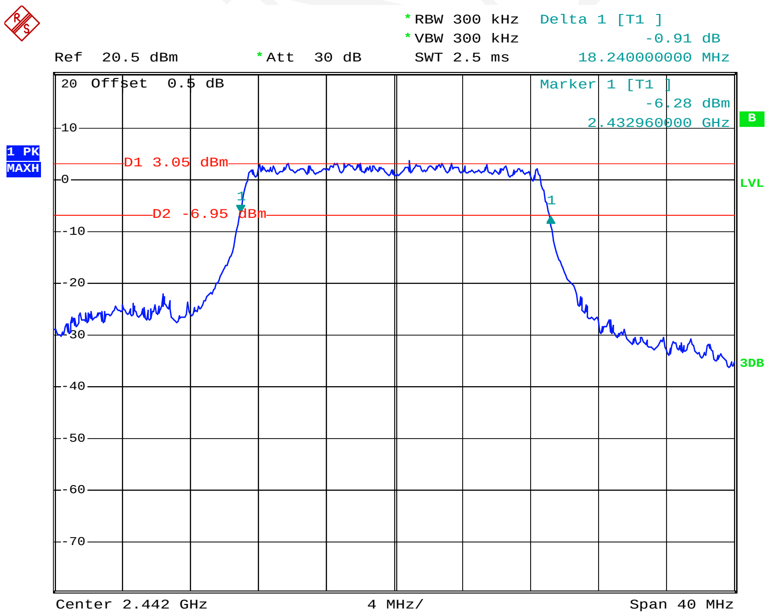
Test Frequency:2442MHz



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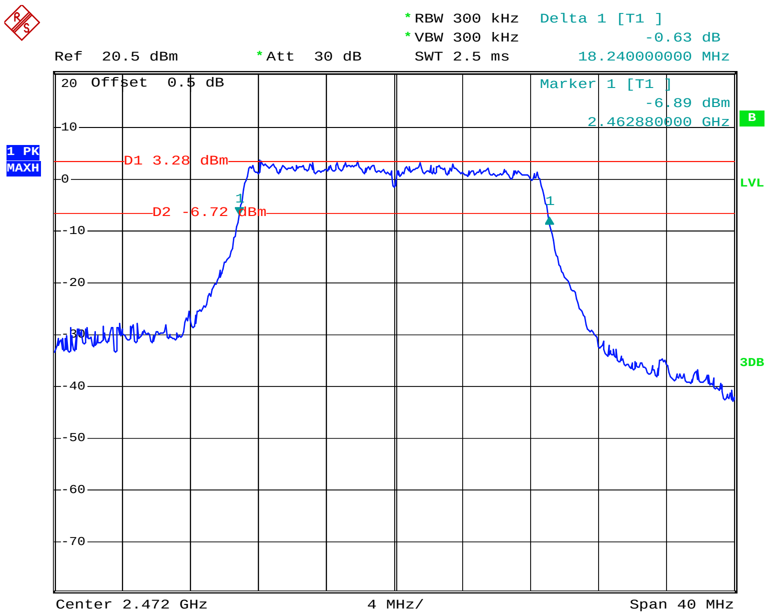
Test Frequency:2472MHz



Date: 27.SEP.2018 21:43:46

OCCUPIED BANDWIDTH AND SPREADING BANDWIDTH

Limit

- Occupied bandwidth: FH≤83.5 MHz; DS≤26 MHz; OFDM≤38 MHz, Others≤26 MHz
- Spread Bandwidth:≥ 500 kHz(FH,DS),Spread factor≥5.

Test Procedure

1. Setting of SA is following as: RB: 300 kHz / VB: 300 kHz / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
2. EUT have transmitted the maximum modulation signal and fixed channelize. SA set to 99% of occupied bandwidth to measure occupied bandwidth.
3. EUT have transmitted the maximum modulation signal and fixed channelize. SA set to 90% of occupied bandwidth to measure spread bandwidth.
4. Spread Factor=Spread Bandwidth/modulation rate. The modulation rate: MR=1.375 for 802.11b, 1.5 for 802.11g/n ht20.

Test Data

Environmental Conditions

Temperature:	26.4°C
Relative Humidity:	63 %
ATM Pressure:	100.4 kPa

The testing was performed by Harry yang on 2018-09-27.

Test Result: Compliance

Test Mode: Transmitting

802.11b Mode:

Frequency		Low Channel			Middle Channel			High Channel			Limit
Voltage		**V-10%**	**Normal**	**V+10%**	**V-10%**	**Normal**	**V+10%**	**V-10%**	**Normal**	**V+10%**	
Occupied Bandwidth	**MHz**	13.20	13.20	13.28	13.52	13.52	13.52	13.52	13.52	13.52	<26MHz
Spreading Bandwidth	**MHz**	8.56	8.56	8.64	8.80	8.80	8.80	8.80	8.80	8.80	>500KHz
Spreading Factor		6.23	6.23	6.28	6.40	6.40	6.40	6.40	6.40	6.40	>5

802.11g Mode:

Frequency		Low Channel			Middle Channel			High Channel			Limit
Voltage		**V-10%**	**Normal**	**V+10%**	**V-10%**	**Normal**	**V+10%**	**V-10%**	**Normal**	**V+10%**	
Occupied Bandwidth	**MHz**	16.96	16.96	16.96	16.96	16.96	16.96	16.96	16.96	16.96	<26MHz
Spreading Bandwidth	**MHz**	14.72	14.72	14.80	14.88	14.88	14.80	14.80	14.80	14.80	>500KHz
Spreading Factor		9.81	9.81	9.87	9.92	9.92	9.87	9.87	9.87	9.87	>5

802.11n ht20 Mode:

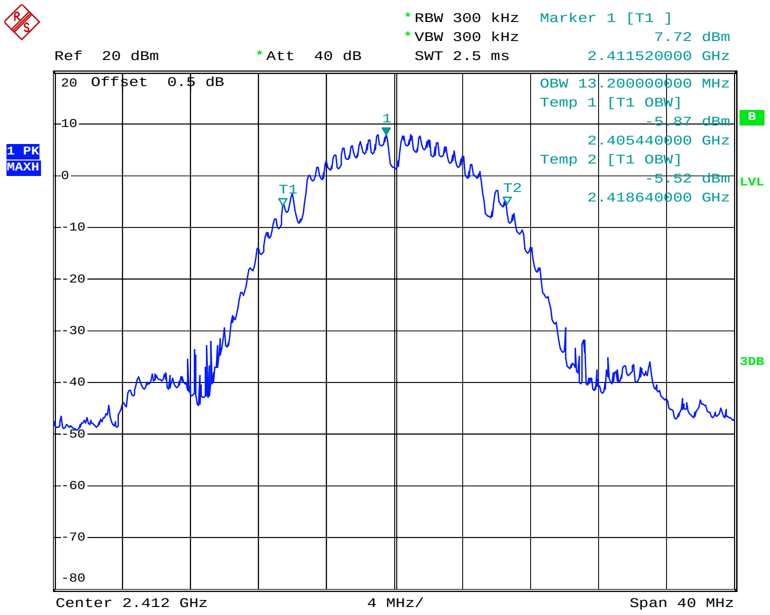
Frequency		Low Channel			Middle Channel			High Channel			Limit
Voltage		**V-10%**	**Normal**	**V+10%**	**V-10%**	**Normal**	**V+10%**	**V-10%**	**Normal**	**V+10%**	
Occupied Bandwidth	**MHz**	17.84	17.84	17.92	17.84	17.84	17.84	17.92	17.92	17.92	<26MHz
Spreading Bandwidth	**MHz**	15.84	15.76	15.76	15.76	15.76	15.76	15.76	15.76	15.84	>500KHz
Spreading Factor		10.56	10.51	10.51	10.51	10.51	10.51	10.51	10.51	10.56	>5

Please refer to the following plots for normal voltage:

Occupied Bandwidth:

802.11b mode:

Test Frequency:2412MHz



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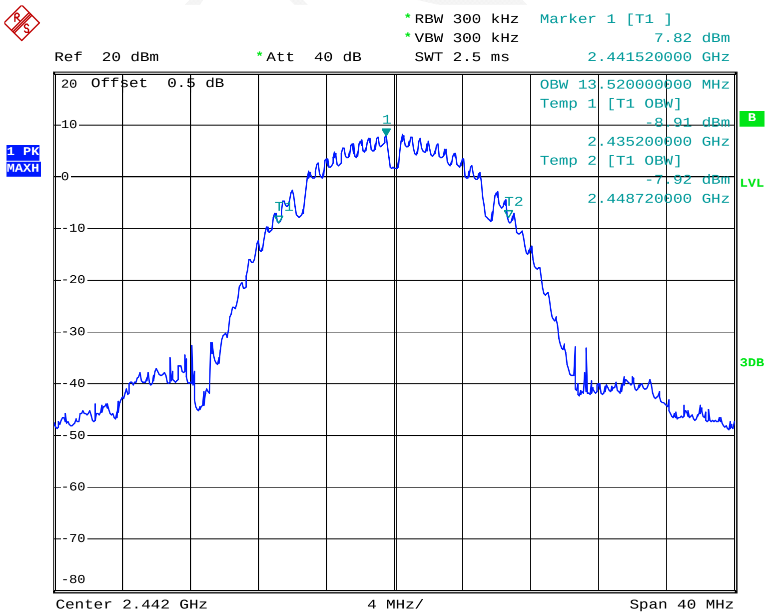
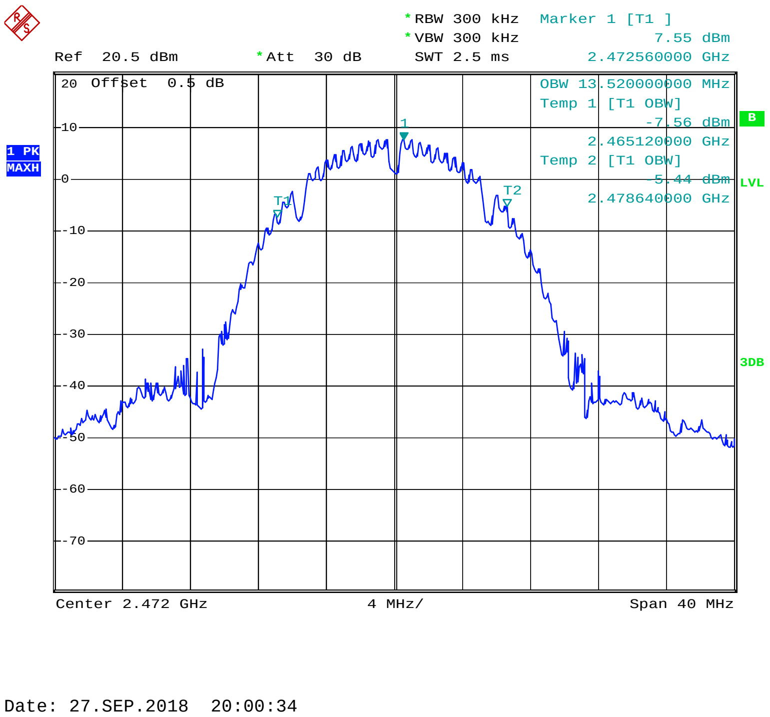
Test Frequency:2442MHz



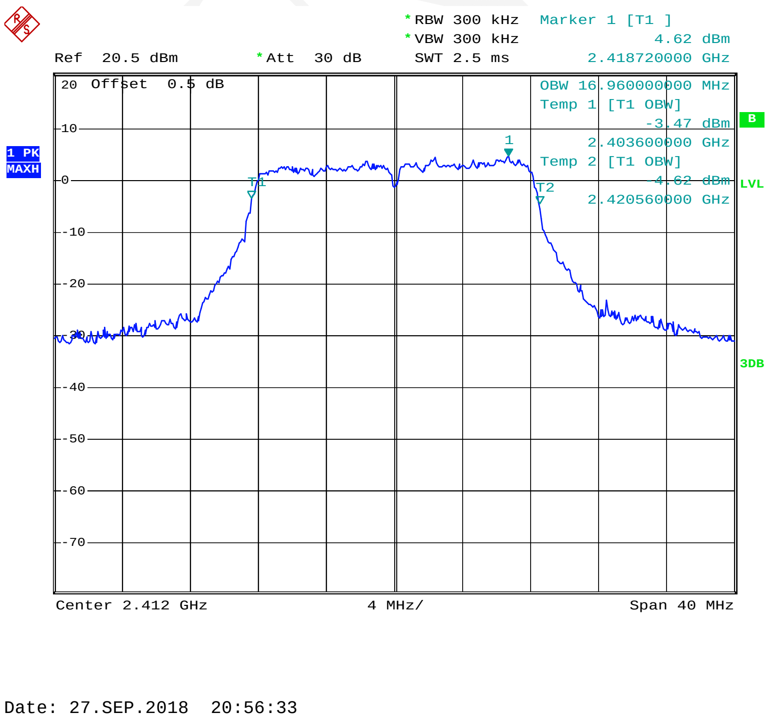
Date: 27.SEP.2018 20:09:32

Test Frequency:2472MHz

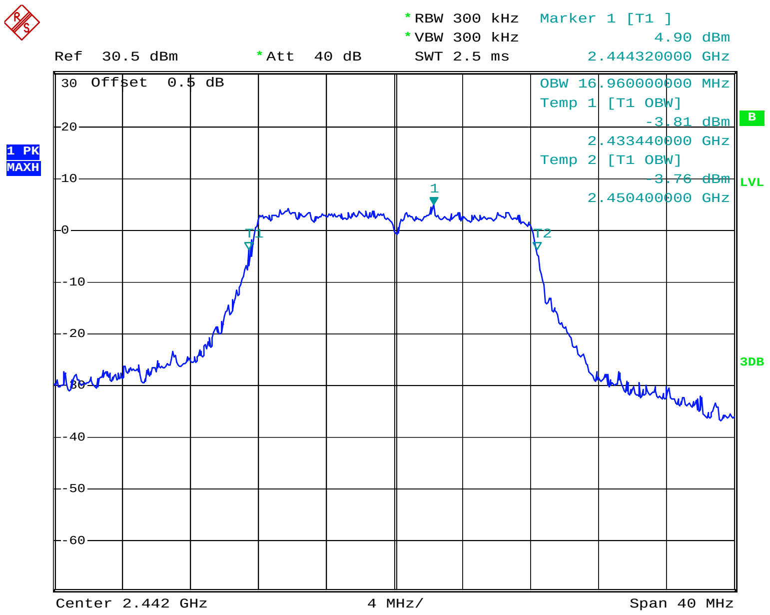


802.11g Mode:

Test Frequency:2412MHz



Test Frequency:2442MHz



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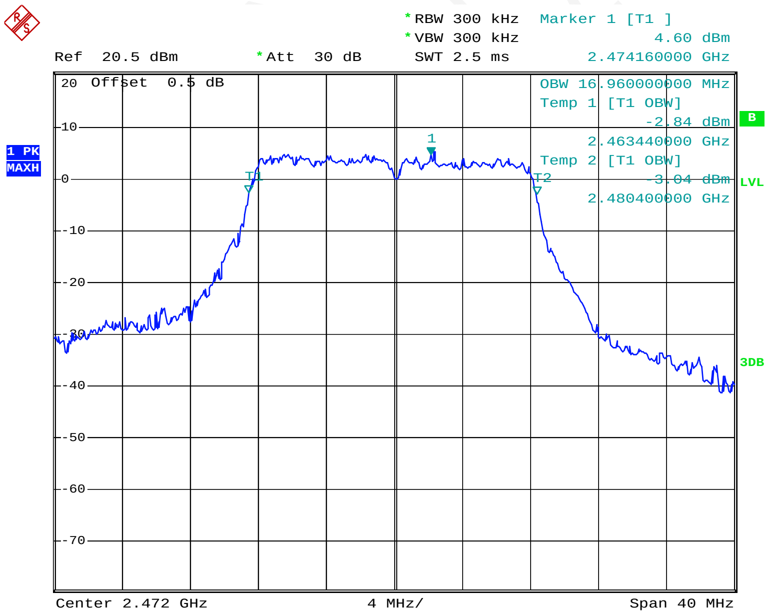
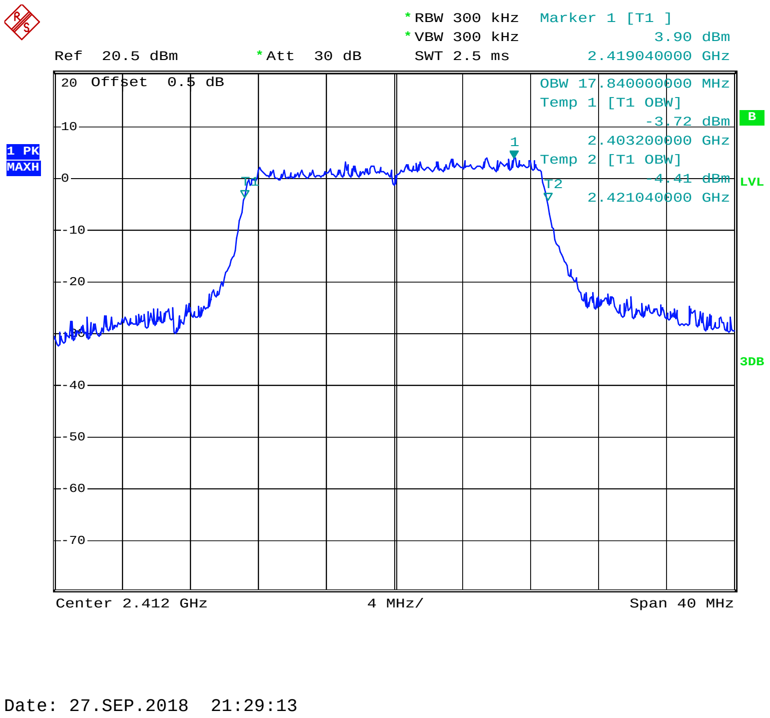
Test Frequency:2472MHz



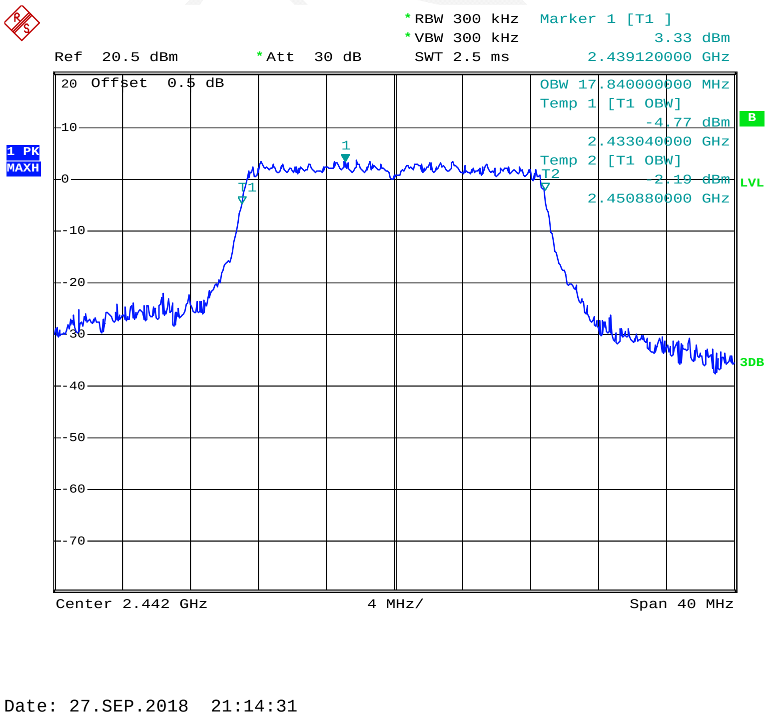
Date: 27.SEP.2018 21:05:07

802.11n ht20 mode:

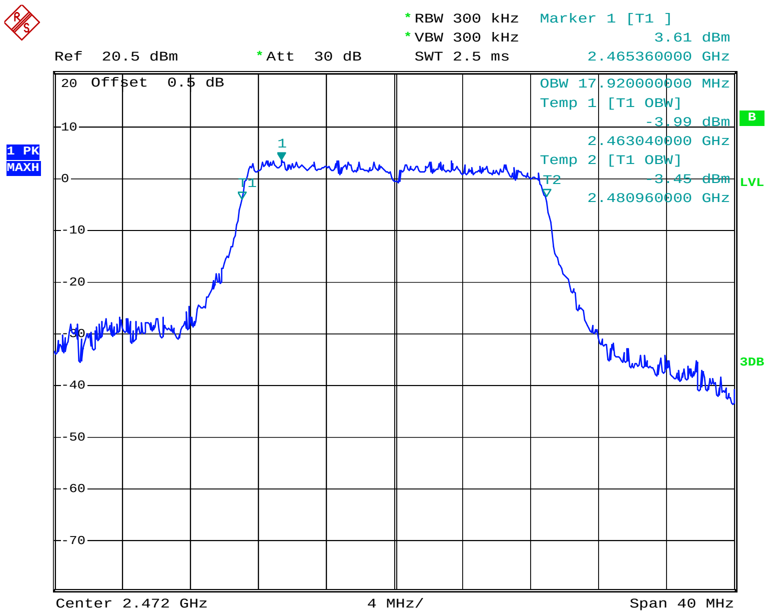
Test Frequency:2412MHz



Test Frequency:2442MHz



Test Frequency:2472MHz

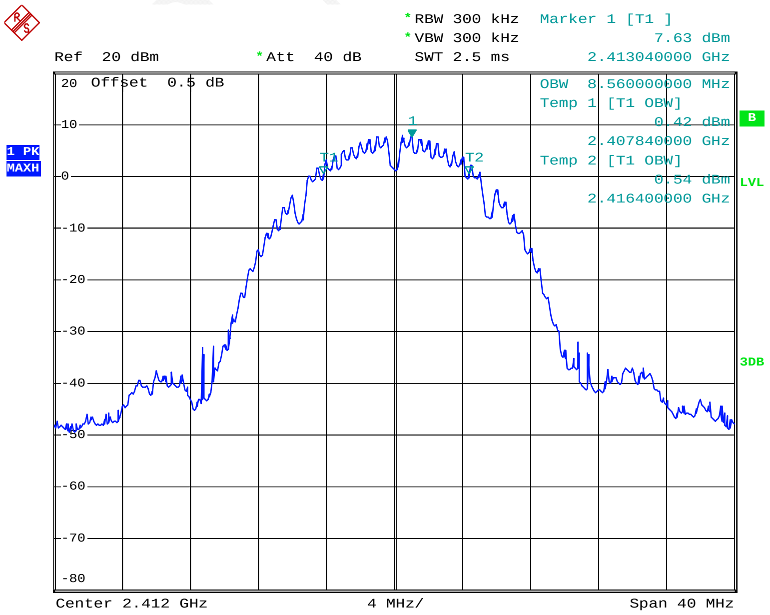


Date: 27.SEP.2018 21:22:29

Spread Bandwidth:

802.11b Mode:

Test Frequency:2412MHz



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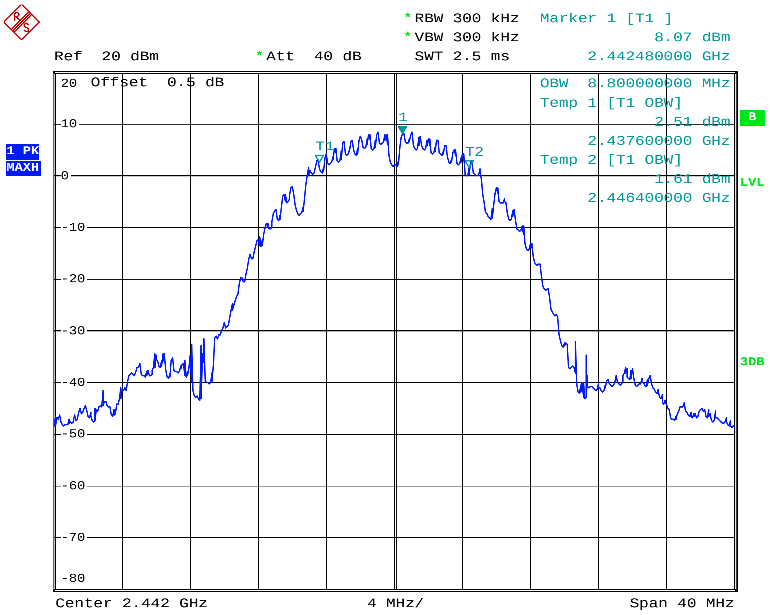
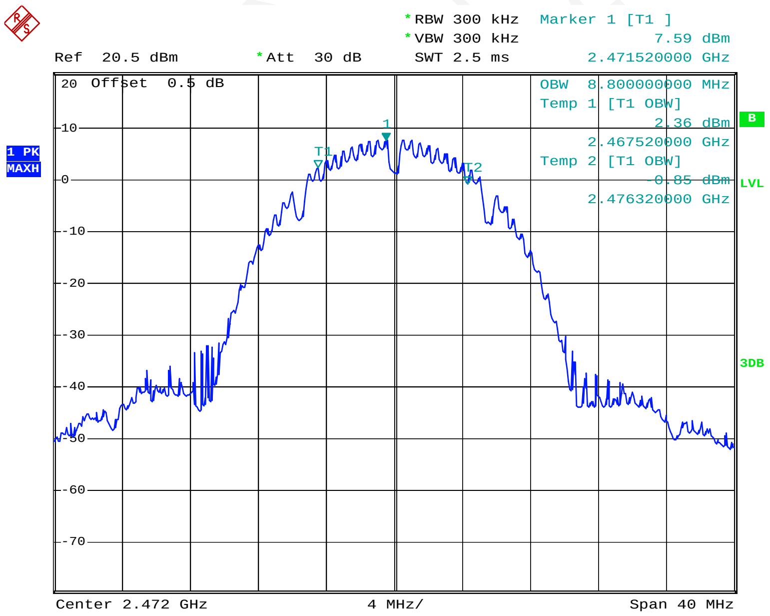
Test Frequency:2442MHz



Date: 27.SEP.2018 20:09:21

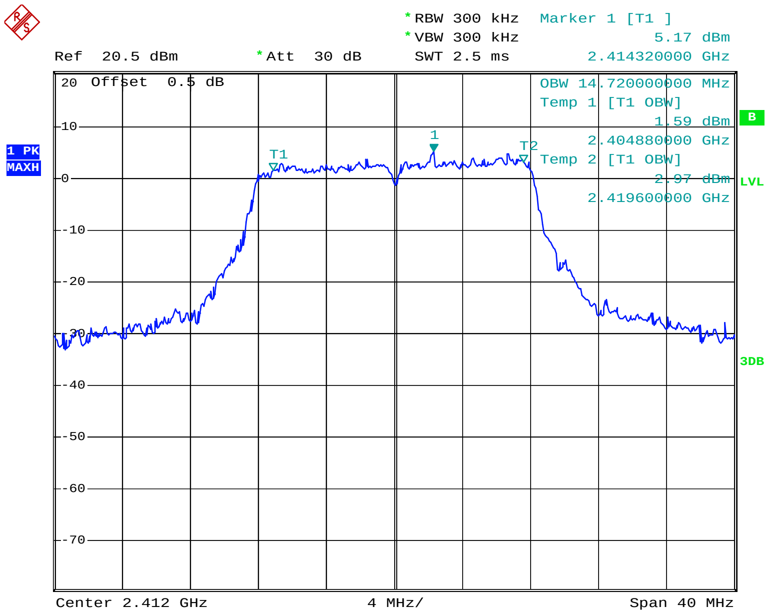
Test Frequency:2472MHz



Date: 27.SEP.2018 20:00:50

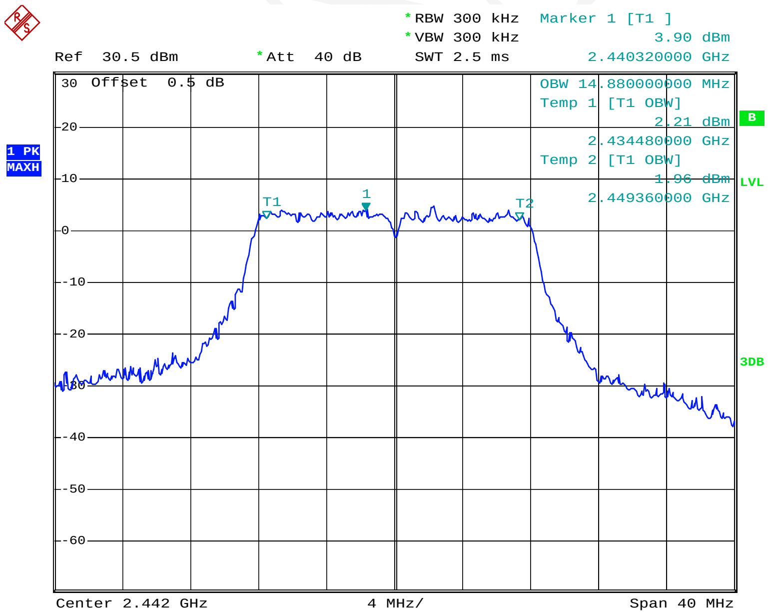
802.11g Mode:

Test Frequency:2412MHz



Date: 27.SEP.2018 20:56:55

Test Frequency:2442MHz



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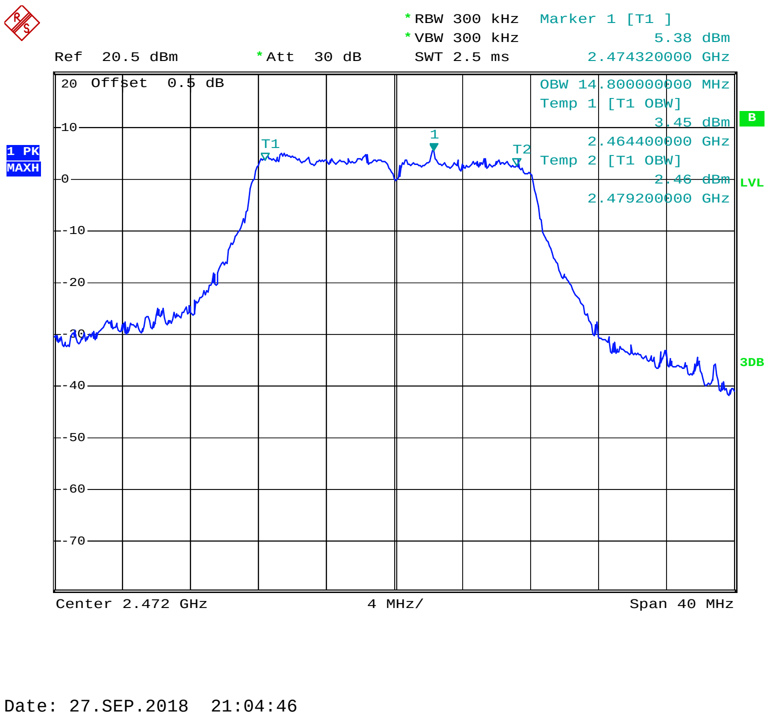
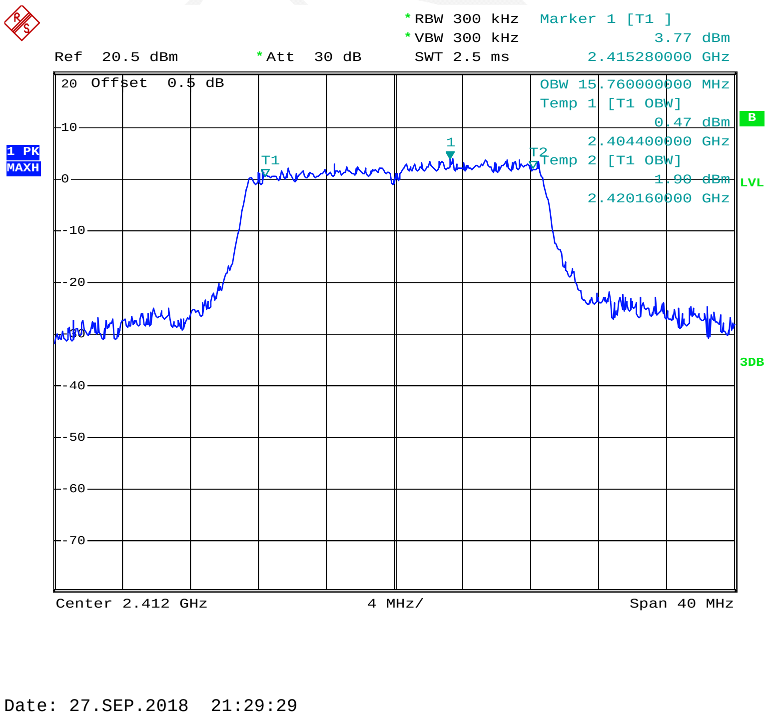
Test Frequency:2472MHz

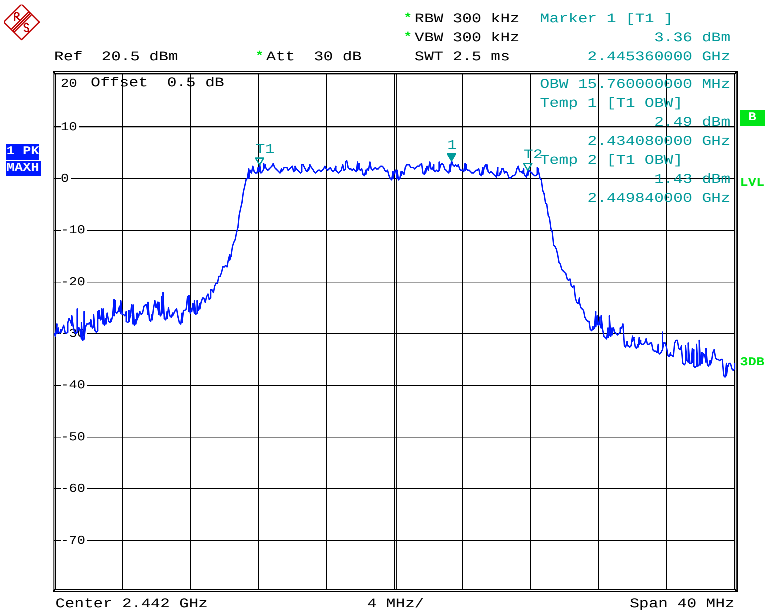


802.11n ht20:

Test Frequency:2412MHz



Test Frequency:2442MHz



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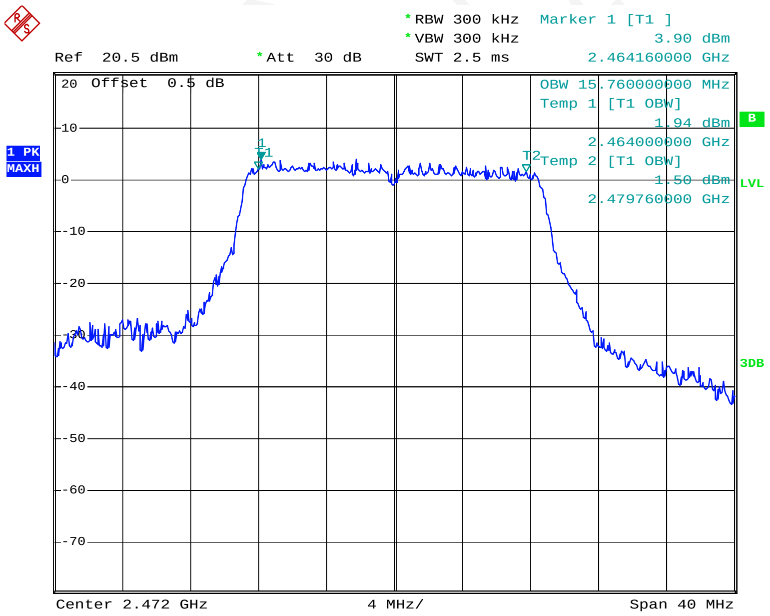
Test Frequency:2472MHz



Date: 27.SEP.2018 21:22:10

TRANSMITTER SPURIOUS EMISSION STRENGTH AND UNWANTED EMISSION INTENSITY

Limit

- f＜1000 MHz: ≤0.25μW/100kHz
- 1000 MHz<f＜2387 MHz, f＞2496.5 MHz: ≤2.5μW/MHz
- 2387 MHz≤f≤2400 MHz; 2483.5 MHz＜f≤2496.5 MHz: ≤25μW/MHz

Test Procedure

❖ Conditions of Application Equipment (EUT)

- The modulation state shall be in continuously transmitting mode.

❖ Spectrum Analyzer Conditions

- Setting of SA start 30MHz and stop frequency 1000MHz,RB:100kHz/VB:100kHz,Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value + cable loss shall be less than 0.25μW/100kHz.
- Setting of SA start 1000MHz and stop frequency 2387MHz,RB:1MHz/VB:1MHz,Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value + cable loss shall be less than 2.5μW/MHz.
- Setting of SA start 2387MHz and stop frequency 2400MHz,RB:1MHz/VB:1MHz,Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value + cable loss shall be less than 25μW/MHz.
- Setting of SA start 2483.5MHz and stop frequency 2496.5MHz,RB:1MHz/VB:1MHz,Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value + cable loss shall be less than 25μW/MHz.
- Setting of SA start 2496.5MHz and stop frequency 12500MHz,RB:1MHz/VB:1MHz,Sweep time: Auto. Sweep mode: continuous sweep .Detect mode: Positive peak/Trace mode: max hold. Then to mark peak. reading value + cable loss shall be less than 2.5μW/MHz.

Test Data

Environmental Conditions

Temperature:	26.4°C
Relative Humidity:	63 %
ATM Pressure:	100.4 kPa

The testing was performed by Harry yang on 2018-09-27.

Test Mode: Transmitting,

Test Result: Compliant, *Please refer to the below tables and plots*

802.11b Mode:

	Frequency Band	2412 MHz			2442 MHz			2472 MHz			Limit
		LV	NV	HV	LV	NV	HV	LV	NV	HV	
Raw data	Band I (dBm/100kHz)	-47.67	-47.57	-47.56	-47.60	-47.67	-47.59	-50.42	-50.47	-50.44	-36dBm/100kHz
	Band II (dBm/MHz)	-42.95	-42.94	-43.01	-48.93	-48.88	-48.83	-41.95	-41.91	-41.96	-26dBm/MHz
	Band III (dBm/MHz)	-24.50	-24.54	-24.55	-46.40	-46.40	-46.42	-41.44	-41.39	-41.43	-16dBm/MHz
	Band IV (dBm/MHz)	-40.62	-40.68	-40.75	-46.70	-46.72	-46.72	-25.43	-25.37	-25.30	-16dBm/MHz
	Band V (dBm/MHz)	-41.44	-41.38	-41.32	-41.09	-41.18	-41.20	-40.96	-41.02	-41.09	-26dBm/MHz
Unwanted Emission Intensity	Band I (µW/100kHz)	0.0171	0.0175	0.0175	0.0174	0.0171	0.0174	0.0091	0.0090	0.0090	0.25 µW/100kHz
	Band II (µW/MHz)	0.0507	0.0508	0.0500	0.0128	0.0129	0.0131	0.0638	0.0644	0.0637	2.5 µW/MHz
	Band III (µW/MHz)	3.54813	3.51560	3.50752	0.02291	0.02291	0.02280	0.07178	0.07261	0.07194	25 µW/MHz
	Band IV (µW/MHz)	0.08670	0.08551	0.08414	0.02138	0.02128	0.02128	2.86418	2.90402	2.95121	25 µW/MHz
	Band V (µW/MHz)	0.07178	0.07278	0.07379	0.07780	0.07621	0.07586	0.08017	0.07907	0.07780	2.5 µW/MHz

802.11g Mode:

	Frequency Band	2412 MHz			2442 MHz			2472 MHz			Limit
		LV	NV	HV	LV	NV	HV	LV	NV	HV	
Raw data	Band I (dBm/100kHz)	-48.16	-48.13	-48.18	-47.64	-47.65	-47.65	-47.44	-47.49	-47.50	-36dBm/100kHz
	Band II (dBm/MHz)	-26.36	-26.35	-26.30	-38.32	-38.28	-38.34	-37.52	-37.56	-37.61	-26dBm/MHz
	Band III (dBm/MHz)	-16.26	-16.23	-16.24	-30.11	-30.03	-30.11	-33.87	-33.80	-33.76	-16dBm/MHz
	Band IV (dBm/MHz)	-40.71	-40.63	-40.53	-38.83	-38.79	-38.85	-16.12	-16.08	-16.06	-16dBm/MHz
	Band V (dBm/MHz)	-37.88	-37.78	-37.77	-39.98	-40.80	-40.12	-38.74	-38.76	-38.83	-26dBm/MHz
Unwanted Emission Intensity	Band I (µW/100kHz)	0.0153	0.0154	0.0152	0.0172	0.0172	0.0172	0.0180	0.0178	0.0178	0.25 µW/100kHz
	Band II (µW/MHz)	2.3121	2.3174	2.3442	0.1472	0.1486	0.1466	0.1770	0.1754	0.1734	2.5 µW/MHz
	Band III (µW/MHz)	23.65920	23.82319	23.76840	0.97499	0.99312	0.97499	0.41020	0.41687	0.42073	25 µW/MHz
	Band IV (µW/MHz)	0.08492	0.08650	0.08851	0.13092	0.13213	0.13032	24.43431	24.66039	24.77422	25 µW/MHz
	Band V (µW/MHz)	0.16293	0.16672	0.16711	0.10046	0.08318	0.09727	0.13366	0.13305	0.13092	2.5 µW/MHz

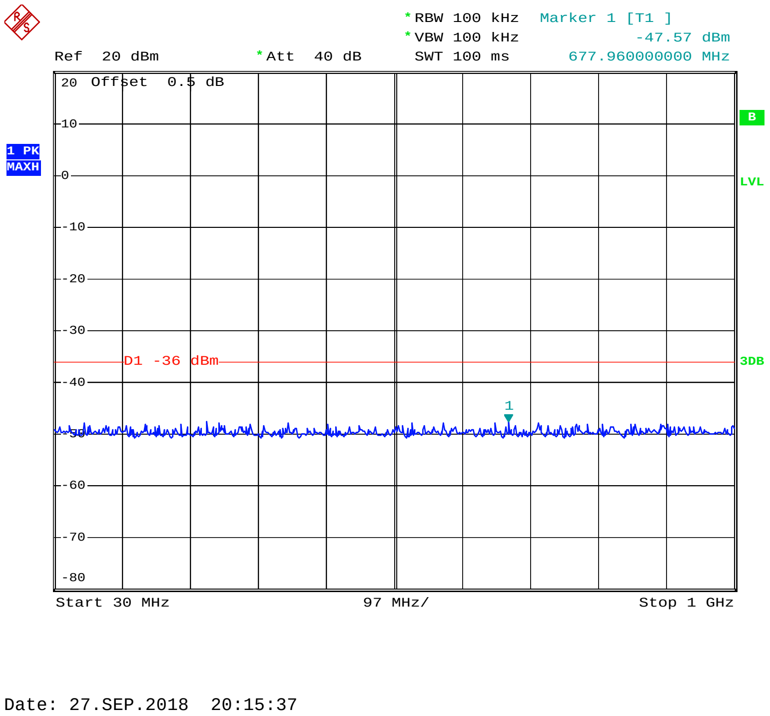
802.11n ht20 Mode:

	Frequency Band	2412 MHz			2442 MHz			2472 MHz			Limit
		LV	NV	HV	LV	NV	HV	LV	NV	HV	
Raw data	Band I (dBm/100kHz)	-47.80	-47.82	-47.87	-47.02	-47.10	-47.01	-48.45	-48.51	-48.48	-36dBm/100kHz
	Band II (dBm/MHz)	-26.78	-26.75	-26.84	-37.85	-37.84	-37.92	-41.08	-41.11	-41.03	-26dBm/MHz
	Band III (dBm/MHz)	-17.43	-17.52	-17.46	-26.95	-26.95	-27.02	-34.72	-34.73	-34.76	-16dBm/MHz
	Band IV (dBm/MHz)	-40.93	-40.99	-40.90	-35.48	-35.50	-35.41	-16.65	-16.73	-16.73	-16dBm/MHz
	Band V (dBm/MHz)	-41.47	-41.54	-41.56	-39.69	-39.69	-39.75	-41.45	-41.40	-41.36	-26dBm/MHz
Unwanted Emission Intensity	Band I (μW/100kHz)	0.0166	0.0165	0.0163	0.0199	0.0195	0.0199	0.0143	0.0141	0.0142	0.25 μW/100kHz
	Band II (μW/MHz)	2.0989	2.1135	2.0701	0.1641	0.1644	0.1614	0.0780	0.0774	0.0789	2.5 μW/MHz
	Band III (μW/MHz)	18.0717	17.7011	17.9473	2.0184	2.0184	1.9861	0.3373	0.3365	0.3342	25 μW/MHz
	Band IV (μW/MHz)	0.0807	0.0796	0.0813	0.2831	0.2818	0.2877	21.6272	21.2324	21.2324	25 μW/MHz
	Band V (μW/MHz)	0.0713	0.0701	0.0698	0.1074	0.1074	0.1059	0.0716	0.0724	0.0731	2.5 μW/MHz

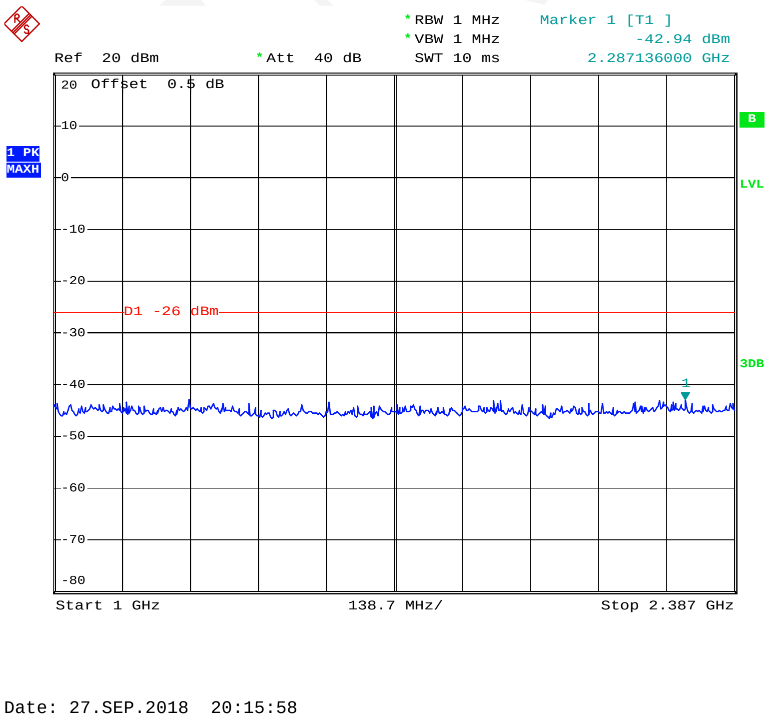
Note:
Band I: 30MHz～1000MHz
Band II: 1000MHz～2387MHz
Band III: 2387MHz～2400MHz
Band IV: 2483.5MHz～2496.5MHz
Band V: 2496.5MHz~12500MHz

Please refer to the following plots for normal voltage:
802.11b mode:
Test Frequency: 2412MHz

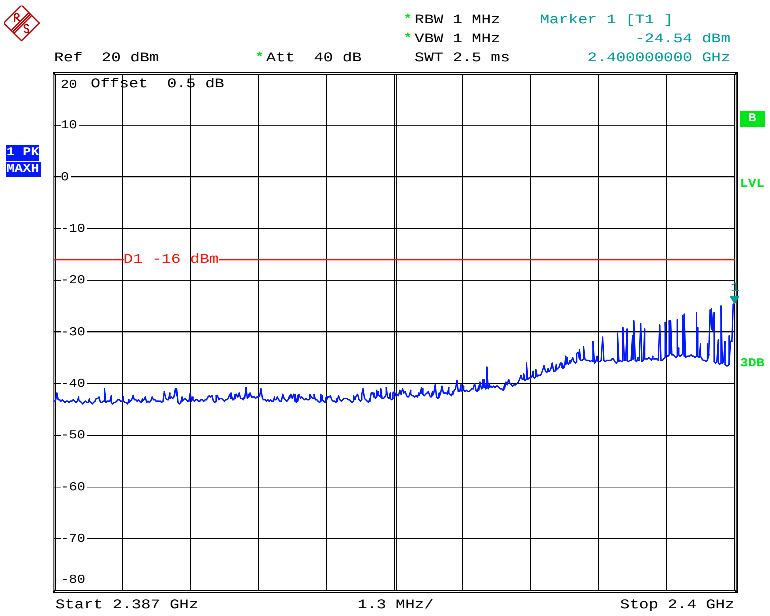
30MHz～1000MHz



1000MHz～2387MHz

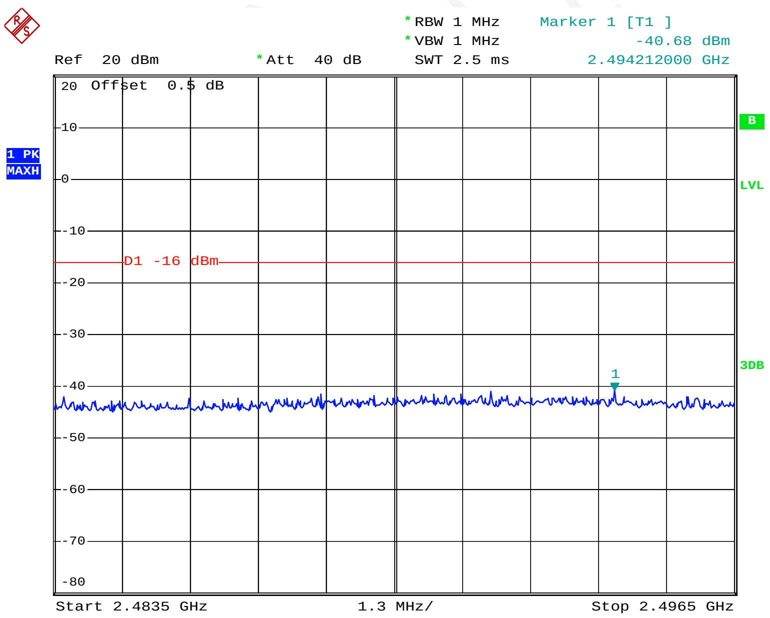


2387MHz～2400MHz



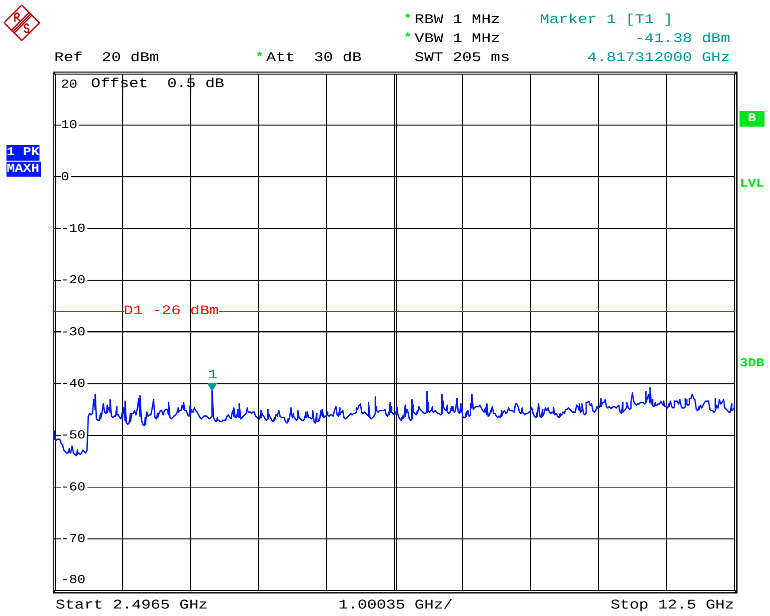
Date: 27.SEP.2018 20:16:22

2483.5MHz～2496.5MHz



Date: 27.SEP.2018 20:22:45

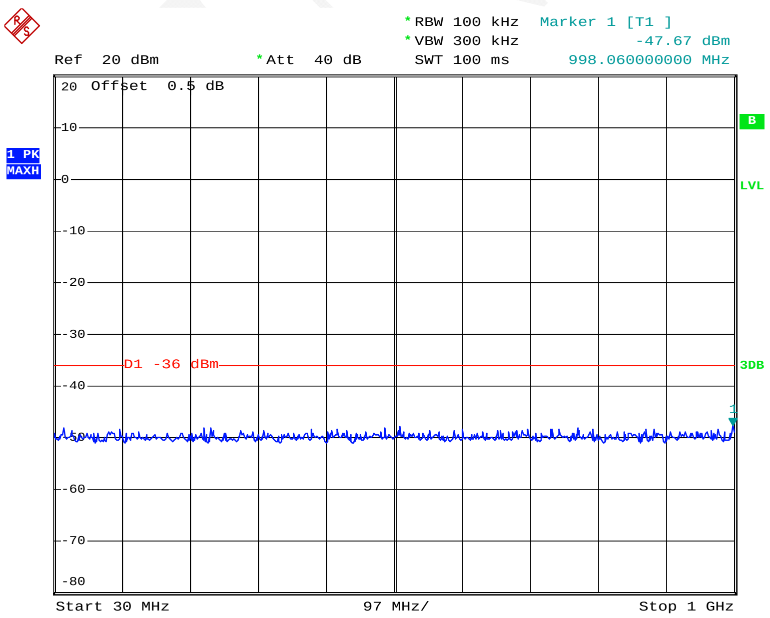
2496.5MHz～12500MHz



Date: 27.SEP.2018 20:23:08

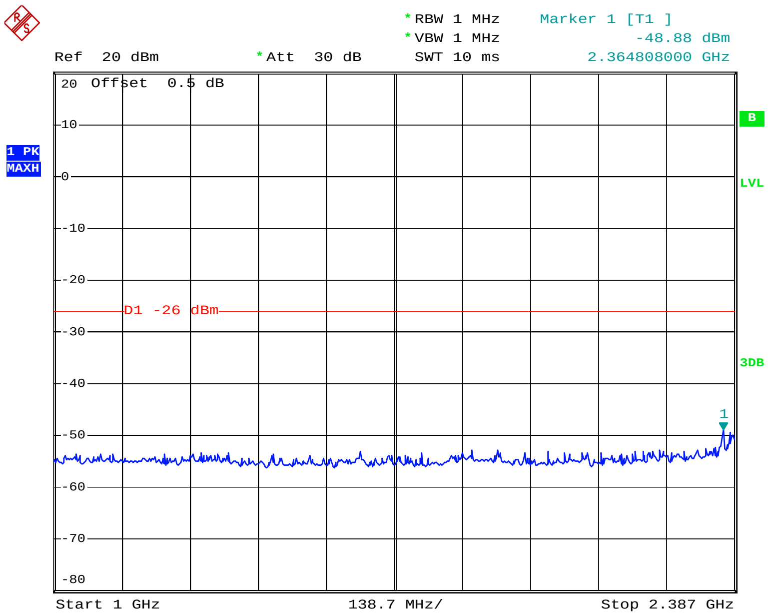
Test Frequency: 2442MHz:

30MHz～1000MHz



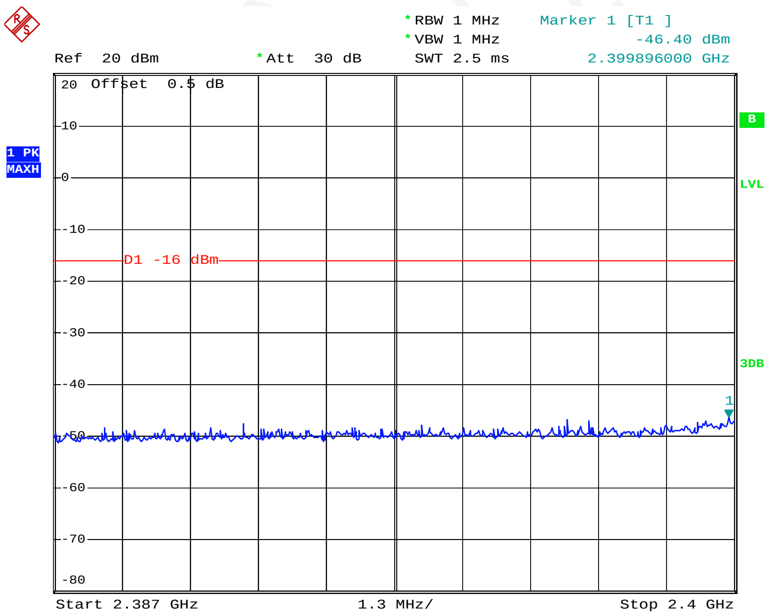
Date: 27.SEP.2018 20:08:29

1000MHz～2387MHz



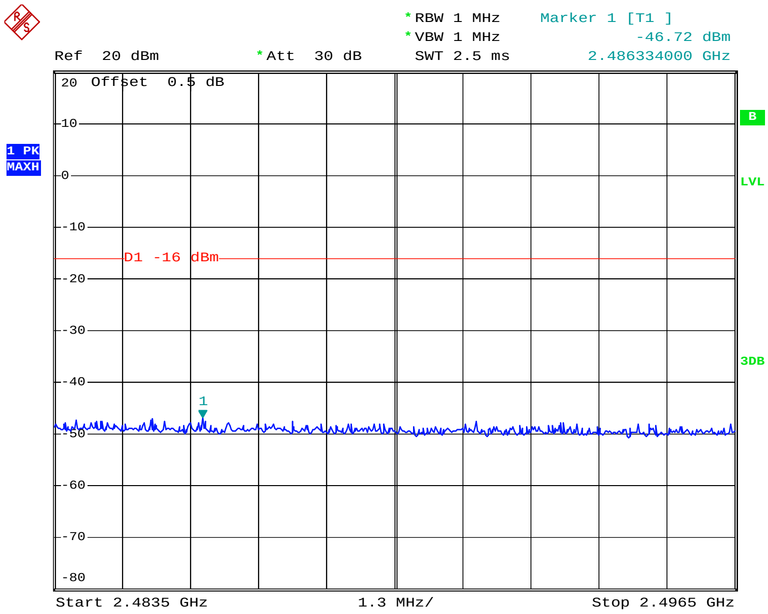
Date: 27.SEP.2018 20:07:57

2387MHz～2400MHz



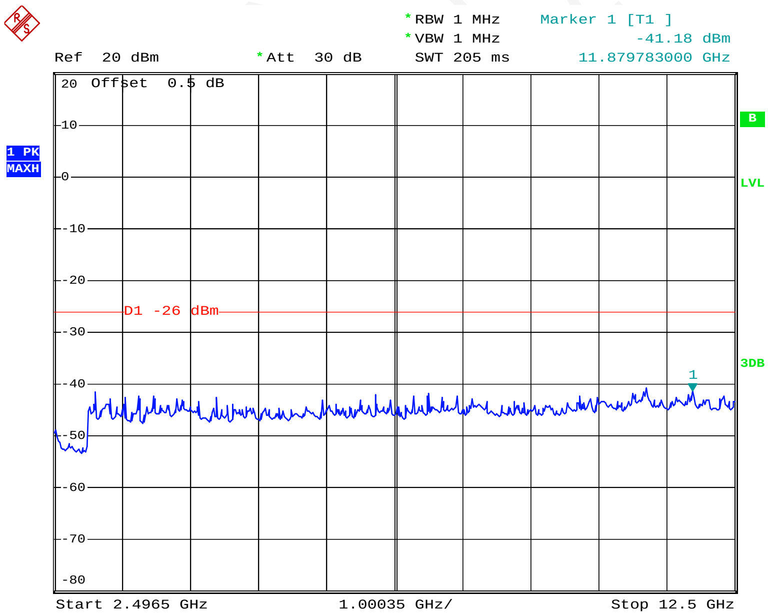
Date: 27.SEP.2018 20:07:43

2483.5MHz～2496.5MHz



Date: 27.SEP.2018 20:07:21

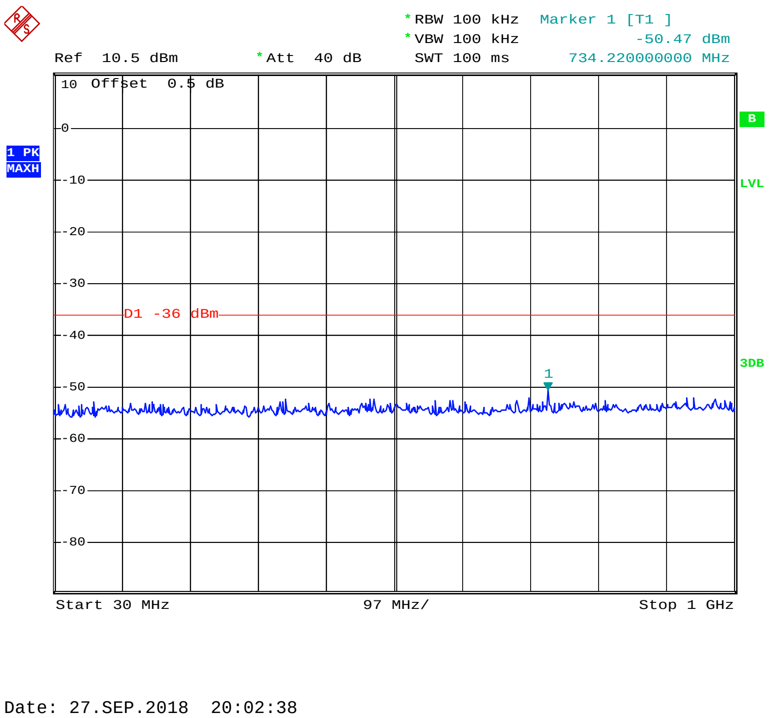
2496.5MHz～12500MHz



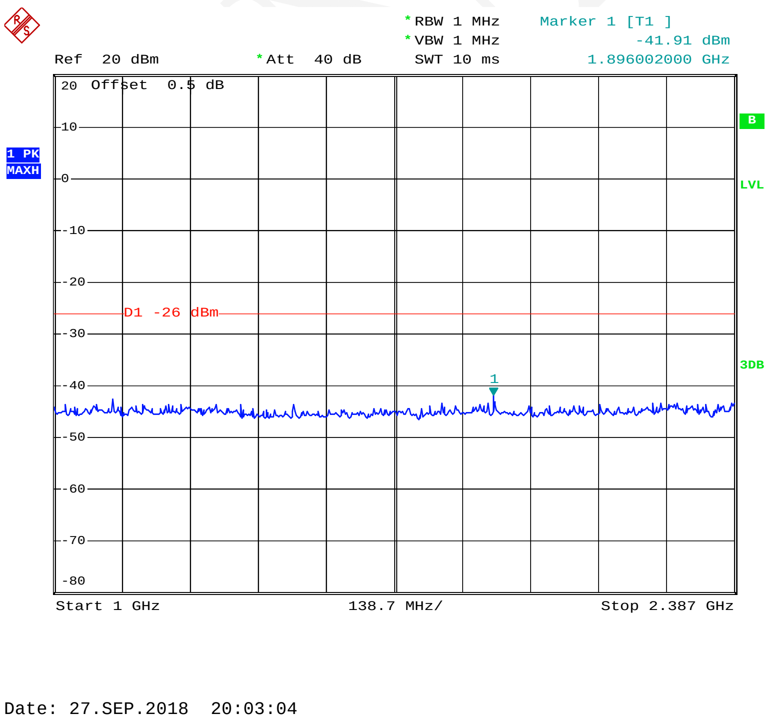
Date: 27.SEP.2018 20:06:52

Test Frequency: 2472MHz:

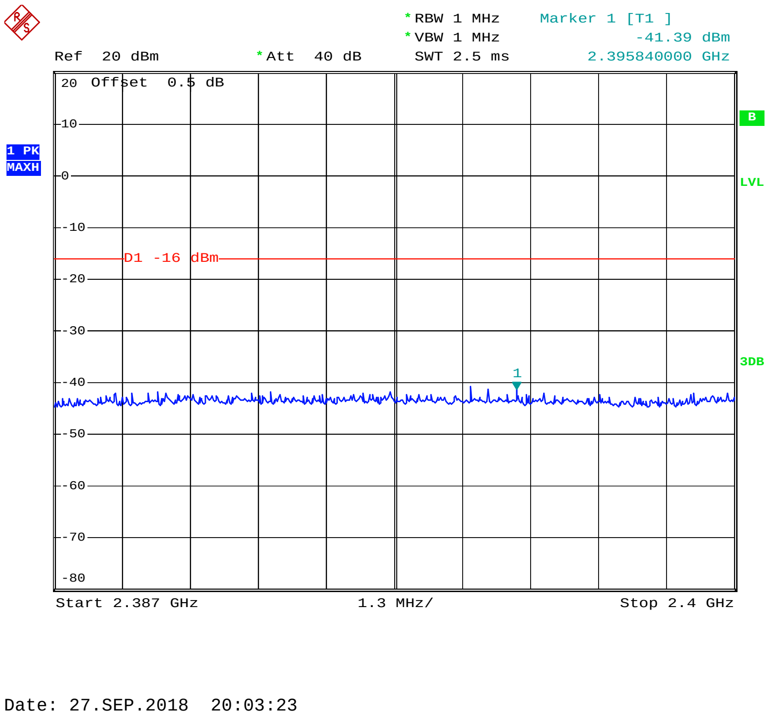
30MHz～1000MHz



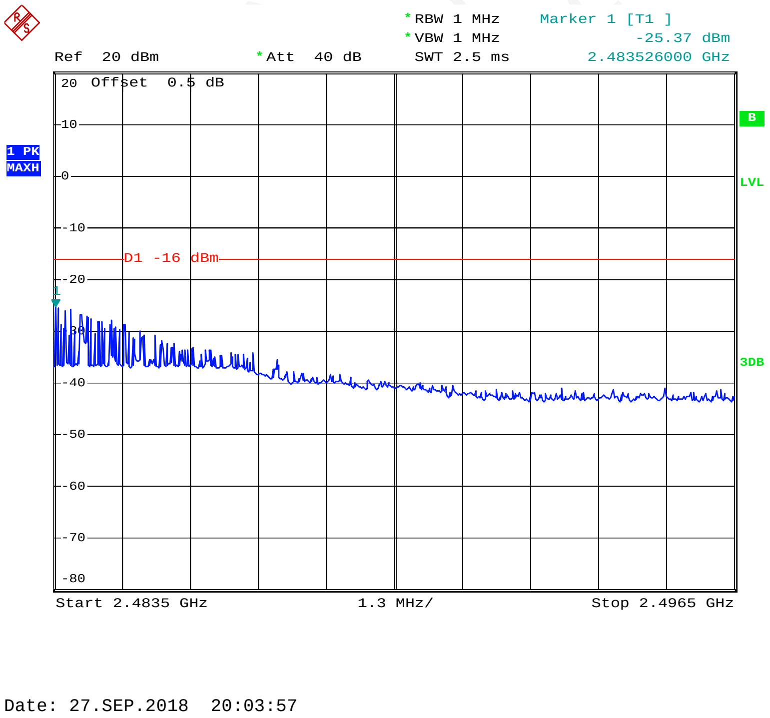
1000MHz～2387MHz



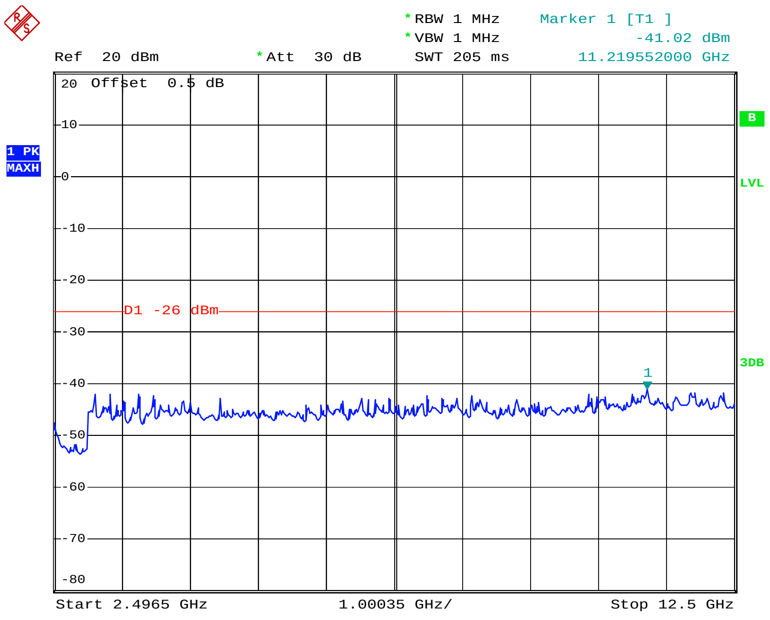
2387MHz～2400MHz



2483.5MHz～2496.5MHz



2496.5MHz～12500MHz

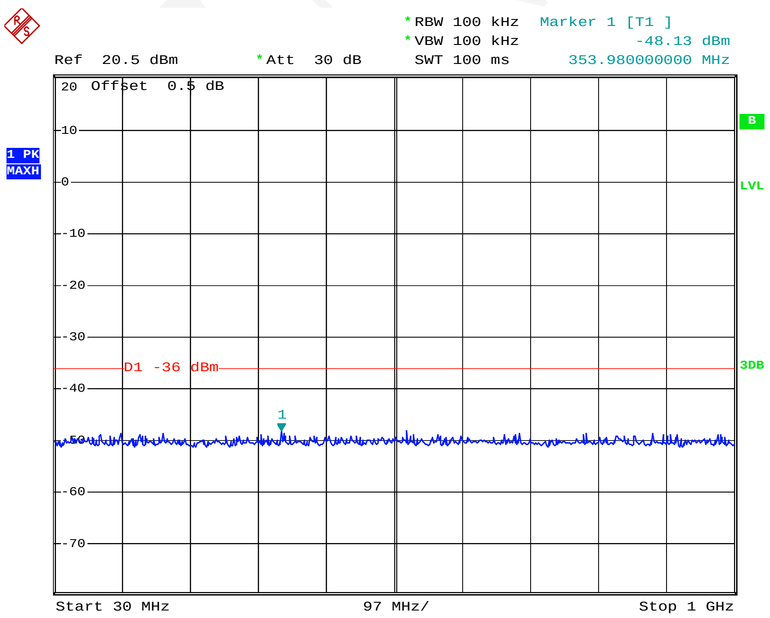


Date: 27.SEP.2018 20:04:36

802.11g Mode:

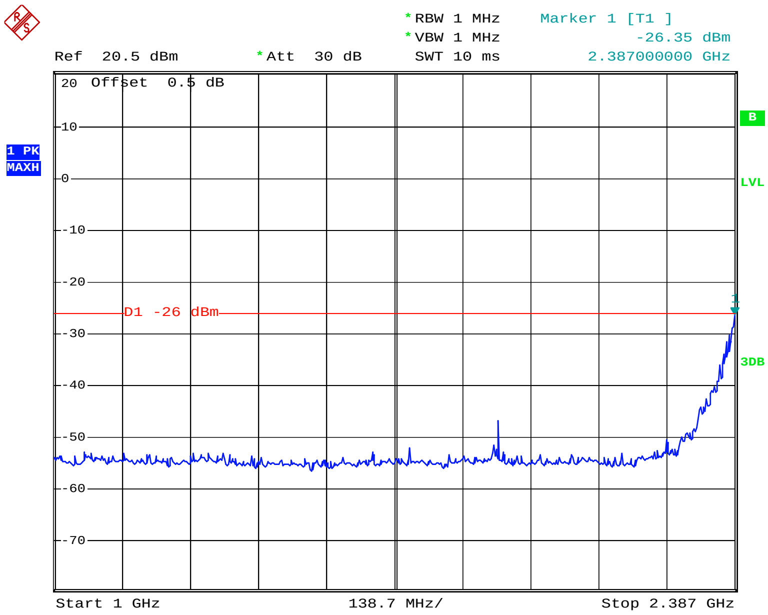
Test Frequency: 2412MHz:

30MHz～1000MHz



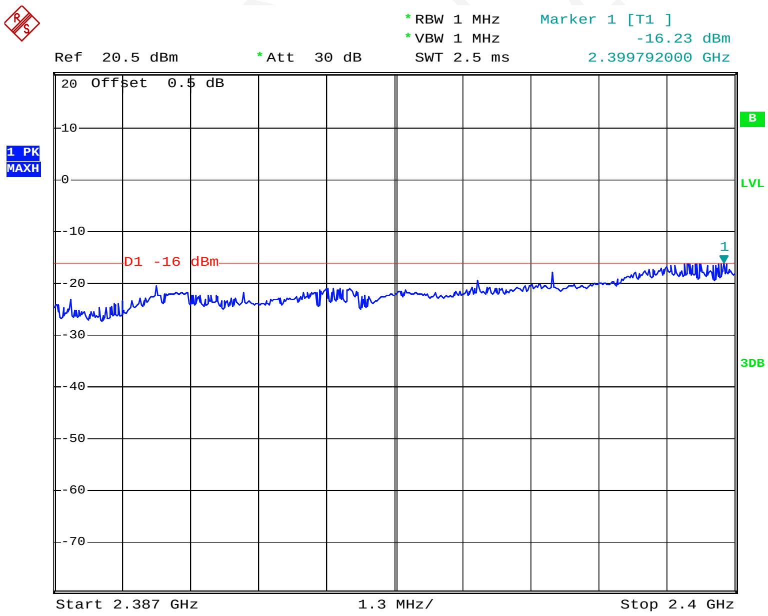
Date: 27.SEP.2018 20:54:07

1000MHz～2387MHz



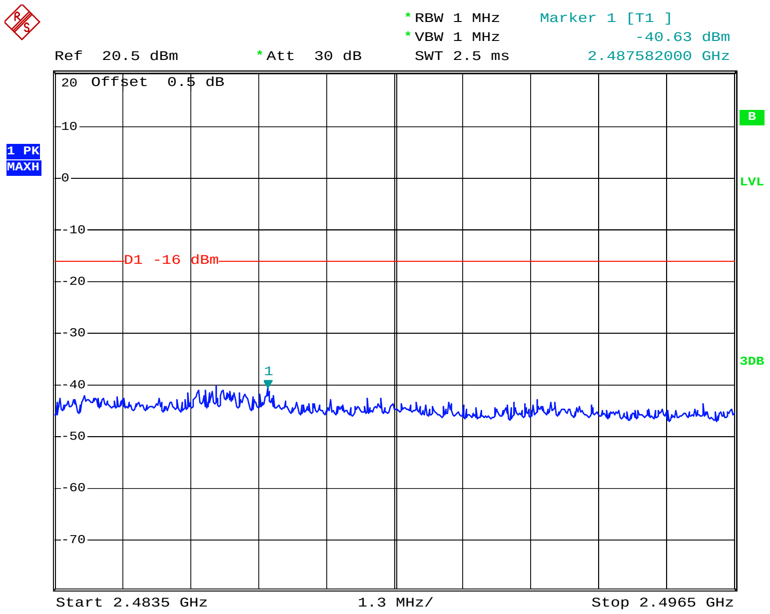
Date: 27.SEP.2018 20:53:37

2387MHz～2400MHz



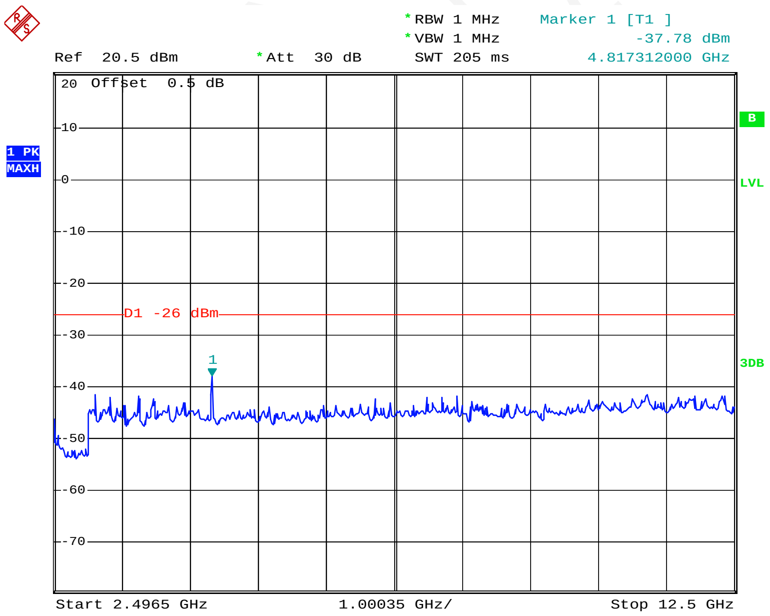
Date: 27.SEP.2018 20:53:10

2483.5MHz～2496.5MHz



Date: 27.SEP.2018 20:52:42

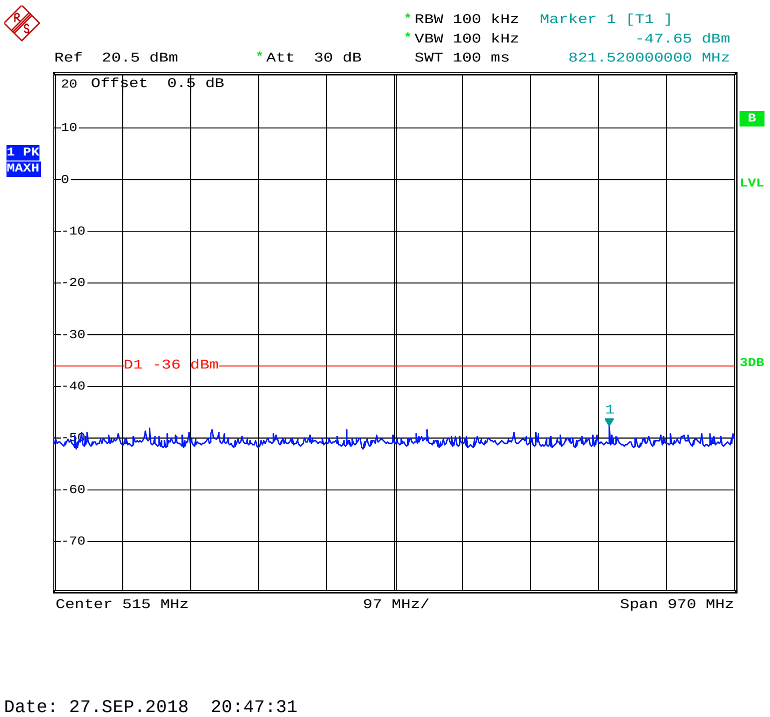
2496.5MHz～12500MHz



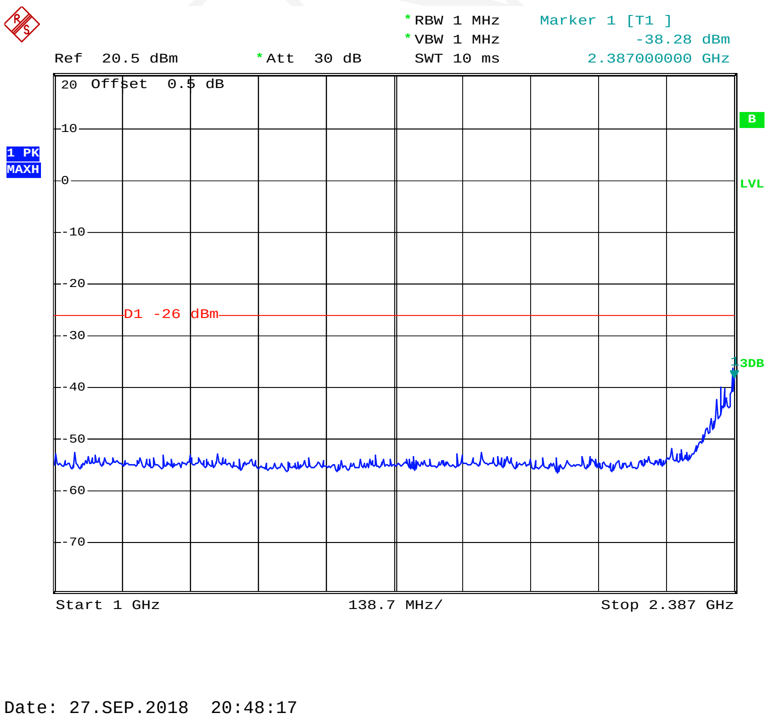
Date: 27.SEP.2018 20:52:18

Test Frequency: 2442MHz:

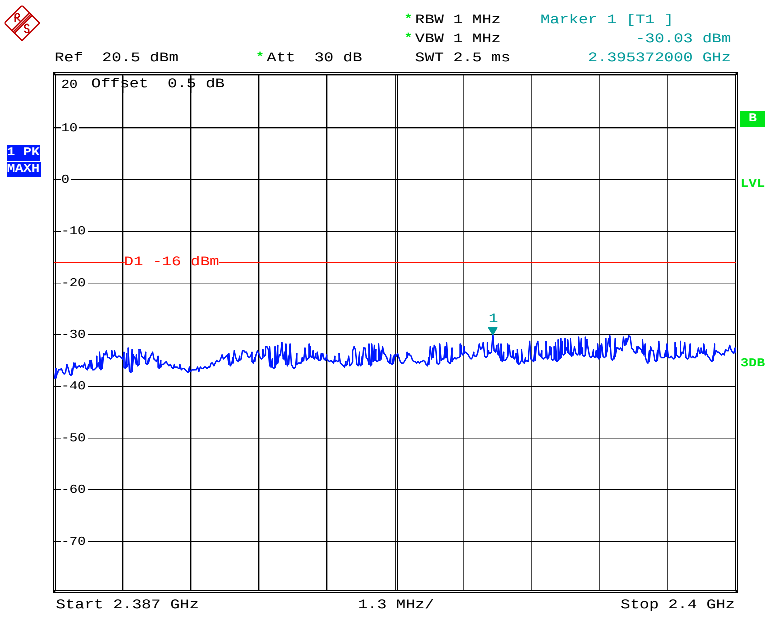
30MHz～1000MHz



1000MHz～2387MHz

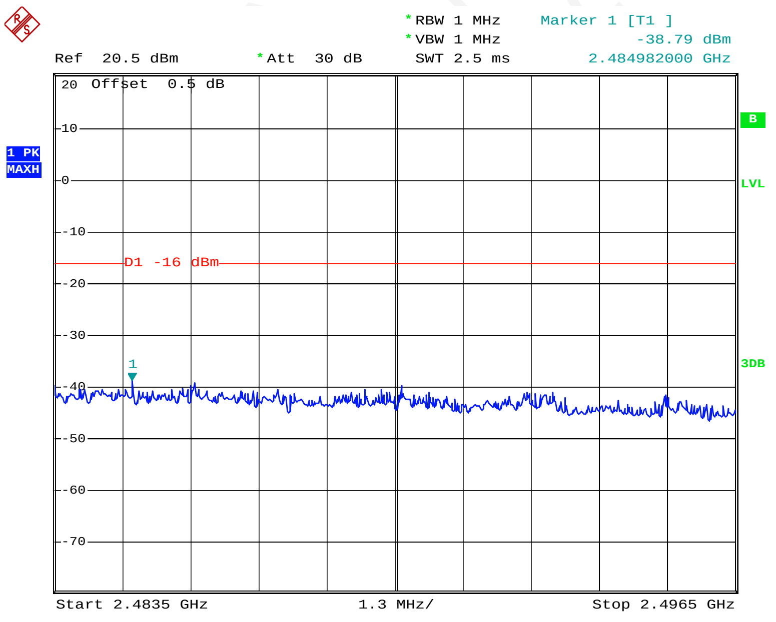


2387MHz～2400MHz



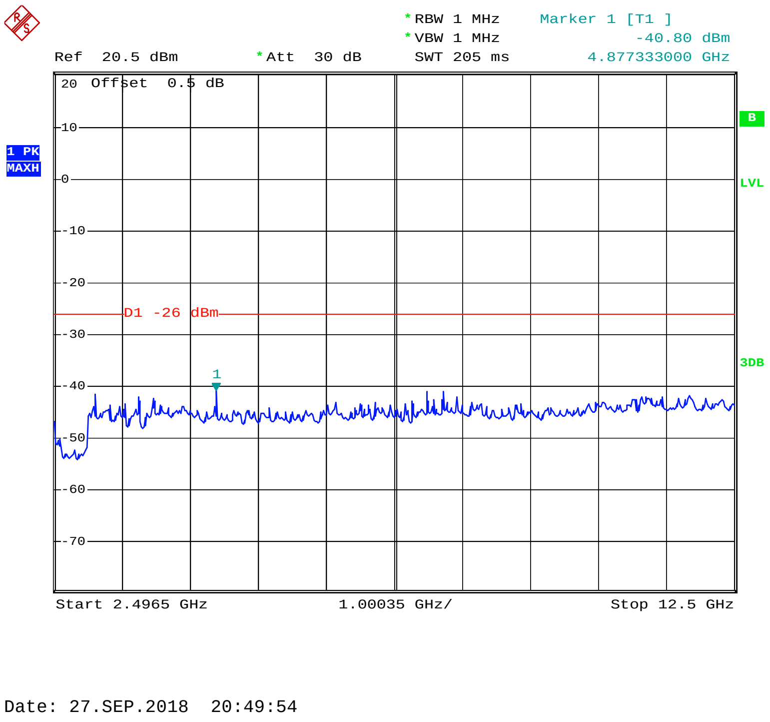
Date: 27.SEP.2018 20:48:55

2483.5MHz～2496.5MHz



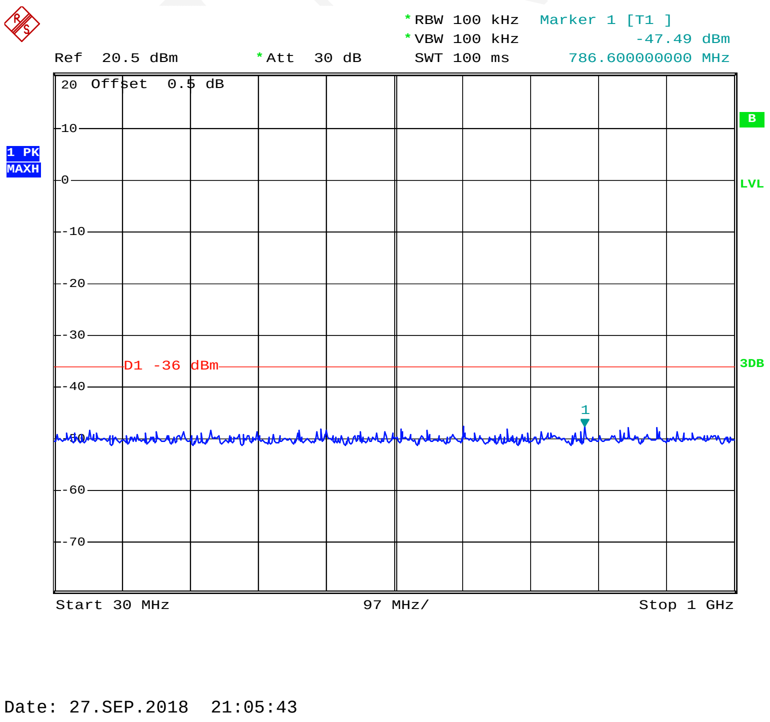
Date: 27.SEP.2018 20:49:25

2496.5MHz～12500MHz

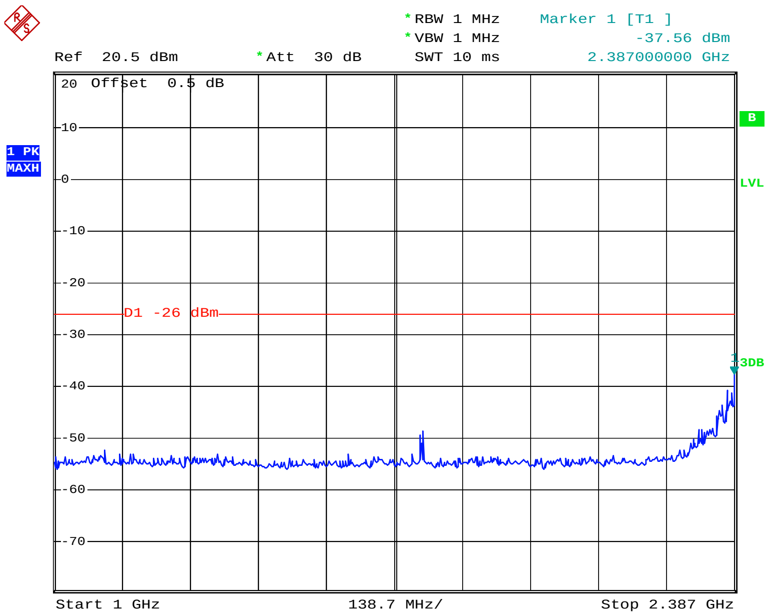


Test Frequency: 2472MHz:

30MHz～1000MHz

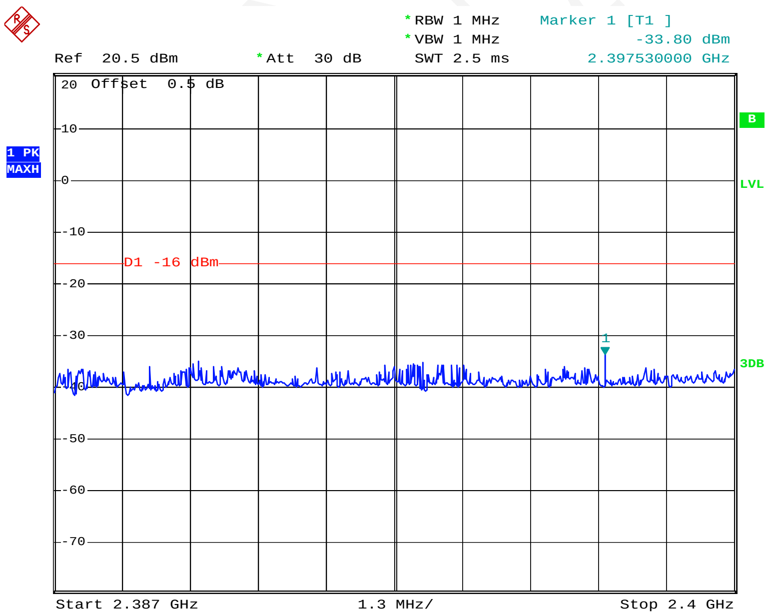


1000MHz～2387MHz



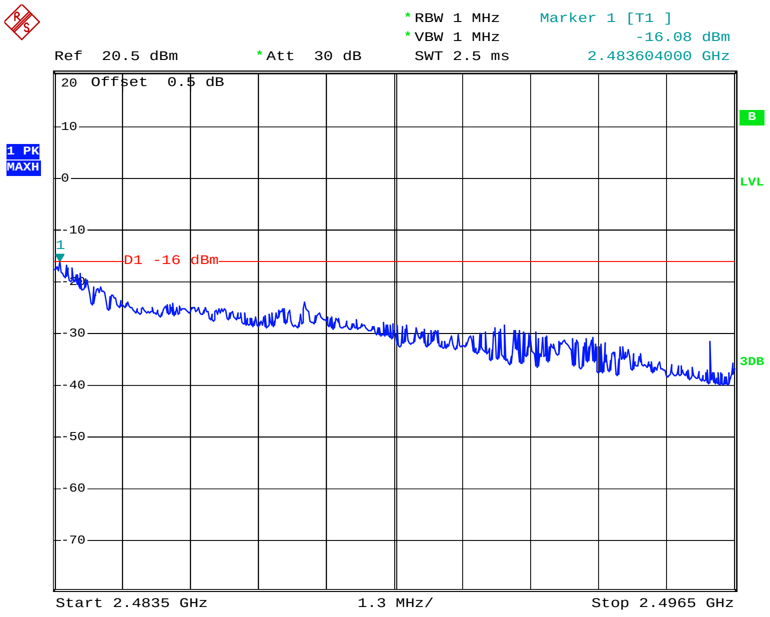
Date: 27.SEP.2018 21:06:08

2387MHz～2400MHz



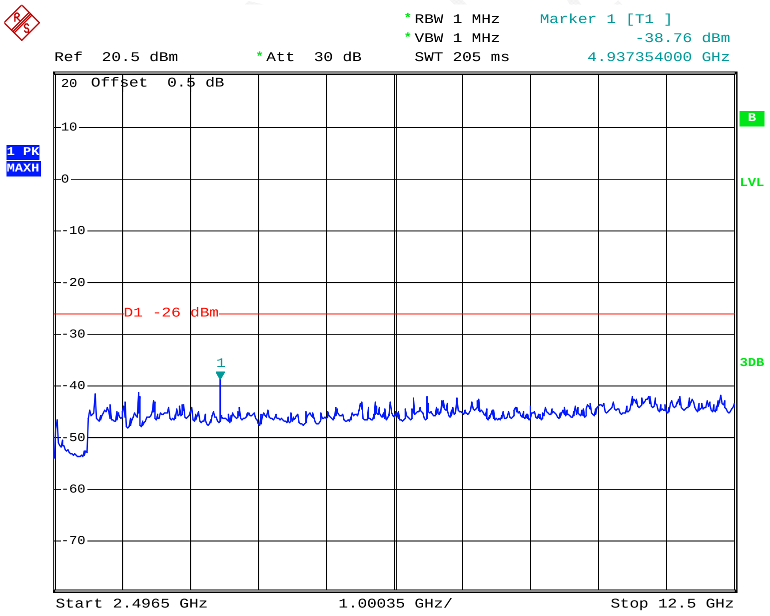
Date: 27.SEP.2018 21:06:29

2483.5MHz～2496.5MHz



Date: 27.SEP.2018 21:07:18

2496.5MHz～12500MHz

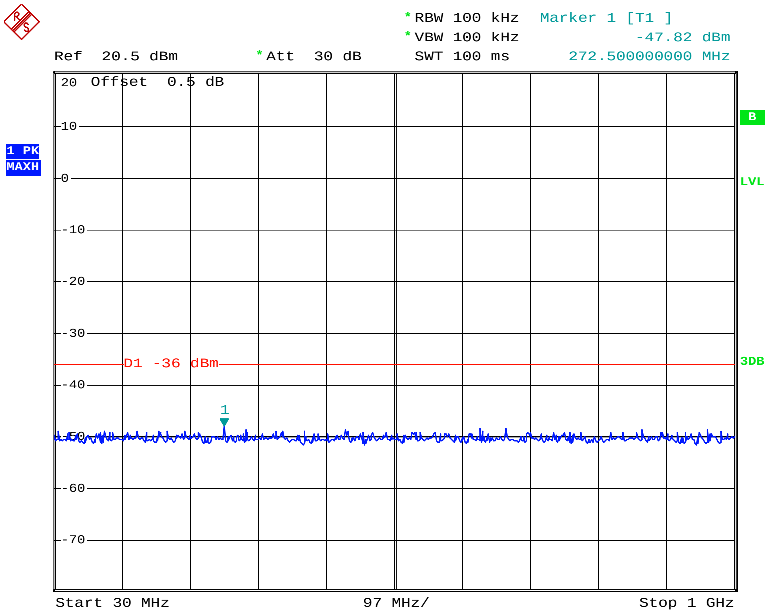


Date: 27.SEP.2018 21:08:22

802.11n ht20 mode:

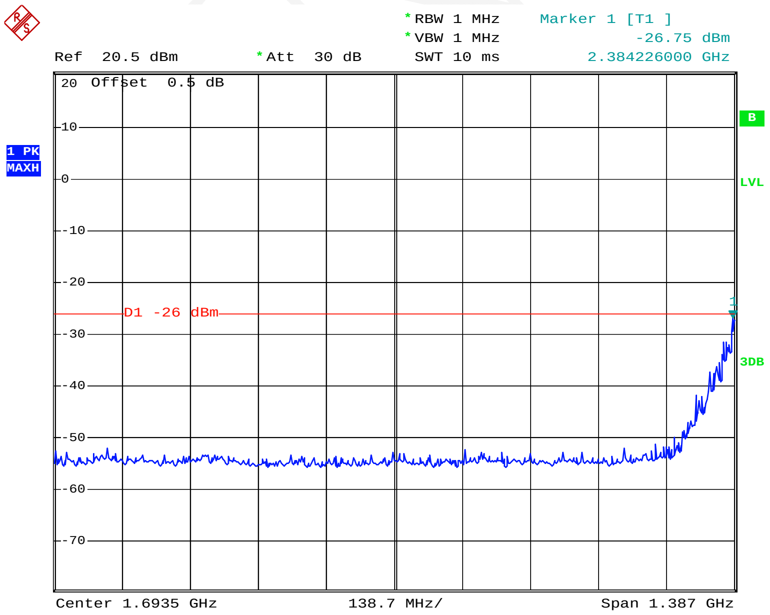
Test Frequency: 2412MHz:

30MHz～1000MHz



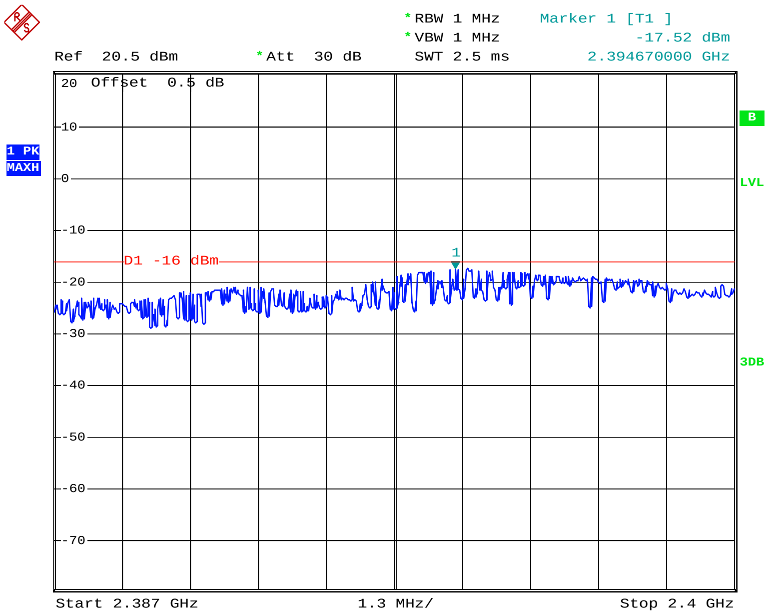
Date: 27.SEP.2018 21:30:04

1000MHz～2387MHz



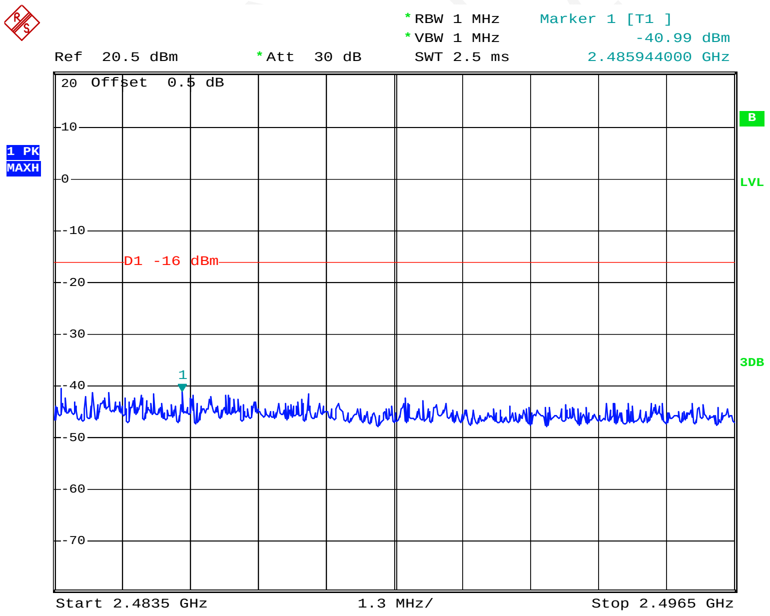
Date: 27.SEP.2018 21:33:39

2387MHz～2400MHz



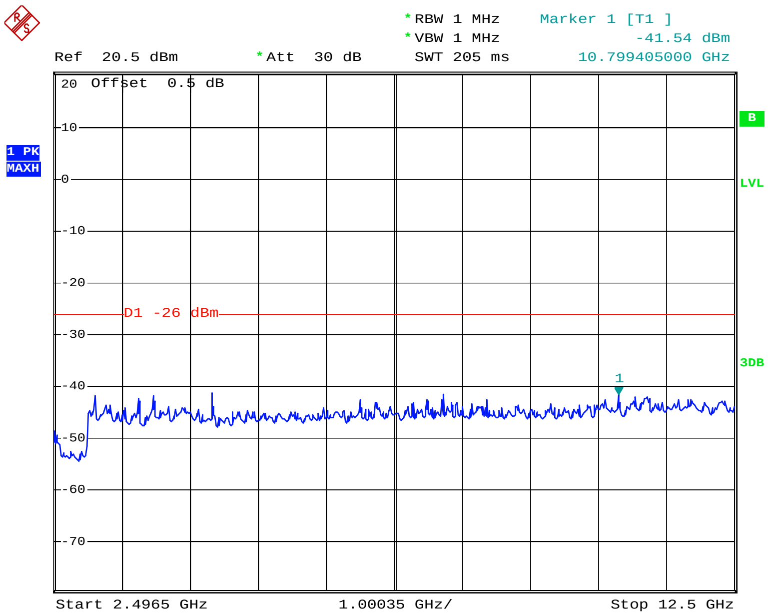
Date: 27.SEP.2018 21:34:22

2483.5MHz～2496.5MHz



Date: 27.SEP.2018 21:34:46

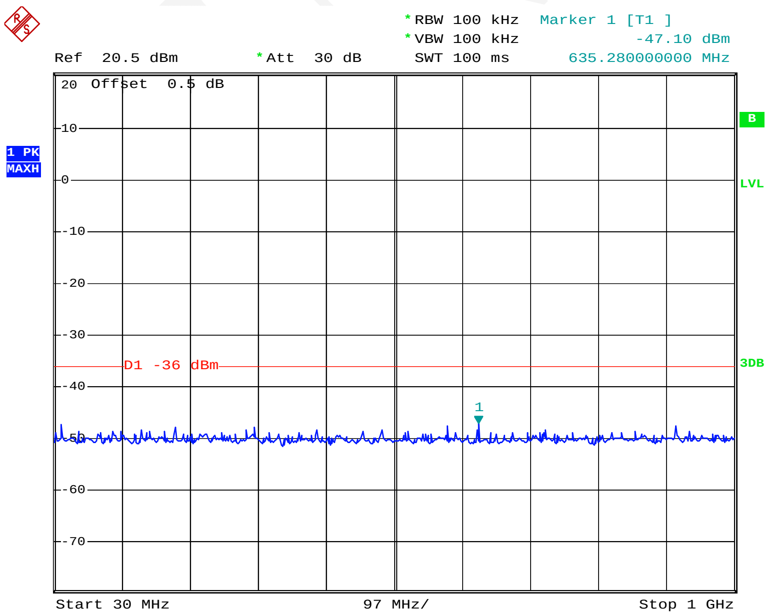
2496.5MHz～12500MHz



Date: 27.SEP.2018 21:35:06

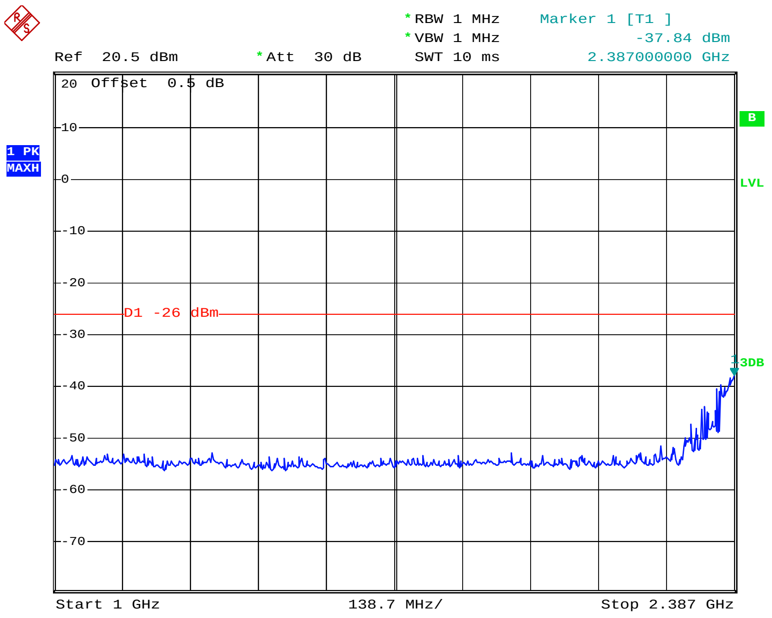
Test Frequency: 2442MHz

30MHz～1000MHz



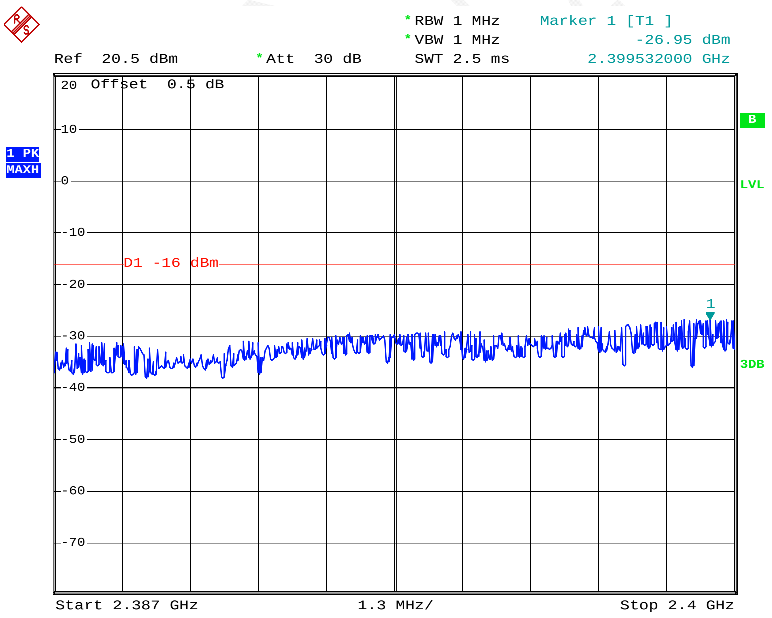
Date: 27.SEP.2018 21:15:26

1000MHz～2387MHz



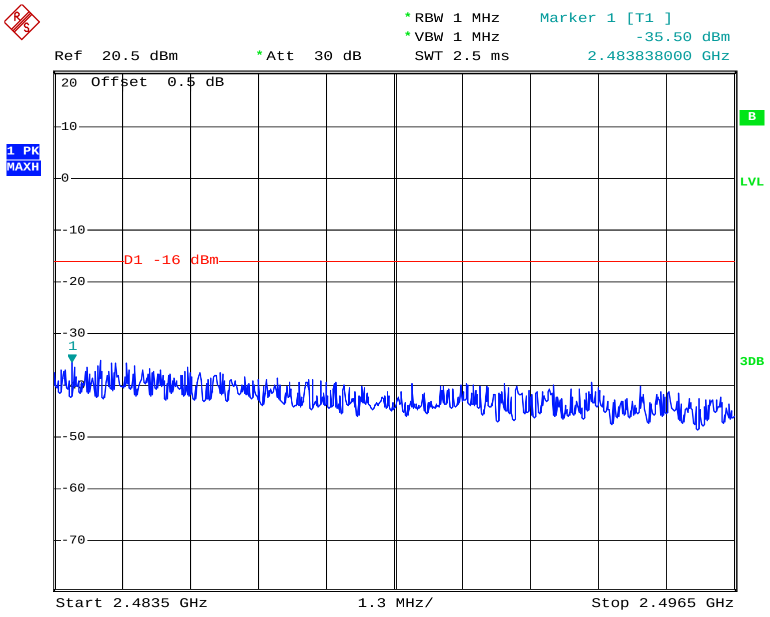
Date: 27.SEP.2018 21:15:56

2387MHz～2400MHz



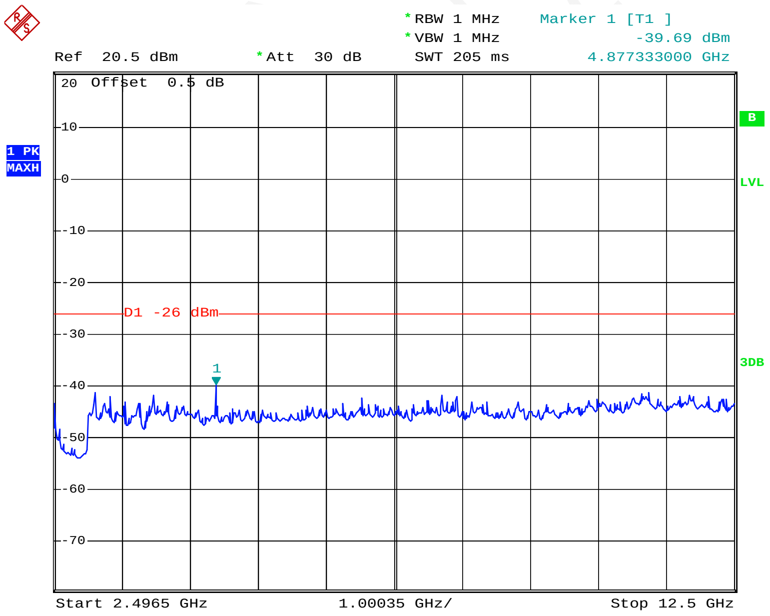
Date: 27.SEP.2018 21:16:15

2483.5MHz～2496.5MHz



Date: 27.SEP.2018 21:16:31

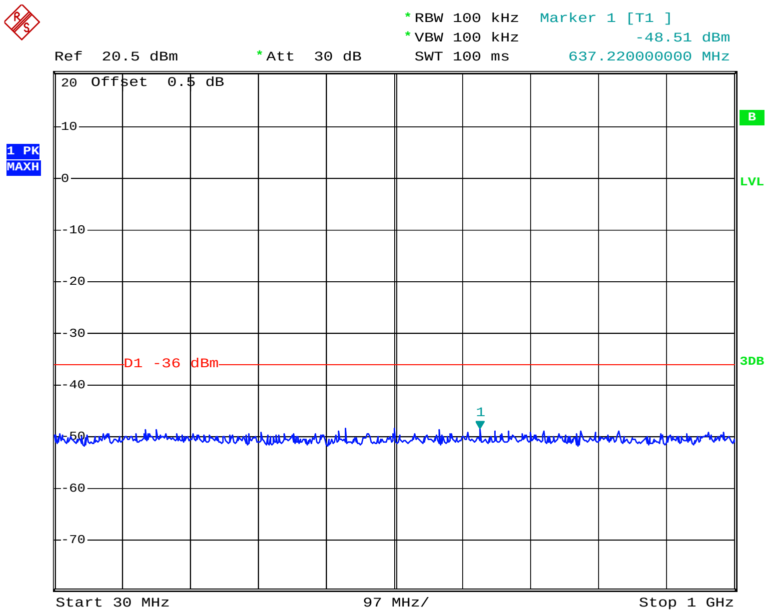
2496.5MHz～12500MHz



Date: 27.SEP.2018 21:16:53

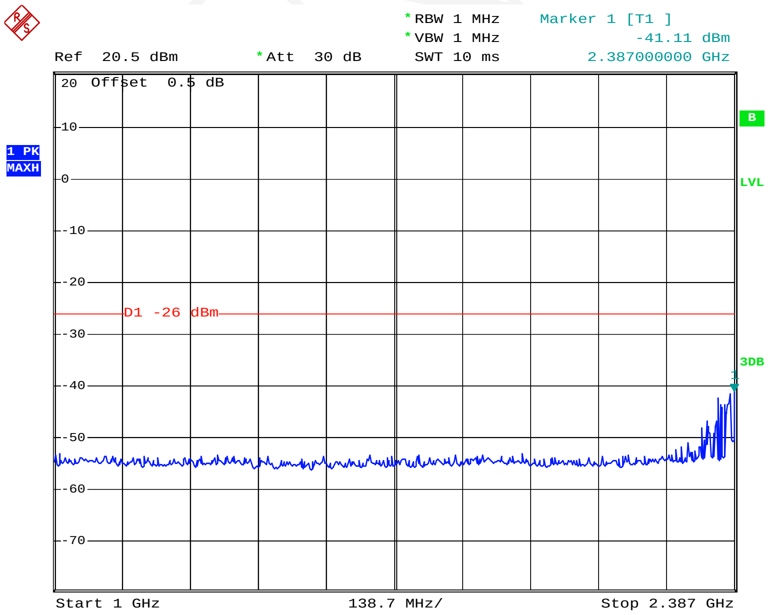
Test Frequency: 2472MHz

30MHz～1000MHz



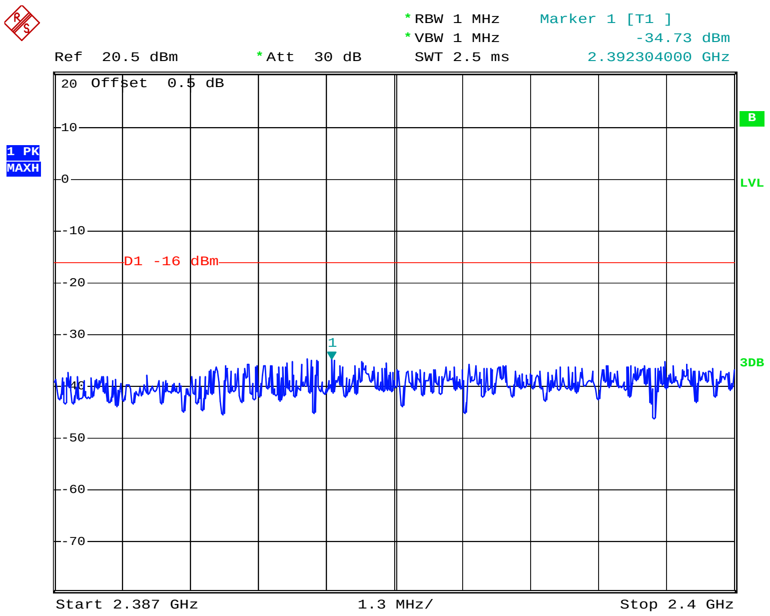
Date: 27.SEP.2018 21:21:34

1000MHz～2387MHz



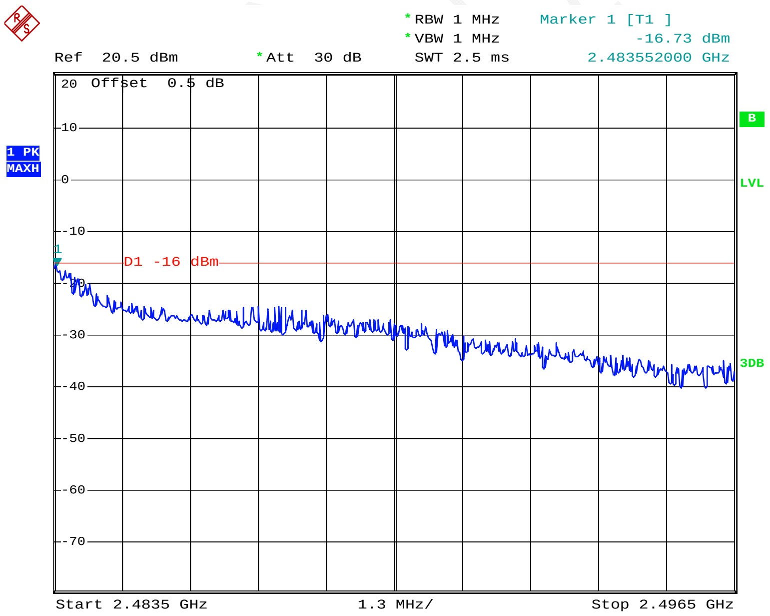
Date: 27.SEP.2018 21:21:13

2387MHz～2400MHz



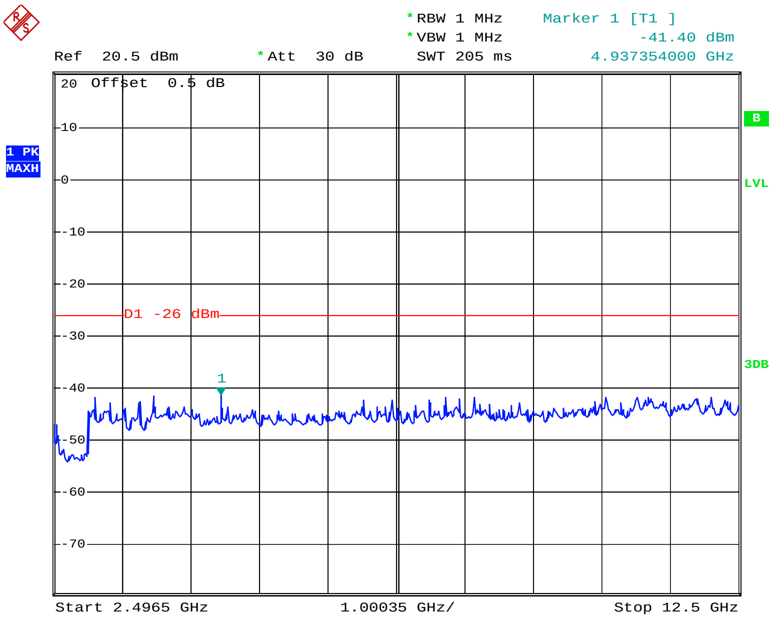
Date: 27.SEP.2018 21:20:48

2483.5MHz～2496.5MHz



Date: 27.SEP.2018 21:20:28

2496.5MHz～12500MHz



Date: 27.SEP.2018 21:20:01

ANTENNA OUTPUT POWER, ANTENNA POWER TOLERANCE AND TRANSMISSION ANTENNA GAIN

Limit

- ⩽ 3 mW /MHz(FHSS from 2400-2483.5 MHz)
- ⩽ 10 mW/MHz (OFDM/DSSS for bandwidth⩽ 26MHz)
- ⩽ 5 mW/MHz (OFDM for bandwidth⩽ 38MHz)
- ⩽ 10 mW (others)

The Output Power Tolerance must be within +20%, -80%.

E.i.r.p:

- ≤12.14dBm/MHz(OFDM,DS for 2400-2483.5MHz)

Note: E.I.R.P will not be applied to the transmission antenna which has a gain of 2.14dBi or less.

Test Procedure

For FHSS UUT:
Connect the UUT to the power meter

For OFDM, DSSS UUT:
Step 1:
Connect the UUT to the spectrum analyser and use the following settings:
- Centre Frequency: The centre frequency of the channel under test.
- RBW: 1 MHz.
- VBW: 1 MHz.
- Span: Wide enough to cover the complete power envelope of the signal of the UUT.
- Detector: Peak.
- Trace Mode: Max Hold.

Step 2:
When the trace is complete, find the peak value of the power envelope and record the frequency.

Step 3:
Make the following changes to the settings of the spectrum analyser:
- Centre Frequency: Equal to the frequency recorded in step 2.
- Span: 3 MHz.
- RBW: 1 MHz.
- VBW: 1 MHz.
- Detector: Average (see note).
- Trace Mode: Max Hold.

For other UUT:
Make the following changes to the settings of the spectrum analyser:

- Centre Frequency: The centre frequency of the channel under test.
- Span: 5MHz.
- RBW: 3 MHz.
- VBW: 10 MHz.
- Detector: Peak
- Trace Mode: Max Hold.

NOTE: The detector mode "Average" is often referred to as "RMS Average" or "Sample" but do not use Video Average.

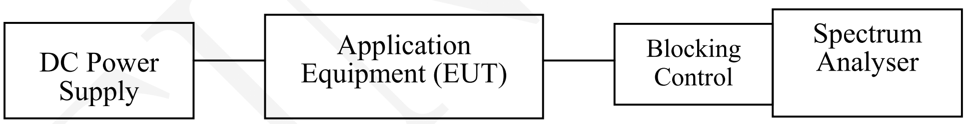
When the trace is complete, capture the trace, for example using the "View" option on the spectrum analyser.For Find the peak value of the trace and place the analyser marker on this peak. This level is recorded as D.

D shall be recorded in the test report.

The maximum PD, which is e.i.r.p. PSD (spectral density power) or power, is calculated from the above measured value D, and the applicable antenna assembly gain "G" in dBi, according to the formula below. If more than one antenna assembly is intended for this power setting, the gain of the antenna assembly with the highest gain shall be used.

PD = D + G

Test Setup Block diagram



Test Data

Environmental Conditions

Temperature:	26.4°C
Relative Humidity:	63 %
ATM Pressure:	100.4 kPa

The testing was performed by Harry yang on 2018-09-27.

Test Result: Compliance

Test Mode: Transmitting

802.11b:

Frequency		2412 MHz			2442 MHz			2472 MHz			Limit
Voltage		LV	NV	HV	LV	NV	HV	LV	NV	HV	
Antenna power	dBm/MHz	7.24	7.35	7.39	7.39	7.45	7.48	7.44	7.52	7.49	/
Duty Cycle Factor	dB	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	/
Antenna power	mW/MHz	5.33	5.47	5.52	5.52	5.60	5.64	5.58	5.69	5.65	10mW/MHz
antenna power Error	%	-11.17	-8.83	-8.00	-8.00	-6.67	-6.00	-7.00	-5.17	-5.83	+20% ~ -80%
EIRP	dBm/MHz	9.52	9.63	9.67	9.67	9.73	9.76	9.72	9.80	9.77	12.14dBm/MHz

802.11g:

Frequency		2412 MHz			2442 MHz			2472 MHz			Limit
Voltage		LV	NV	HV	LV	NV	HV	LV	NV	HV	
Antenna power	dBm/MHz	-4.17	-4.12	-4.15	-4.32	-4.28	-4.25	-3.95	-3.89	-3.92	/
Duty Cycle Factor	dB	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	6.62	/
Antenna power	mW/MHz	1.76	1.78	1.77	1.70	1.71	1.73	1.85	1.88	1.86	10mW/MHz
antenna power Error	%	-12.10	-11.10	-11.70	-15.10	-14.30	-13.70	-7.55	-6.25	-6.90	+20% ~ -80%
EIRP	dBm/MHz	4.70	4.75	4.72	4.55	4.59	4.62	4.92	4.98	4.95	12.14dBm/MHz

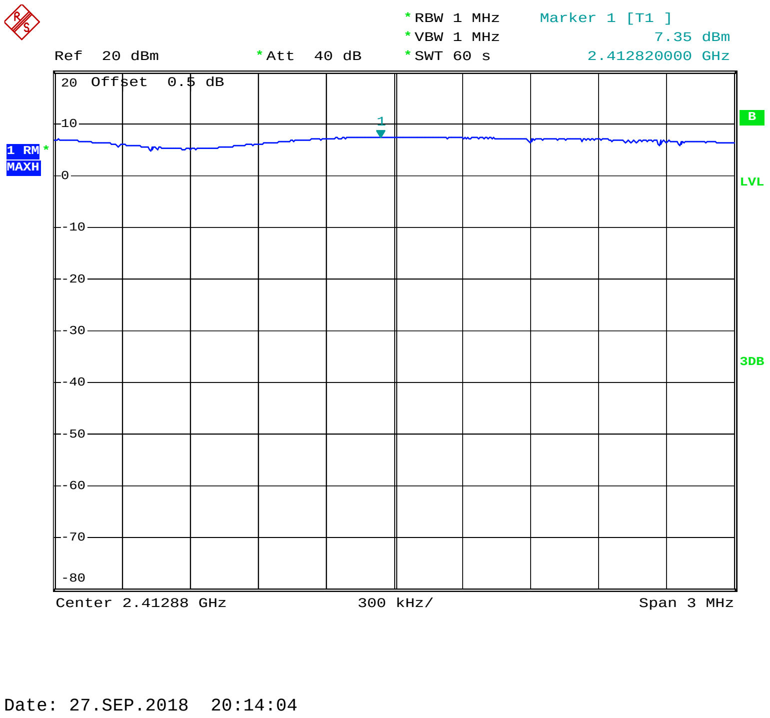
802.11n ht20:

Frequency		2412 MHz			2442 MHz			2472 MHz			Limit
Voltage		LV	NV	HV	LV	NV	HV	LV	NV	HV	
Antenna power	dBm/MHz	-6.56	-6.49	-6.42	-5.91	-5.84	-5.88	-5.49	-5.41	-5.32	/
Duty Cycle Factor	dB	6.99	6.99	6.99	6.99	6.99	6.99	6.99	6.99	6.99	/
Antenna power	mW/MHz	1.10	1.12	1.14	1.28	1.30	1.29	1.41	1.44	1.47	10mW/MHz
antenna power Error	%	-26.40	-25.20	-24.00	-14.53	-13.13	-13.93	-5.80	-4.07	-2.07	+20% ~ -80%
EIRP	dBm/MHz	2.68	2.75	2.82	3.33	3.40	3.36	3.75	3.83	3.92	12.14dBm/MHz

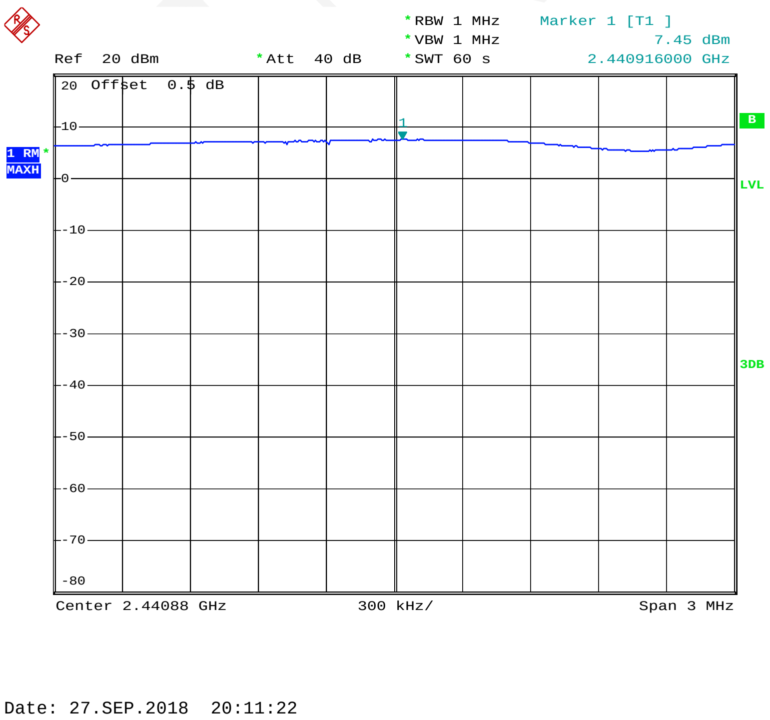
Note 1: the antenna gain is 2.25dBi.
Note 2: the nominal Output power is 6mW/MHz for 802.11b, 2mW/MHz for 802.11g, 1.5mW/MHz for 802.11n ht20.
Note 3: Transmission Antenna Gain and Transmission Radiation Angle Width are not required since EIRP less than 12.14dBm/MHz.

Please refer to the plots below for normal voltage.
802.11b mode:

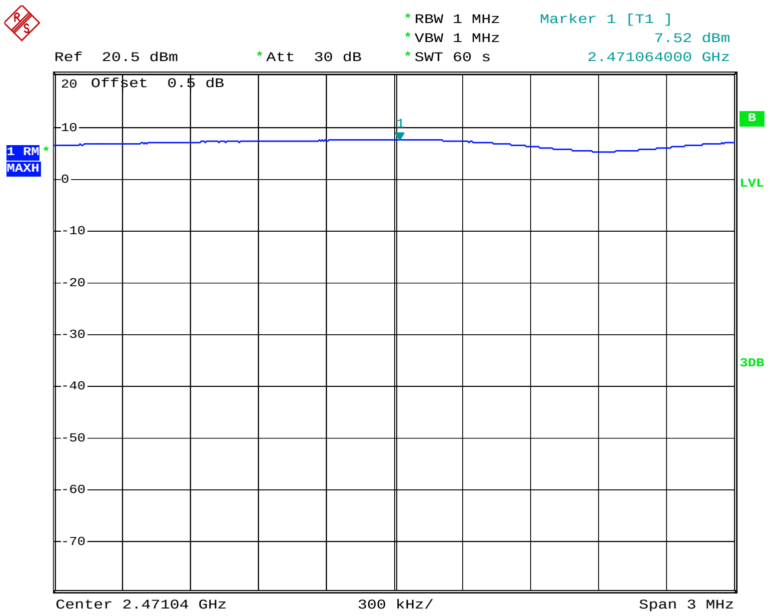
Test Frequency:2412MHz



Test Frequency:2442MHz



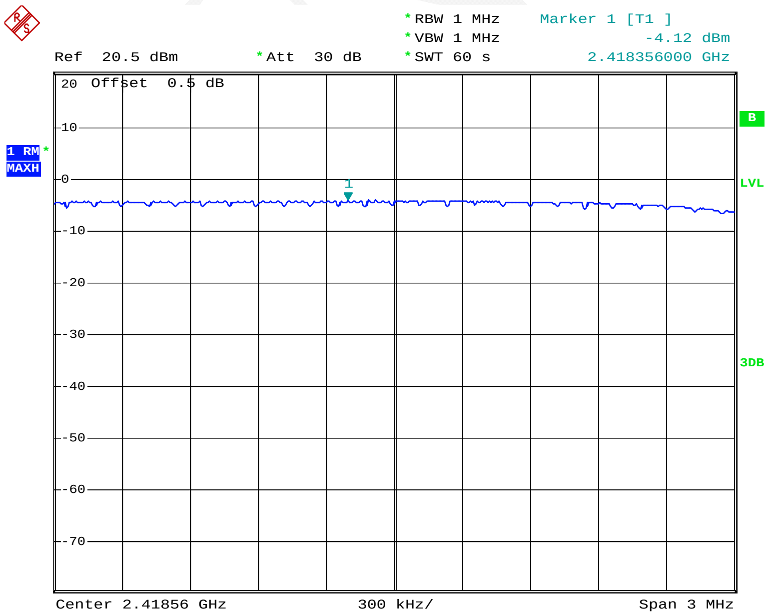
Test Frequency:2472MHz



Date: 27.SEP.2018 19:59:46

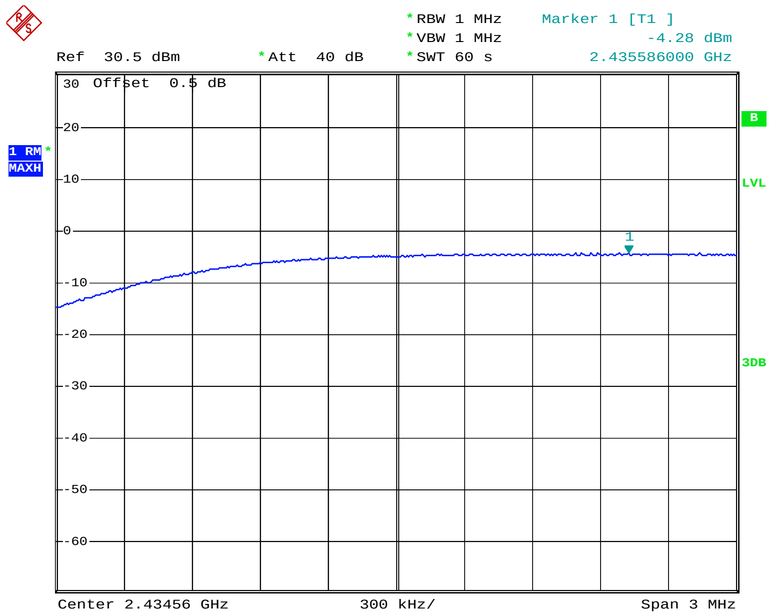
802.11g Mode:

Test Frequency:2412MHz



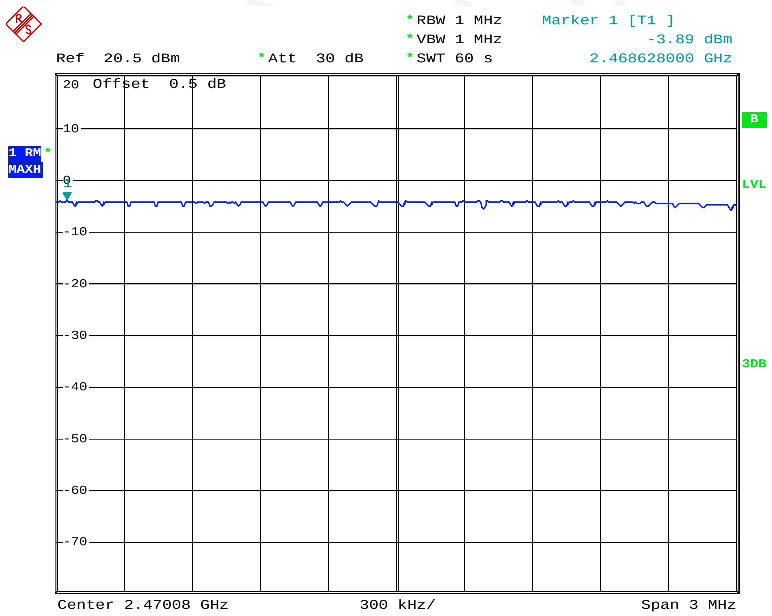
Date: 27.SEP.2018 20:58:57

Test Frequency:2442MHz



Date: 27.SEP.2018 20:41:16

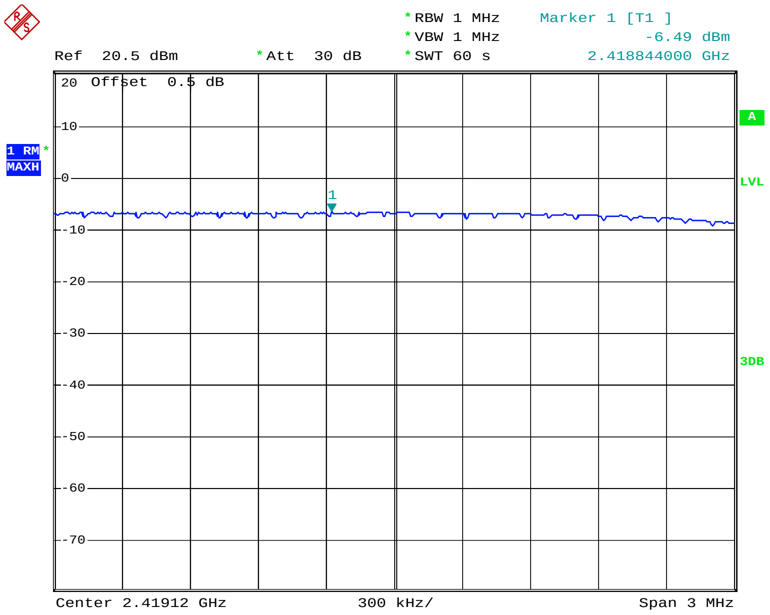
Test Frequency:2472MHz



Date: 27.SEP.2018 21:04:13

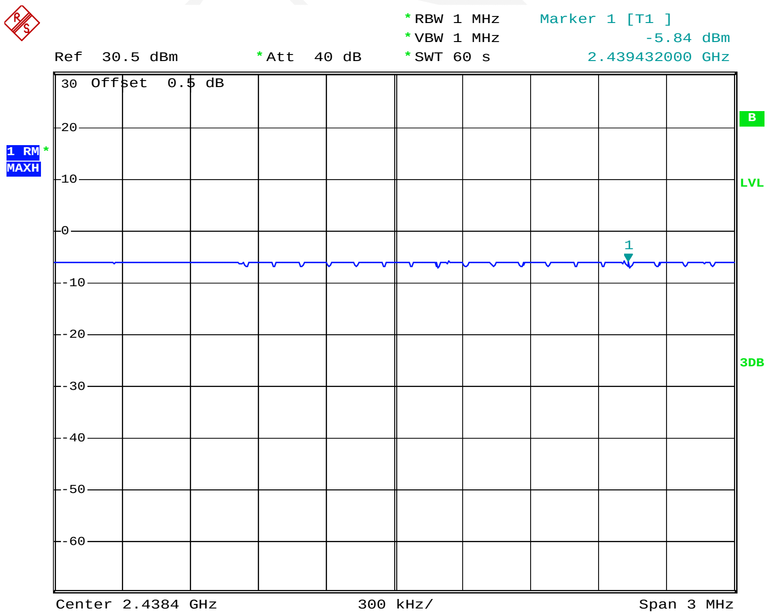
802.11n ht20 mode:

Test Frequency:2412MHz



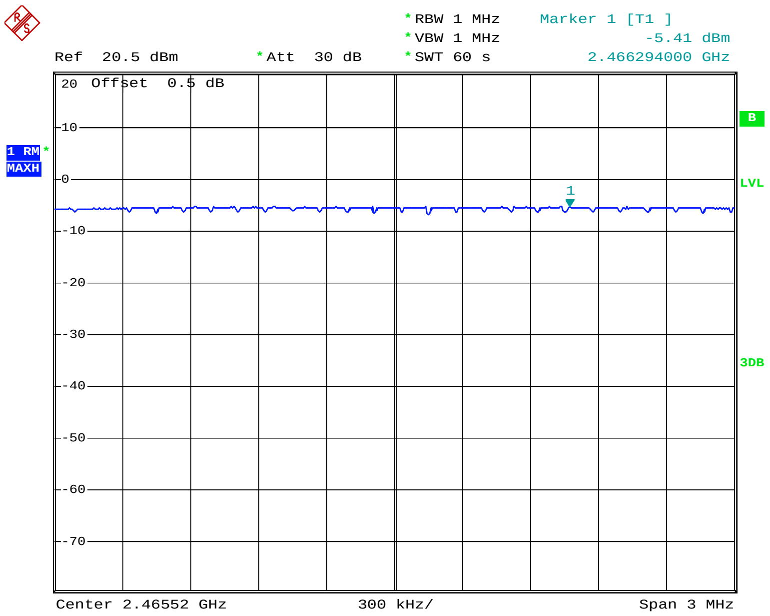
Date: 27.SEP.2018 22:02:24

Test Frequency:2442MHz



Date: 27.SEP.2018 21:13:33

Test Frequency:2472MHz



Date: 27.SEP.2018 21:23:54

RECEIVER SPURIOUS EMISSION AND UNWANTED EMISSION INTENSITY

Limit

- ≤ 4 nW (30 MHz≤f≤1000 MHz)
- ≤ 20 nW (1 GHz≤f≤12.5 GHz)

Test Procedure

❖ Conditions of Application Equipment (EUT)

- The modulation state shall be “continuous receiving mode”.

❖ Spectrum Analyzer Conditions

- Start Frequency: Start Frequency of frequency range to measure (30MHz or 1GHz)
- Stop Frequency: Stop Frequency of frequency range to measure (1GHz or 12.5GHz)
- Span: AUTO (Measurement Range)
- RBW: 100 kHz, VBW: 100 kHz for Frequency < 1 GHz
- RBW: 1MHz, VBW: 1MHz for Frequency > 1 GHz
- Sweep time: AUTO or more
- Sweep mode: Auto Sweep
- Detection: Positive Peak
- Reference Level: Enough level for maximum dynamic range

Measurement Result

Environmental Conditions

Temperature:	26.4°C
Relative Humidity:	63 %
ATM Pressure:	100.4 kPa

The testing was performed by Harry yang on 2018-09-27.

Test Result: Compliant, please see the below tables and plots

Test Mode: Receiving

802.11b mode:

	Frequency band	2412 MHz			2442 MHz			2472 MHz			Limit
		LV	NV	HV	LV	NV	HV	LV	NV	HV	
Raw data	Band VI (dBm)	-61.45	-61.37	-61.44	-62.81	-62.90	-62.84	-61.27	-61.18	-61.22	-54dBm
	Band VII (dBm)	-61.69	-61.79	-61.84	-61.41	-61.31	-61.22	-62.10	-62.09	-62.03	-47dBm
Unwanted Emission Intensity	Band VI (nW)	0.71614	0.72946	0.71779	0.52360	0.51286	0.52000	0.74645	0.76208	0.75509	4nW
	Band VII (nW)	0.67764	0.66222	0.65464	0.72277	0.73961	0.75509	0.61660	0.61802	0.62661	20nW

Note: Band VI: 30MHz～1000MHz Band VII: 1000MHz～12500MHz

802.11g mode:

	Frequency band	2412 MHz			2442 MHz			2472 MHz			Limit
		LV	NV	HV	LV	NV	HV	LV	NV	HV	
Raw data	Band VI (dBm)	-62.03	-62.11	-62.19	-62.52	-62.56	-62.66	-62.62	-62.58	-62.58	-54dBm
	Band VII (dBm)	-60.15	-60.24	-60.25	-61.55	-61.63	-61.56	-61.72	-61.76	-61.71	-47dBm
Unwanted Emission Intensity	Band VI (nW)	0.62661	0.61518	0.60395	0.55976	0.55463	0.54200	0.54702	0.55208	0.55208	4nW
	Band VII (nW)	0.96605	0.94624	0.94406	0.69984	0.68707	0.69823	0.67298	0.66681	0.67453	20nW

Note: Band VI: 30MHz～1000MHz Band VII: 1000MHz～12500MHz

802.11n ht20 mode:

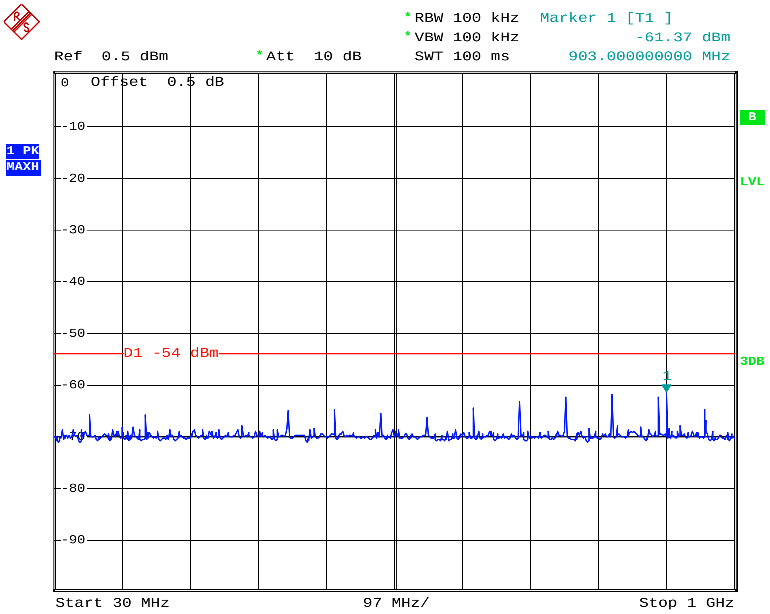
	Frequency band	2412 MHz			2442 MHz			2472 MHz			Limit
		LV	NV	HV	LV	NV	HV	LV	NV	HV	
Raw data	Band VI (dBm)	-59.95	-59.95	-59.91	-61.53	-61.57	-61.63	-62.36	-62.46	-62.42	-54dBm
	Band VII (dBm)	-61.61	-61.63	-61.68	-60.87	-60.85	-60.91	-62.06	-62.01	-62.08	-47dBm
Unwanted Emission Intensity	Band VI (nW)	1.01158	1.01158	1.02094	0.70307	0.69663	0.68707	0.58076	0.56754	0.57280	4nW
	Band VII (nW)	0.69024	0.68707	0.67920	0.81846	0.82224	0.81096	0.62230	0.62951	0.61944	20nW

Note: Band VI: 30MHz～1000MHz Band VII: 1000MHz～12500MHz

Please refer to the plots below for normal voltage.

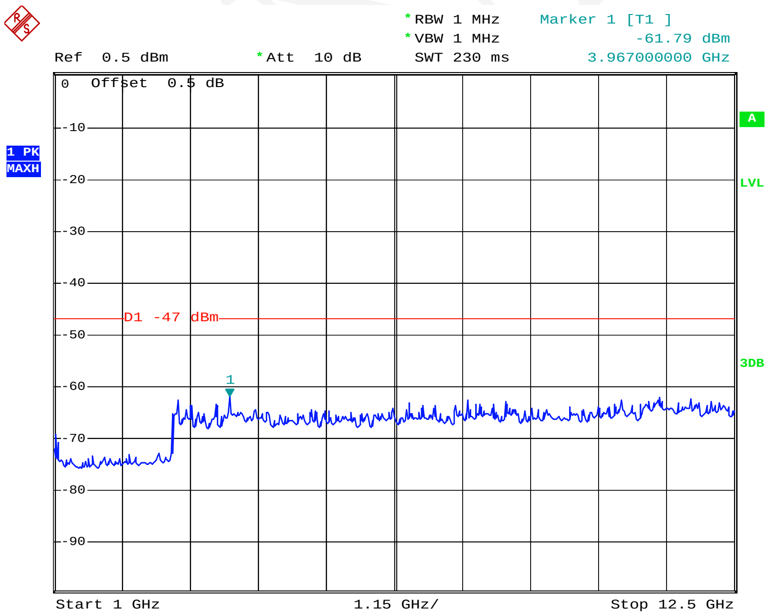
802.11b mode, Test Frequency: 2412MHz

30MHz～1000MHz



Date: 27.SEP.2018 21:51:43

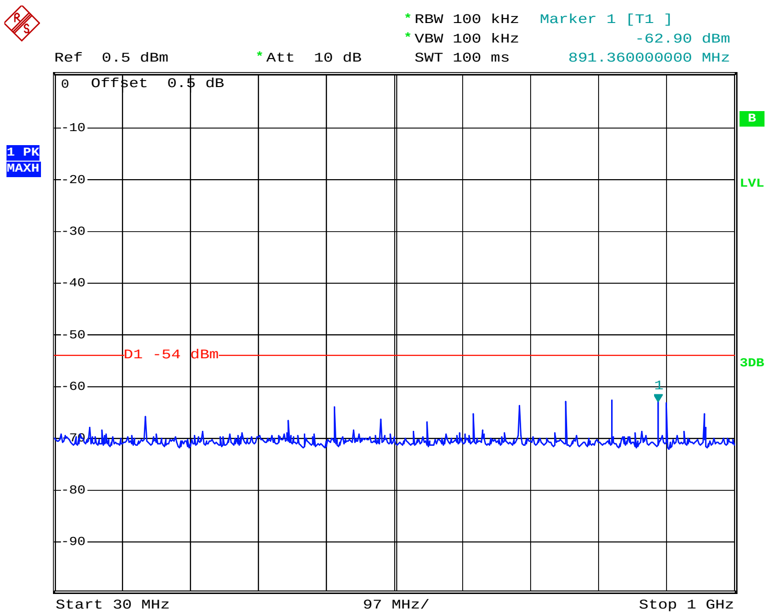
1000MHz～12500MHz



Date: 27.SEP.2018 21:52:52

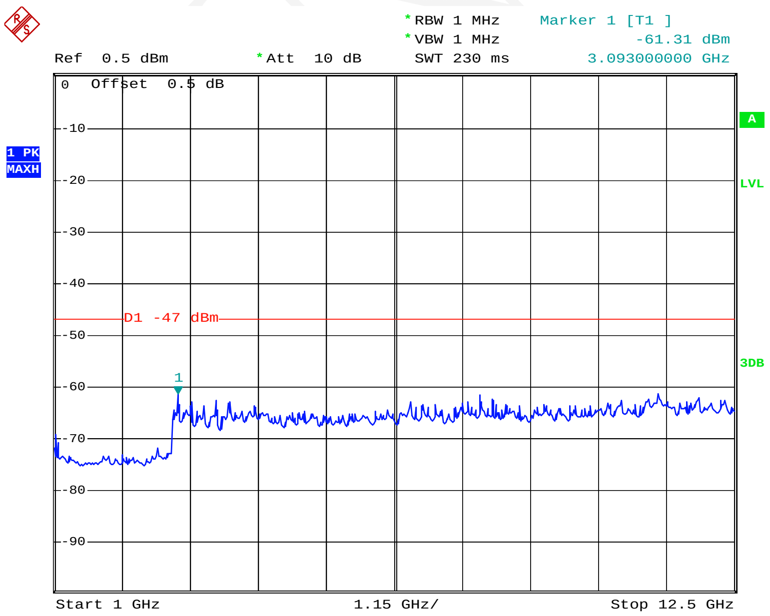
Test Frequency: 2442MHz:

30MHz～1000MHz



Date: 27.SEP.2018 21:53:45

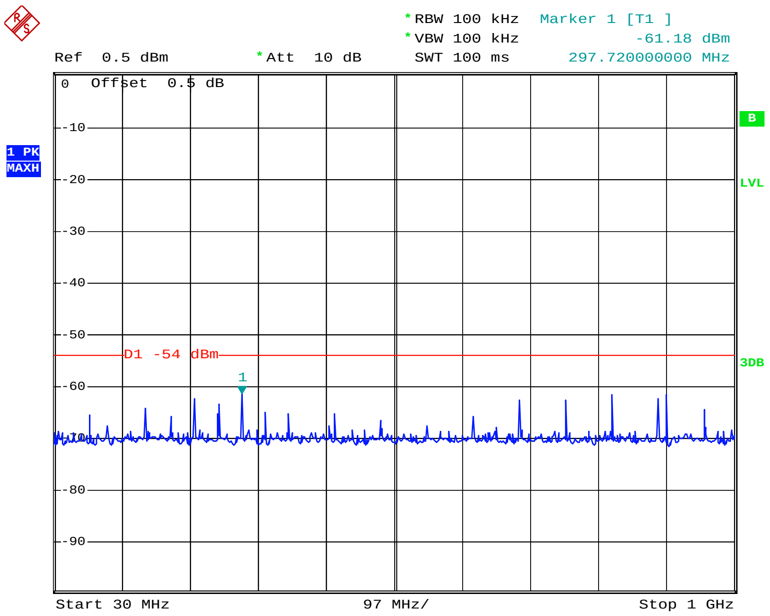
1000MHz～12500MHz



Date: 27.SEP.2018 21:53:13

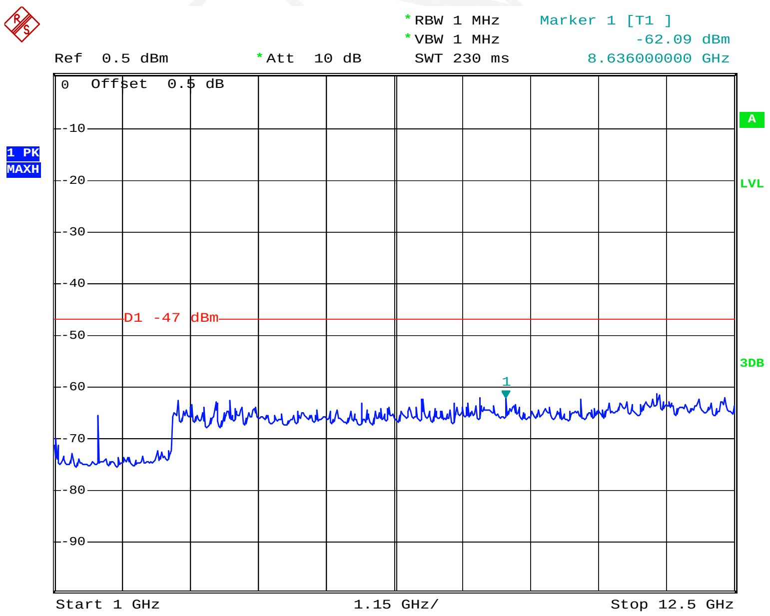
Test Frequency: 2472MHz:

30MHz～1000MHz



Date: 27.SEP.2018 21:54:18

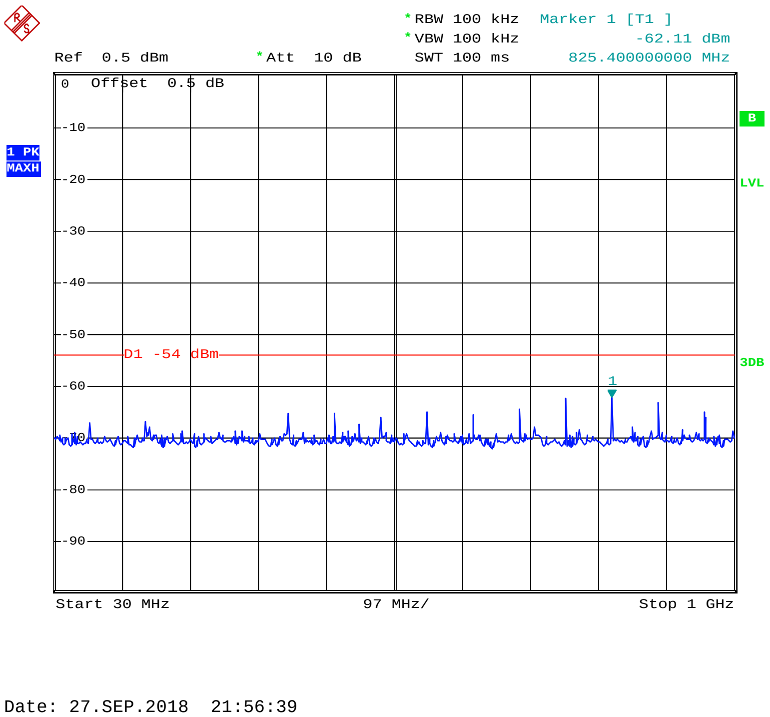
1000MHz～12500MHz



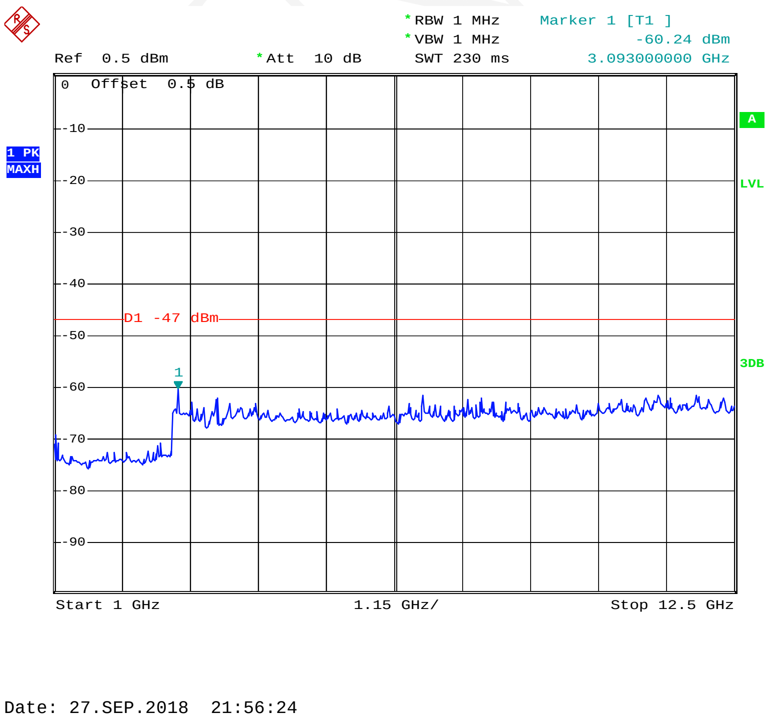
Date: 27.SEP.2018 21:54:30

802.11g mode, Test Frequency: 2412MHz

30MHz ~1000MHz

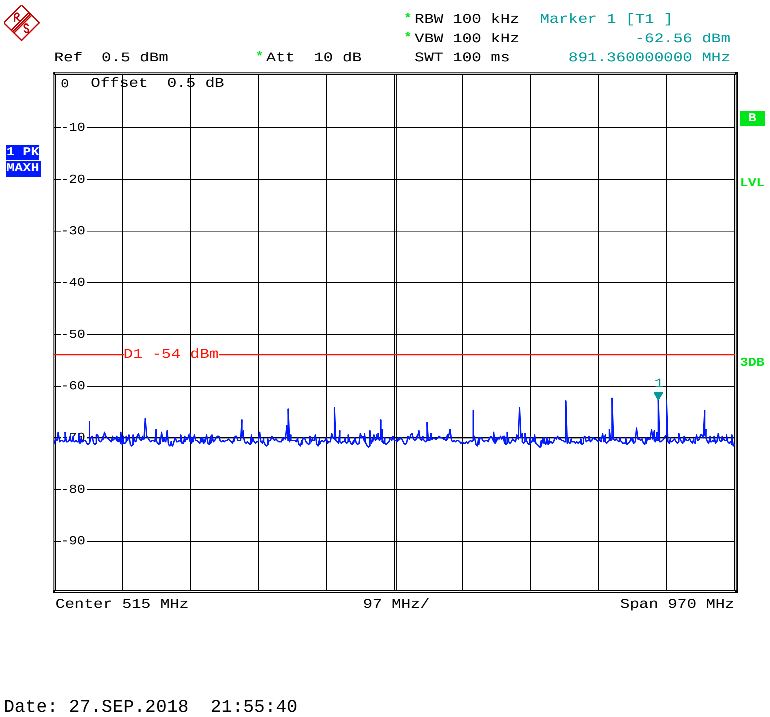


1000MHz ~12500MHz

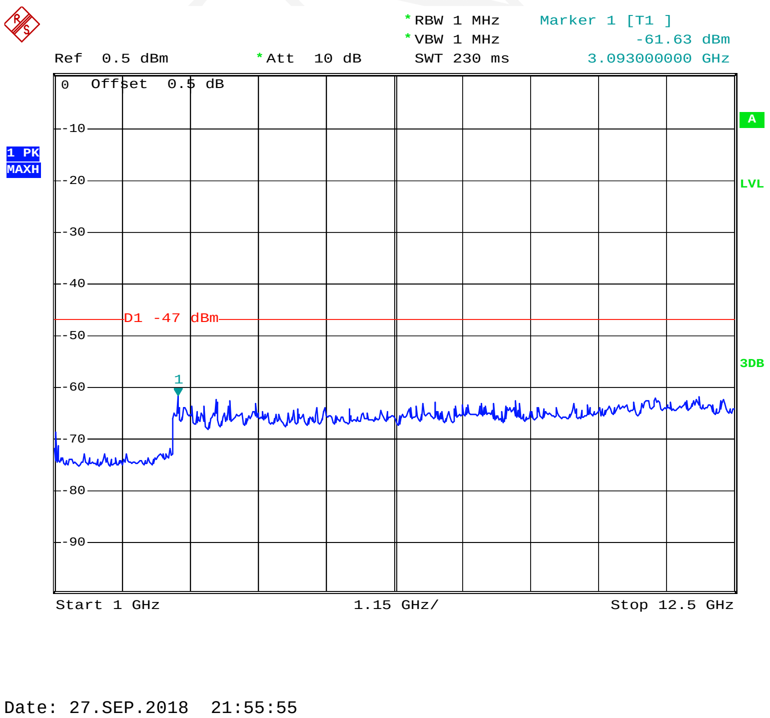


Test Frequency: 2442MHz:

30MHz～1000MHz

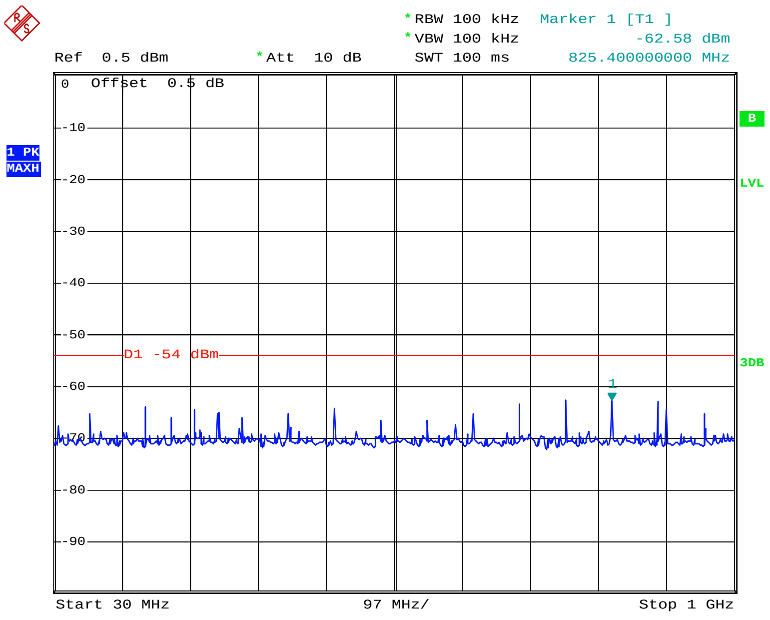


1000MHz～12500MHz



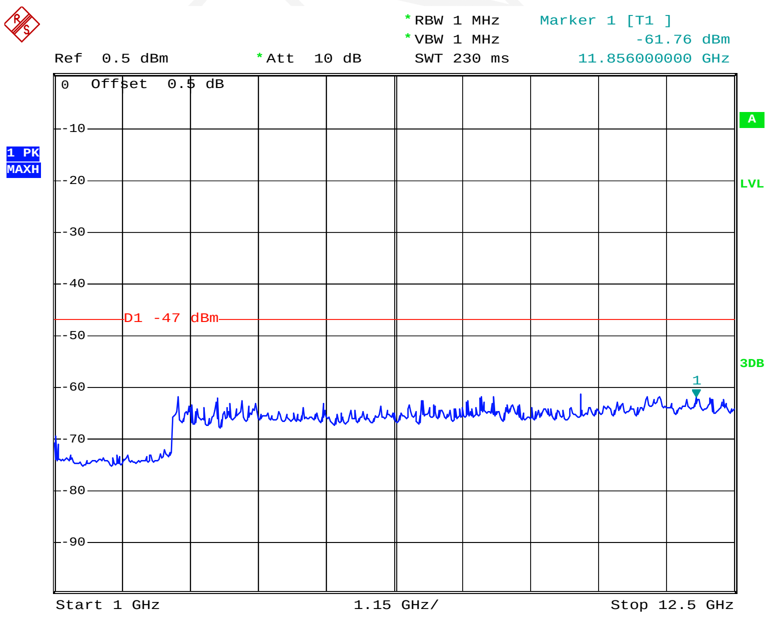
Test Frequency: 2472MHz:

30MHz～1000MHz



Date: 27.SEP.2018 21:55:16

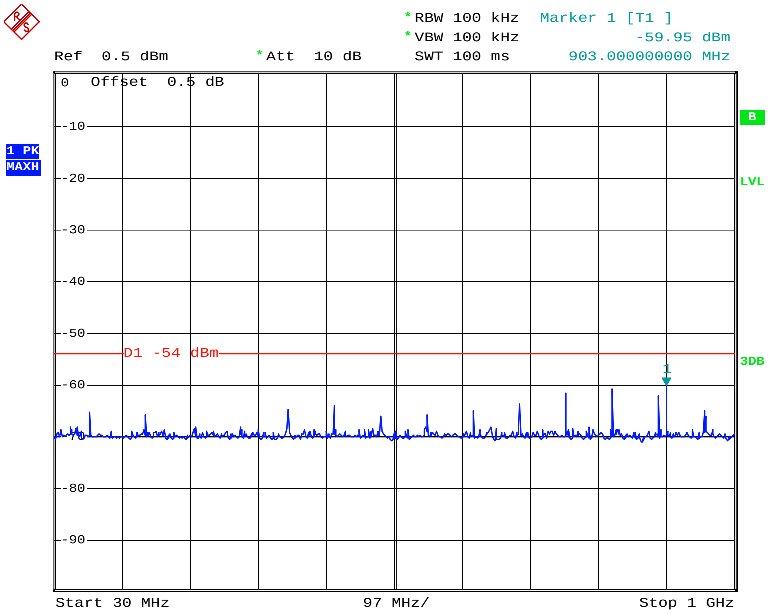
1000MHz～12500MHz



Date: 27.SEP.2018 21:55:03

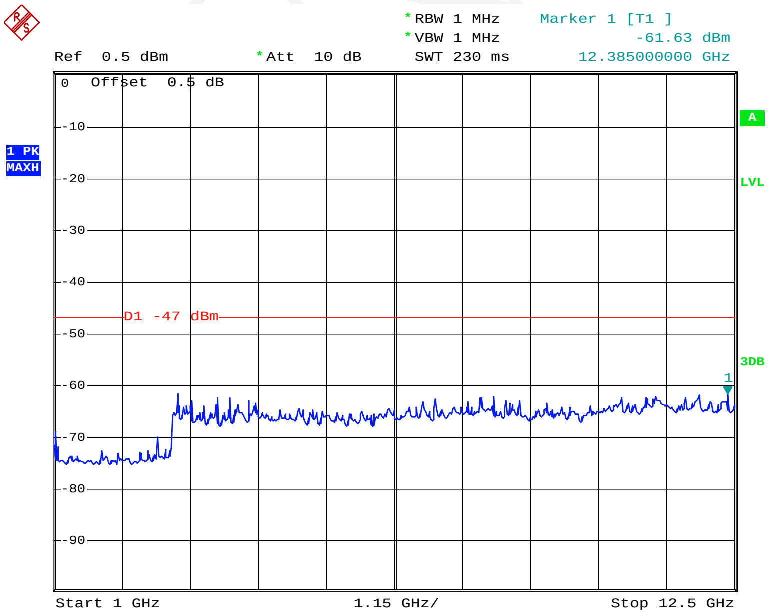
802.11n ht20 mode, Test Frequency: 2412MHz

30MHz～1000MHz



Date: 27.SEP.2018 21:57:31

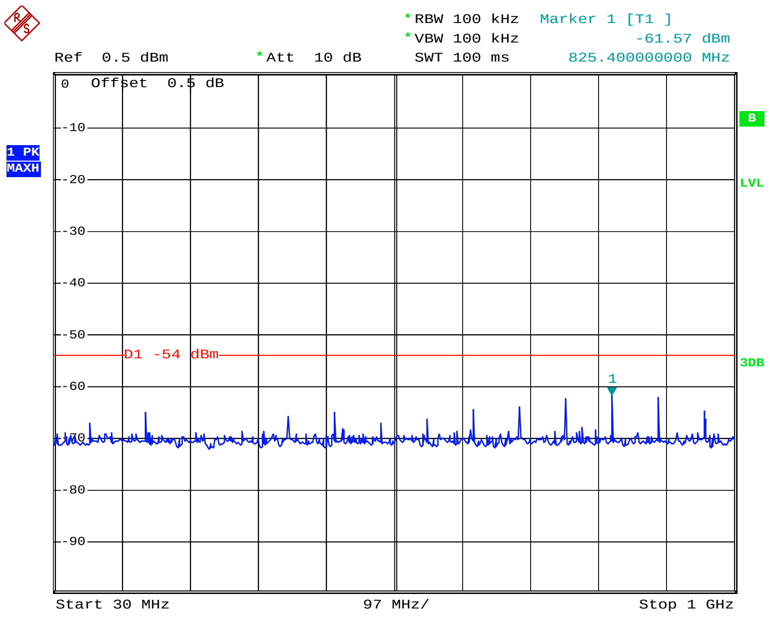
1000MHz～12500MHz



Date: 27.SEP.2018 21:57:45

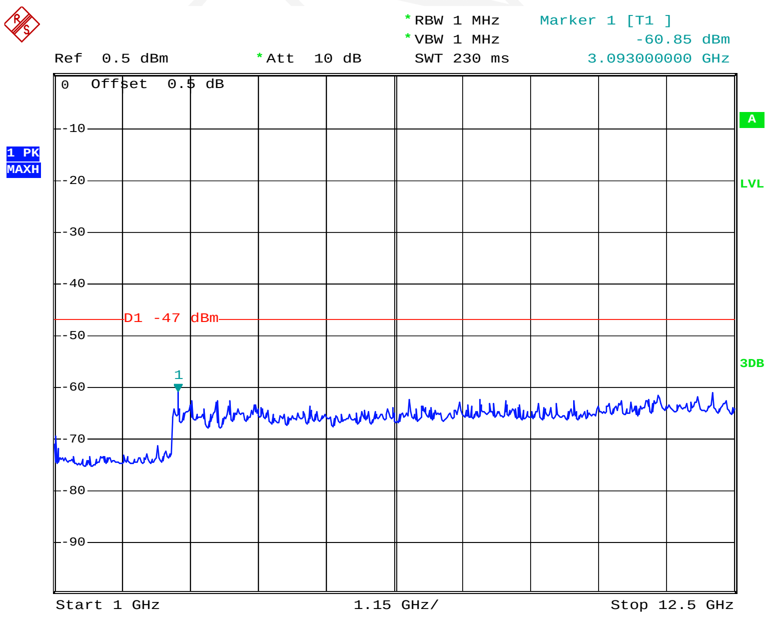
Test Frequency: 2442MHz:

30MHz～1000MHz



Date: 27.SEP.2018 21:58:30

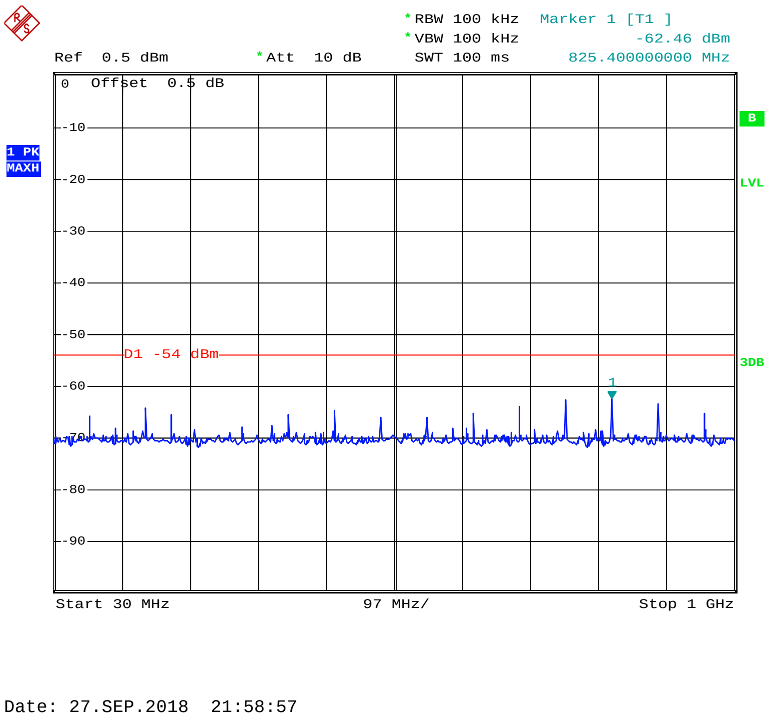
1000MHz～12500MHz



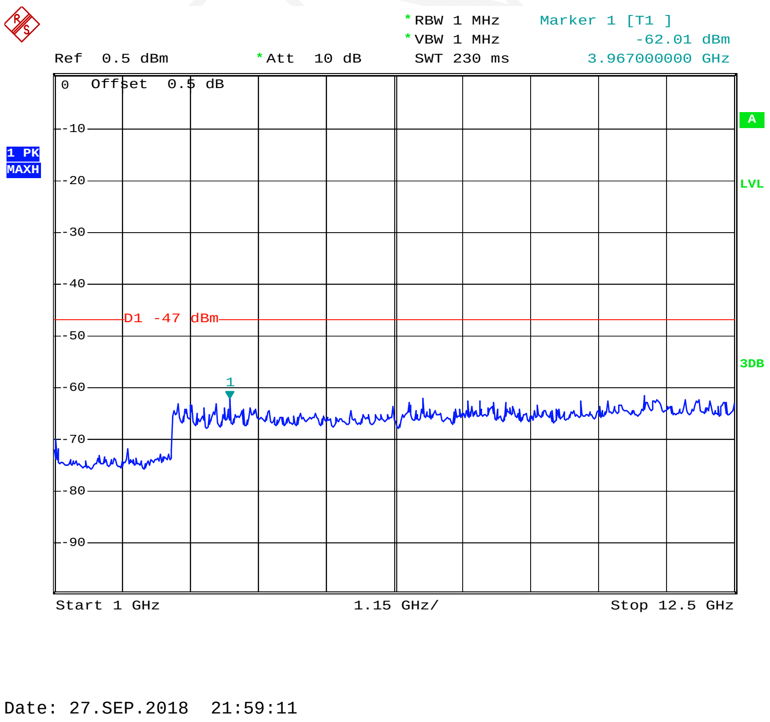
Date: 27.SEP.2018 21:58:14

Test Frequency: 2472MHz:

30MHz～1000MHz



1000MHz～12500MHz



INTERFERENCE PREVENTION FUNCTION

Requirement

The EUT shall have the interference prevention capability to transmit or to receive the identification automatically, so that sender and receiver shall exclude other equipment.

Test Procedure

In the case that the EUT has the function of automatically transmitting the identification code:
1. Transmit the predetermined identification codes from EUT
2. Check the transmitted identification codes with the demodulator.

In the case of receiving the identification codes:
1. Transmit the predetermined identification codes from the counterpart.
2. Check if communication is normal
3. Transmit the signal other than predetermined ID codes from the counterpart.
4. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

Measurement Result

Environmental Conditions

Temperature:	26.4°C
Relative Humidity:	63 %
ATM Pressure:	100.4 kPa

The testing was performed by Harry yang on 2018-09-27.

Test Result: Good

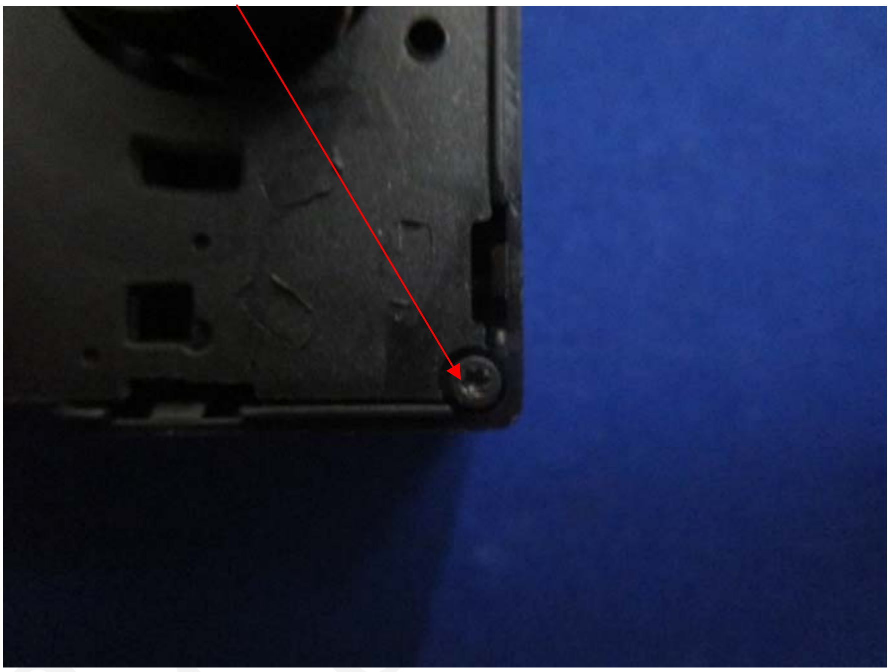
CONSTRUCTION PROTECTION CONFIRMATION

Limit

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

Confirmation Method

The EUT was locked by special screw which can`t be opened easily. Please refer the EUT photo.



****END OF REPORT****