CE Radio Test Report

Project No.	:	1705C214
Equipment	:	150Mbps High Gain Wireless USB Adapter
Model Name	:	U2
Applicant	:	SHENZHEN TENDA TECHNOLOGY CO.,LTD
Address	:	6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052

Date of Receipt	:	May 25, 2017
Date of Test	:	May 25, 2017 ~ Jun. 26, 2017
Issued Date	:	Jun. 27, 2017
Tested by	:	BTL Inc.

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Declaration

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For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-ETSP-1-1705C214	Original Issue	Jun. 27, 2017

1. CERTIFICATION

Equipment	:	150Mbps High Gain Wireless USB Adapter
Brand Name	:	Tenda
Model Name	:	U2
Applicant	:	SHENZHEN TENDA TECHNOLOGY CO.,LTD
Manufacturer	:	SHENZHEN TENDA TECHNOLOGY CO.,LTD
Address	:	6-8 Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052
Date of Test	:	May 25, 2017 ~ Jun. 26, 2017
Test Sample	:	Engineering Sample
Standard(s)	:	EN 300 328 V2.1.1 (2016-11)

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-ETSP-1-1705C214) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

Test results included in this report is only for the WIFI 2.4GHz part.

2. RF EMISSIONS MEASUREMENT

2.1TEST FACILITY

The test facilities used to collect the test data in this report is **DG-CB12/OVEN** at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

2.2MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2 .The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{cispr} requirement.

Parameter	**Uncertainty**
Output Power	±0.95dB
Occupied Channel Bandwidth	±3.8 %
Power Spectral Density	±0.86 dB
Conducted Spurious Emission	±2.71 dB
Radiated Emissions, (f≦1GHz)	±3.38dB
Radiated Emissions, (1 GHz＜f≦26.5GHz)	±3.06dB
Temperature	±0.08°C

2.3 TEST CHANNEL

IEEE 802.11b/g/n(20 MHz)		
Test Channel	EUT Channel	Test Frequency (MHz)
low	CH01	2412
middle	CH07	2442
high	CH13	2472

IEEE 802.11n(40 MHz)		
Test Channel	EUT Channel	Test Frequency (MHz)
low	CH03	2422
middle	CH07	2442
high	CH11	2462

Note:

(1) The technical requirements of the present document apply under the environmental profile for operation of the equipment, which shall be stated by the supplier.

2.4 TEST METHODOLOGY AND RESULT

Harmonised Standard ETSI EN 300 328 V2.1.1					
Essential Requirement			Requirement Conditionality		Result
No	Description	Reference: Clause No	U/C	Condition	
1	RF Output Power	4.3.1.2 or 4.3.2 2	U	-	Pass
2	Power Spectral Density	4.3.2.3	C	Only for equipment using wide band modulations other than FHSS	Pass
3	Duty cycle, Tx-Sequence, Tx-gap	4.3.1.3 or 4.3.2.4	C	Only for non-adaptive equipment and RF Output Power>10dBm	N/A
4	Accumulated Transmit time,, Frequency Occupation & Hopping Sequence	4.3.1.4	C	Only for FHSS equipment	N/A
5	Hopping Frequency Separation	4.3.1.5	C	Only for FHSS equipment	N/A
6	Medium Utilisation	4.3.1.6 or 4.3.2.5	C	Only for non-adaptive equipment and RF Output Power>10dBm	N/A
7	Adaptivity	4.3.1.7 or 4.3.2.6	C	Only for adaptive equipment and RF Output Power>10dBm	Pass
8	Occupied Channel Bandwidth	4.3.1.8 or 4.3.2.7	U	-	Pass
9	Transmitter unwanted emissions in the OOB domain	4.3.1.9 or 4.3.2.8	U	-	Pass
10	Transmitter unwanted emissions in the spurious domain	4.3.1.10 or 4.3.2.9	U	-	Pass
11	Receiver spurious emissions	4.3.1.11 or 4.3.2.10	U	-	Pass
12	Receiver Blocking	4.3.1.12 or 4.3.2.11	U	-	Pass
13	Geo-location capability	4.3.1.13 or 4.3.2.12	C	Only for equipment with geo-location capability	N/A

Note:

(1) “U/C”: Indicates whether the requirement is unconditionally applicable (U) or is conditional upon the manufacturer's claimed functionality of the equipment (C).

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	150Mbps High Gain Wireless USB Adapter	
Brand Name	Tenda	
Model Name	U2	
Model Difference	N/A	
Power Source	Supplied from PC USB port.	
Power Rating	DC 5V	
Product Description	Operation Frequency	2412~2472MHz
	Modulation Technology	802.11b: DSSS 802.11g: OFDM 802.11n: OFDM
	Bit Rate of Transmitter	802.11b: 11/5.5/2/1 Mbps 802.11g: 54/48/36/24/18/12/9/6 Mbps 802.11n: up to 150 Mbps
	EIRP Power (Max.)	802.11b: 12.54dBm 802.11g: 12.84 dBm 802.11n (20MHz): 12.76 dBm 802.11n (40MHz): 12.78 dBm
	Categorization	☒Receiver category 1 ☐Receiver category 2 ☐Receiver category 3

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. Channel List:

CH01 - CH13 for 802.11b, 802.11g, 802.11n(20MHz) CH03 - CH11 for 802.11n(40MHz)					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	06	2437	11	2462
02	2417	07	2442	12	2467
03	2422	08	2447	13	2472
04	2427	09	2452		
05	2432	10	2457		

3. Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	Dipole	N/A	5

3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

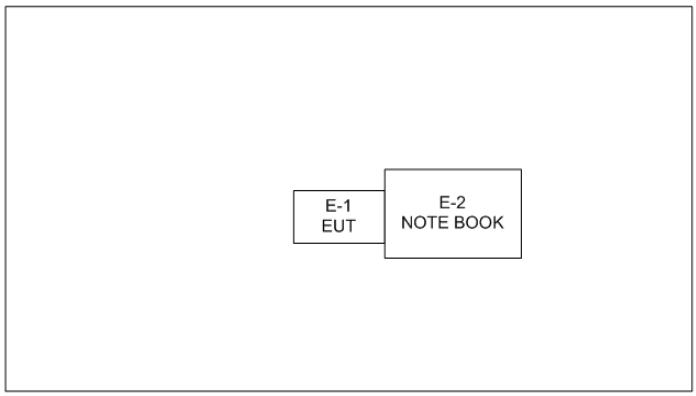
Test Items	Mode	Data Rate	Channel
RF Output Power Power Spectral Density	IEEE 802.11b/CCK	1 Mbps	01/07/13
	IEEE 802.11g/BPSK	6 Mbps	01/07/13
	IEEE 802.11n(20MHz)/BPSK	MCS 0	01/07/13
	IEEE 802.11n(40MHz)/BPSK	MCS 0	03/07/11
Adaptivity, Occupied Channel Bandwidth Transmitter unwanted emissions in the OOB domain	IEEE 802.11b/CCK	1 Mbps	01/13
	IEEE 802.11g/BPSK	6 Mbps	01/13
	IEEE 802.11n(20MHz)/BPSK	MCS 0	01/13
	IEEE 802.11n(40MHz)/BPSK	MCS 0	03/11
Transmitter unwanted emissions in the spurious domain (30MHz~1GHz)	IEEE 802.11b/CCK	1 Mbps	01/13
	IEEE 802.11n(40MHz)/BPSK	MCS 0	03/11
Transmitter unwanted emissions in the spurious domain (1GHz~12.75GHz)	IEEE 802.11b/CCK	1 Mbps	01/13
	IEEE 802.11g/BPSK	6 Mbps	01/13
	IEEE 802.11n(20MHz)/BPSK	MCS 0	01/13
	IEEE 802.11n(40MHz)/BPSK	MCS 0	03/11
Receiver spurious emissions (30MHz~1GHz)	IEEE 802.11b/CCK	1 Mbps	01/13
	IEEE 802.11n(40MHz)/BPSK	MCS 0	03/11
Receiver spurious emissions (1GHz~12.75GHz)	IEEE 802.11b/CCK	1 Mbps	01/13
	IEEE 802.11g/BPSK	6 Mbps	01/13
	IEEE 802.11n(20MHz)/BPSK	MCS 0	01/13
	IEEE 802.11n(40MHz)/BPSK	MCS 0	03/11
Receiver Blocking	IEEE 802.11b/CCK	1 Mbps	01/13

3.3 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Test Software Version	MT7601 USB QA V1.0.9.11		
Frequency (MHz)	2412	2442	2472
IEEE 802.11b	0E	0E	0E
IEEE 802.11g	0D	0D	0D
IEEE 802.11n20	0D	0D	0D
Frequency (MHz)	2422	2442	2462
IEEE 802.11n40	0D	0E	0E

3.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.5 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.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.
A	Notebook	Dell 745	DCSM	DOC	G7K832X

Item	Shielded Type	Ferrite Core	Length	Note
-	-	-	-	-

4. RF OUTPUT POWER

4.1 APPLIED PROCEDURES / LIMIT

Clause	4.3.2.2
Test Item	RF output power
Limit	For adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be 20 dBm. The maximum RF output power for non-adaptive equipment shall be declared by the manufacturer and shall not exceed 20 dBm. See clause 5.4.1 m). For non-adaptive equipment using wide band modulations other than FHSS, the maximum RF output power shall be equal to or less than the value declared by the manufacturer.

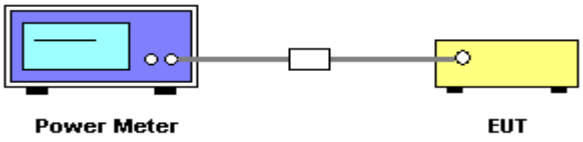
4.2 TEST PROCEDURES

Please refer to chapter 5.4.2 of ETSI EN 300 328 V2.1.1.

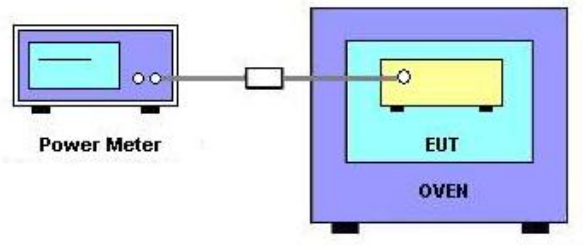
Test Method	
☑ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☑ Lowest, Middle and highest Channel	☐ Lowest and highest Channel
☐ Two Adjacent Hopping Channel	☐ Two Hopping Channel
Environmental conditions	
☐ Normal	☑ Normal and Extreme

4.3 TEST SETUP LAYOUT

Normal Condition



Extreme Condition



4.4 TEST DEVIATION

There is no deviation with the original standard.

4.5 EUT OPERATION DURING TEST

The measurements shall be performed during continuously transmitting.

4.6 TEST RESULTS

Please refer to the Appendix A.

5. POWER SPECTRAL DENSITY

5.1 APPLIED PROCEDURES / LIMIT

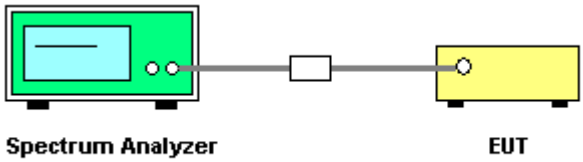
Clause	4.3.2.3
Test Item	Power Spectral Density
Limit	For equipment using wide band modulations other than FHSS, the maximum Power Spectral Density is limited to 10 dBm per MHz.

5.2 TEST PROCEDURES

Please refer to chapter 5.4.3 of ETSI EN 300 328 V2.1.1.

Test Method	
☑ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☑ Lowest, Middle and highest Channel	☐ Lowest and highest Channel
☐ Two Adjacent Hopping Channel	☐ Two Hopping Channel
Environmental conditions	
☑ Normal	☐ Normal and Extreme

5.3 TEST SETUP LAYOUT



5.4 TEST DEVIATION

There is no deviation with the original standard.

5.5 EUT OPERATION DURING TEST

The measurements shall be performed during continuously transmitting.

5.6 TEST RESULTS

Please refer to the Appendix B.

6. DUTY CYCLE, TX-SEQUENCE, TX-GAP

6.1 APPLIED PROCEDURES / LIMIT

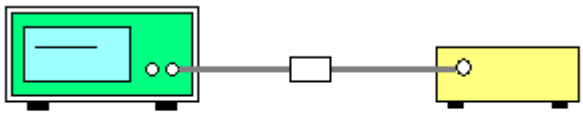
Clause	4.3.2.4
Test Item	Duty Cycle, Tx-sequence, Tx-gap
Limit	The Duty Cycle shall be equal to or less than the maximum value declared by the manufacturer. The Tx-sequence time shall be equal to or less than 10 ms. The minimum Tx-gap time following a Tx-sequence shall be equal to the duration of that proceeding Tx-sequence with a minimum of 3,5 ms.

6.2 TEST PROCEDURES

Please refer to chapter 5.4.2 of ETSI EN 300 328 V2.1.1.

Test Method	
☑ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☑ Lowest, Middle and highest Channel	☐ Lowest and highest Channel
☐ Two Adjacent Hopping Channel	☐ Two Hopping Channel
Environmental conditions	
☑ Normal	☐ Normal and Extreme

6.3 TEST SETUP LAYOUT



6.4 TEST DEVIATION

There is no deviation with the original standard.

6.5 EUT OPERATION DURING TEST

The measurements shall be performed during continuously transmitting.

6.6 TEST RESULTS

Please refer to the Appendix C.

7. MEDIUM UTILISATION (MU) FACTOR

7.1 APPLIED PROCEDURES / LIMIT

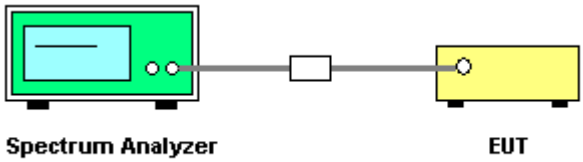
Clause	4.3.2.5
Test Item	Medium Utilisation (MU) factor
Limit	For non-adaptive equipment using wide band modulations other than FHSS, the maximum Medium Utilisation factor shall be 10 %.

7.2 TEST PROCEDURES

Please refer to chapter 5.4.2 of ETSI EN 300 328 V2.1.1.

Test Method	
☑ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☑ Lowest, Middle and highest Channel	☐ Lowest and highest Channel
☐ Two Adjacent Hopping Channel	☐ Two Hopping Channel
Environmental conditions	
☑ Normal	☐ Normal and Extreme

7.3 TEST SETUP LAYOUT



7.4 TEST DEVIATION

There is no deviation with the original standard.

7.5 EUT OPERATION DURING TEST

The measurements shall be performed during continuously transmitting.

7.6 TEST RESULTS

Please refer to the Appendix D.

8. ADAPTIVITY (ADAPTIVE EQUIPMENT USING MODULATIONS OTHER THAN FHSS)

8.1 APPLIED PROCEDURES / LIMIT

Clause	4.3.2.6
Test Item	Adaptivity (adaptive equipment using modulations other than FHSS)
Limit	**Non-LBT based Detect and Avoid** Equipment using a modulation other than FHSS and using the non-LBT based Detect and Avoid mechanism, shall comply with the following minimum set of requirements: 1) During normal operation, the equipment shall evaluate the presence of a signal on its current operating channel. If it is determined that a signal is present with a level above the detection threshold defined in step 5 the channel shall be marked as 'unavailable'. 2) The channel shall remain unavailable for a minimum time equal to 1 s after which the channel may be considered again as an 'available' channel. 3) The total time during which an equipment has transmissions on a given channel without re-evaluating the availability of that channel, is defined as the Channel Occupancy Time. 4) The Channel Occupancy Time shall be less than 40 ms. Each such transmission sequence shall be followed by an Idle Period (no transmissions) of minimum 5 % of the Channel Occupancy Time with a minimum of 100 µs. After this, the procedure as in step 1 needs to be repeated. 5) The detection threshold shall be proportional to the transmit power of the transmitter: for a 20 dBm e.i.r.p. transmitter the detection threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G); however, beamforming gain (Y) shall not be taken into account. For power levels less than 20 dBm e.i.r.p., the detection threshold level may be relaxed to: TL = -70 dBm/MHz + 10 x $\log_{10}$ (100 mW/Pout) (Pout in mW e.i.r.p.). 6) The equipment shall comply with the requirements defined in step 1 to step 4 of the present clause in the presence of an unwanted CW signal as defined in table 9.

Table 9: Unwanted Signal parameters

Wanted signal mean power from companion device (dBm)	Unwanted signal frequency (MHz)	Unwanted CW signal power (dBm)
-30	2 395 or 2 488,5 (see note 1)	-35 (see note 2)
NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1. NOTE 2: The level specified is the level in front of the UUT antenna. In case of conducted measurements, this level has to be corrected by the actual antenna assembly gain.		

Limit	**LBT based Detect and Avoid** The present document defines two types of adaptive equipment using wide band modulations other than FHSS and that uses an LBT based Detect and Avoid mechanism: Frame Based Equipment and Load Based Equipment. Adaptive equipment which is capable of operating as either Load Based Equipment or as Frame Based Equipment is allowed to switch dynamically between these types of operation. **a. Frame Based Equipment** Frame Based Equipment shall comply with the following requirements: 1) Before transmission, the equipment shall perform a Clear Channel Assessment (CCA) check using energy detect. The equipment shall observe the operating channel for the duration of the CCA observation time which shall be not less than 18 µs. The channel shall be considered occupied if the energy level in the channel exceeds the threshold given in step 5 below. If the equipment finds the channel to be clear, it may transmit immediately. See figure 2 below. 2) If the equipment finds the channel occupied, it shall not transmit on this channel during the next Fixed Frame Period. The equipment is allowed to switch to a non-adaptive mode and to continue transmissions on this channel providing it complies with the requirements applicable to non-adaptive equipment. See clause 4.3.2.6.1. Alternatively, the equipment is also allowed to continue Short Control Signalling Transmissions on this channel providing it complies with the requirements given in clause 4.3.2.6.4. 3) The total time during which an equipment has transmissions on a given channel without re-evaluating the availability of that channel, is defined as the Channel Occupancy Time. The Channel Occupancy Time shall be in the range 1 ms to 10 ms followed by an Idle Period of at least 5 % of the Channel Occupancy Time used in the equipment for the current Fixed Frame Period. See figure 2 below. 4) An equipment, upon correct reception of a packet which was intended for this equipment can skip CCA and immediately (see also next paragraph) proceed with the transmission of management and control frames(e.g. ACK and Block ACK frames are allowed but data frames are not allowed). A consecutive sequence of such transmissions by the equipment without a new CCA shall not exceed the maximum Channel Occupancy Time. For the purpose of multi-cast, the ACK transmissions (associated with the same data packet) of the individual devices are allowed to take place in a sequence. 5) The energy detection threshold for the CCA shall be proportional to the transmit power of the transmitter: for a 20 dBm e.i.r.p. transmitter the CCA threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G); however, beamforming gain (Y) shall not be taken into account. For power levels less than 20 dBm e.i.r.p. the CCA threshold level may be relaxed to: $TL = -70 \text{ dBm/MHz} + 10 \times \log_{10} (100 \text{ mW/Pout})$ (Pout in mW e.i.r.p.) 6) The equipment shall comply with the requirements defined in step 1 to step 4 in the present clause in the presence of an unwanted CW signal as defined in table 10.

Limit

Table 10: Unwanted Signal parameters

Wanted signal mean power from companion device	Unwanted signal frequency (MHz)	Unwanted signal power (dBm)
sufficient to maintain the link (see note 2)	2 395 or 2 488,5 (see note 1)	-35 (see note 3)

NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1.
NOTE 2: A typical value which can be used in most cases is -50 dBm/MHz.
NOTE 3: The level specified is the level in front of the UUT antenna. In case of conducted measurements, this level has to be corrected by the actual antenna assembly gain.

b. Load Based Equipment

Load Based Equipment may implement an LBT based spectrum sharing mechanism based on the Clear Channel Assessment (CCA) mode using energy detect as described in IEEE 802.11™-2012 [i.3], clause 9, clause 10, clause 16, clause 17, clause 19 and clause 20, or in IEEE 802.15.4™-2011 [i.4], clause 4, clause 5 and clause 8 providing the equipment complies with the conformance requirements referred to in clause 4.3.2.6.3.4. Load Based Equipment not using any of the mechanisms referenced above shall comply with the following minimum set of requirements:

1) Before a transmission or a burst of transmissions, the equipment shall perform a Clear Channel Assessment(CCA) check using energy detect. The equipment shall observe the operating channel for the duration of the CCA observation time which shall be not less than 18 µs. The channel shall be considered occupied if the energy level in the channel exceeds the threshold given in step 5 below. If the equipment finds the channel to be clear, it may transmit immediately.
2) If the equipment finds the channel occupied, it shall not transmit on this channel (see also the next paragraph). Theequipment shall perform an Extended CCA check in which the channel is observed for a random duration in the range between 18 µs and at least 160 µs. If the extended CCA check has determined the channel to be no longer occupied, the equipment may resume transmissions on this channel. If the Extended CCA time has determined the channel still to be occupied, it shall perform new Extended CCA checks until the channel is no longer occupied.

NOTE: The Idle Period in between transmissions is considered to be the CCA or the Extended CCA check as there are no transmissions during this period.

The equipment is allowed to switch to a non-adaptive mode and to continue transmissions on this channel providing it complies with the requirements applicable to non-adaptive equipment. Alternatively, the equipment is also allowed to continue Short Control Signalling Transmissions on this channel providing it complies with the requirements given in clause 4.3.2.6.4.

Limit

3) The total time that an equipment makes use of a RF channel is defined as the Channel Occupancy Time. This Channel Occupancy Time shall be less than 13 ms, after which the device shall perform a new CCA as described in step 1 above.
4) The equipment, upon correct reception of a packet which was intended for this equipment can skip CCA and immediately (see also next paragraph) proceed with the transmission of management and control frames(e.g. ACK and Block ACK frames are allowed but data frames are not allowed). A consecutive sequence of transmissions by the equipment without a new CCA shall not exceed the maximum channel occupancy time as defined in step 3 above.
For the purpose of multi-cast, the ACK transmissions (associated with the same data packet) of the individual devices are allowed to take place in a sequence.
5) The energy detection threshold for the CCA shall be proportional to the transmit power of the transmitter: for a 20 dBm e.i.r.p. transmitter the CCA threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G); however, beamforming gain (Y) shall not be taken into account. For power levels less than 20 dBm e.i.r.p., the CCA threshold level may be relaxed to:
TL = -70 dBm/MHz + 10 x $\log_{10}$ (100 mW/Pout) (Pout in mW e.i.r.p.).

6) The equipment shall comply with the requirements defined in step 1 to step 4 of the present clause in the presence of an unwanted CW signal as defined in table 11.

Table 11: Unwanted Signal parameters

Wanted signal mean power from companion device	Unwanted signal frequency (MHz)	Unwanted signal power (dBm)
sufficient to maintain the link (see note 2)	2 395 or 2 488,5 (see note 1)	-35 (see note 3)

NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1.
NOTE 2: A typical value which can be used in most cases is -50 dBm/MHz.
NOTE 3: The level specified is the level in front of the UUT antenna. In case of conducted measurements, this level has to be corrected by the actual antenna assembly gain.

Short Control Signalling Transmissions

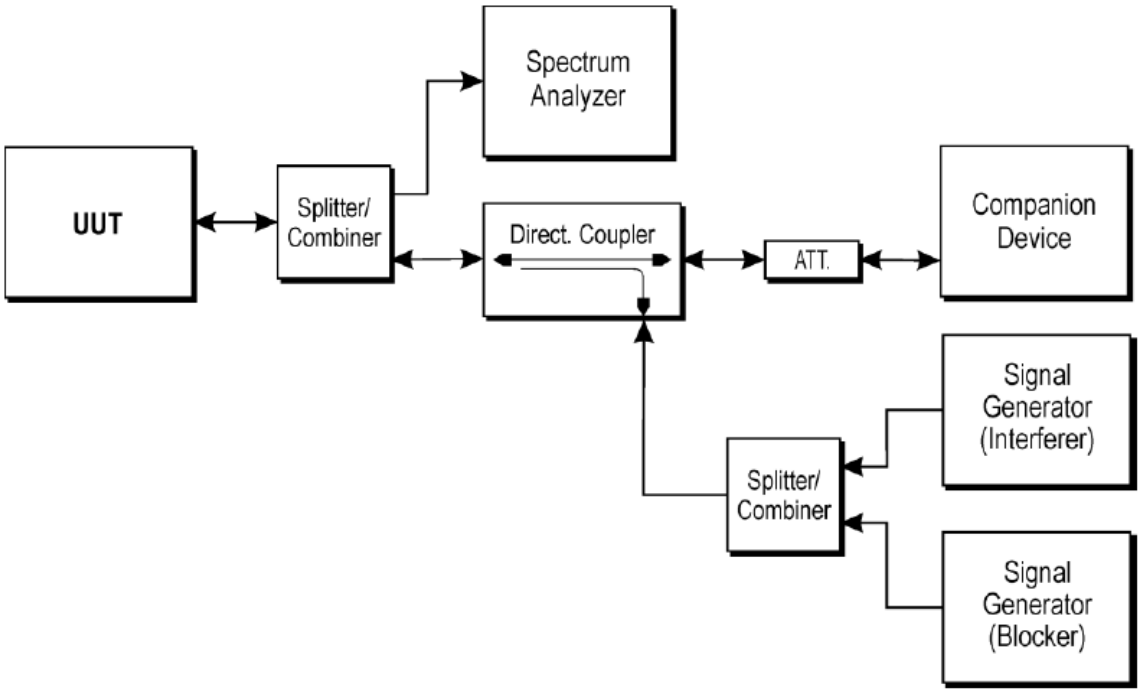
If implemented, Short Control Signalling Transmissions of adaptive equipment using wide band modulations other than FHSS shall have a maximum TxOn / (TxOn + TxOff) ratio of 10 % within any observation period of 50 ms.

8.2 TEST PROCEDURES

Please refer to chapter 5.4.6 of ETSI EN 300 328 V2.1.1.

Test Method	
☑ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☐ Lowest, Middle and highest Channel	☑ Lowest and highest Channel
☐ Two Adjacent Hopping Channel	☐ Two Hopping Channel
Environmental conditions	
☑ Normal	☐ Normal and Extreme

8.3 TEST SETUP LAYOUT



8.4 TEST DEVIATION

There is no deviation with the original standard.

8.5 EUT OPERATION DURING TEST

The measurements shall be performed during normal operation.

8.6 TEST RESULTS

Please refer to the Appendix E.

9. OCCUPIED CHANNEL BANDWIDTH

9.1 APPLIED PROCEDURES / LIMIT

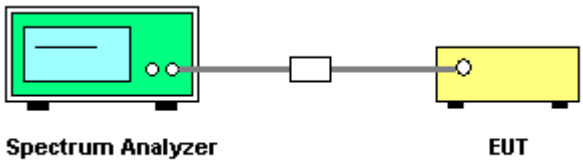
Clause	4.3.2.7
Test Item	Occupied Channel Bandwidth
Limit	The Occupied Channel Bandwidth shall fall completely within the band given in clause 1. In addition, for non-adaptive systems using wide band modulations other than FHSS and with e.i.r.p greater than 10 dBm.

9.2 TEST PROCEDURES

Please refer to chapter 5.4.7 of ETSI EN 300 328 V2.1.1.

Test Method	
☑ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☐ Lowest, Middle and highest Channel	☑ Lowest and highest Channel
☐ Two Adjacent Hopping Channel	☐ Two Hopping Channel
Environmental conditions	
☑ Normal	☐ Normal and Extreme

9.3 TEST SETUP LAYOUT



9.4 TEST DEVIATION

There is no deviation with the original standard.

9.5 EUT OPERATION DURING TEST

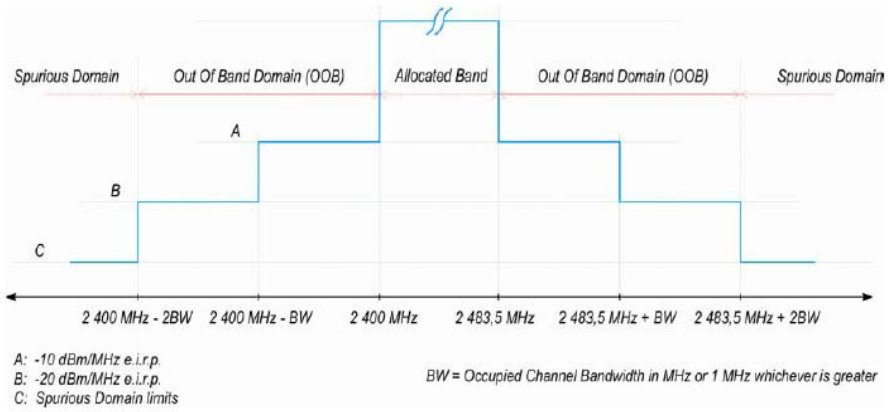
The measurements shall be performed during continuously transmitting.

9.6 TEST RESULTS

Please refer to the Appendix F.

10. TRANSMITTER UNWANTED EMISSIONS IN THE OUT-OF-BAND DOMAIN

10.1 APPLIED PROCEDURES / LIMIT

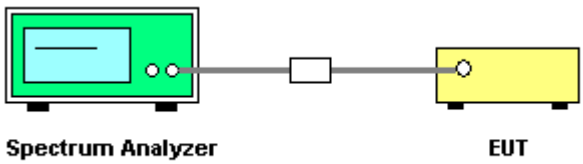
Clause	4.3.2.8
Test Item	Transmitter unwanted emissions in the out-of-band domain
Limit	The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in below figure. 

10.2 TEST PROCEDURES

Please refer to chapter 5.4.8 of ETSI EN 300 328 V2.1.1.

Test Method	
☑ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☐ Lowest, Middle and highest Channel	☑ Lowest and highest Channel
☐ Two Adjacent Hopping Channel	☐ Two Hopping Channel
Environmental conditions	
☑ Normal	☐ Normal and Extreme

10.3 TEST SETUP LAYOUT



10.4 TEST DEVIATION

There is no deviation with the original standard.

10.5 EUT OPERATION DURING TEST

The measurements shall be performed during continuously transmitting.

10.6 TEST RESULTS

Please refer to the Appendix G.

11. TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

11.1 APPLIED PROCEDURES / LIMIT

<table>
<tr><td>Clause</td><td>4.3.2.9</td></tr>
<tr><td>Test Item</td><td>Transmitter unwanted emissions in the spurious domain</td></tr>
<tr><td>Limit</td><td>The transmitter unwanted emissions in the spurious domain shall not exceed the values given in below table.
These limits are e.r.p for emissions up to 1GHz and e.i.r.p for emissions above 1GHz.
<table>
<tr><th>Frequency range</th><th>Maximum power</th><th>Bandwidth</th></tr>
<tr><td>30 MHz to 47 MHz</td><td>-36 dBm</td><td>100 kHz</td></tr>
<tr><td>47 MHz to 74 MHz</td><td>-54 dBm</td><td>100 kHz</td></tr>
<tr><td>74 MHz to 87,5 MHz</td><td>-36 dBm</td><td>100 kHz</td></tr>
<tr><td>87,5 MHz to 118 MHz</td><td>-54 dBm</td><td>100 kHz</td></tr>
<tr><td>118 MHz to 174 MHz</td><td>-36 dBm</td><td>100 kHz</td></tr>
<tr><td>174 MHz to 230 MHz</td><td>-54 dBm</td><td>100 kHz</td></tr>
<tr><td>230 MHz to 470 MHz</td><td>-36 dBm</td><td>100 kHz</td></tr>
<tr><td>470 MHz to 862 MHz</td><td>-54 dBm</td><td>100 kHz</td></tr>
<tr><td>862 MHz to 1 GHz</td><td>-36 dBm</td><td>100 kHz</td></tr>
<tr><td>1 GHz to 12,75 GHz</td><td>-30 dBm</td><td>1 MHz</td></tr>
</table>
</td></tr>
</table>

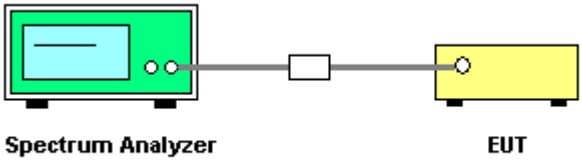
11.2 TEST PROCEDURES

Please refer to chapter 5.4.9 of ETSI EN 300 328 V2.1.1.

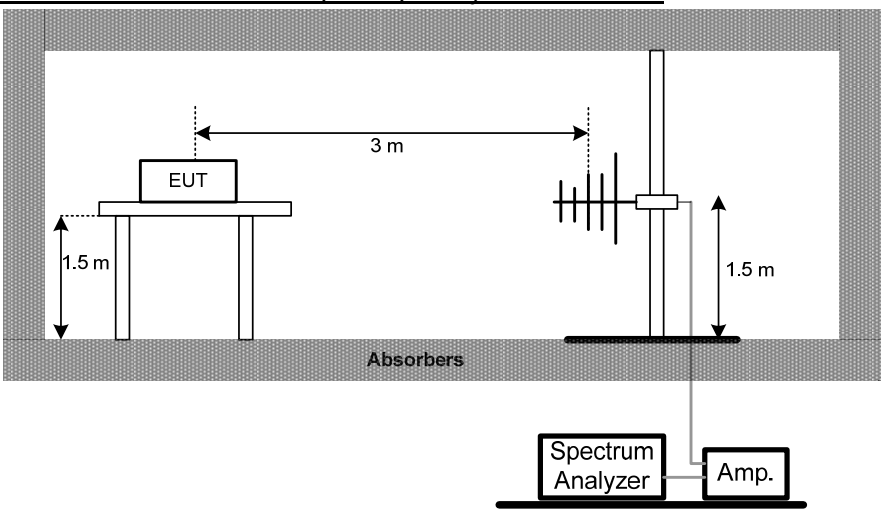
<table>
<tr><td colspan="2">Test Method</td></tr>
<tr><td>☑ Conducted Measurement</td><td>☑ Radiated Measurement</td></tr>
<tr><td colspan="2">Test Channels</td></tr>
<tr><td>☐ Lowest, Middle and highest Channel</td><td>☑ Lowest and highest Channel</td></tr>
<tr><td>☐ Two Adjacent Hopping Channel</td><td>☐ Two Hopping Channel</td></tr>
<tr><td colspan="2">Environmental conditions</td></tr>
<tr><td>☑ Normal</td><td>☐ Normal and Extreme</td></tr>
</table>

11.3 TEST SETUP LAYOUT

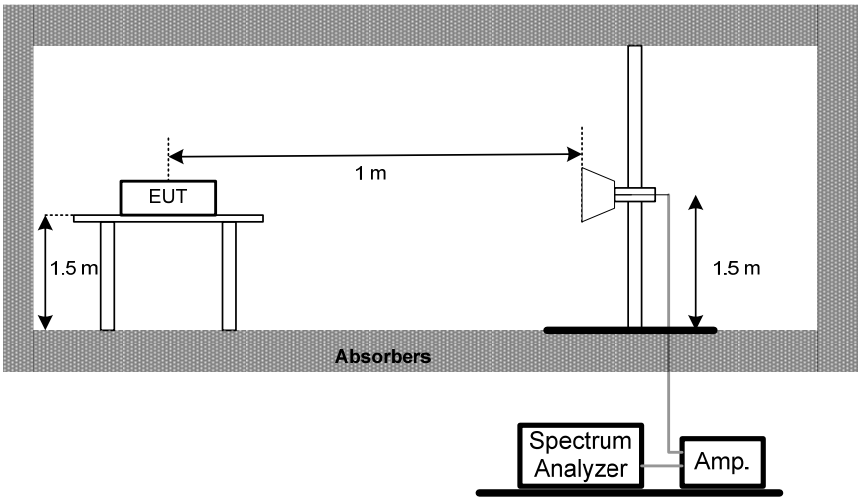
Conducted Measurement



Radiated Measurement Test Set-Up Frequency Below 1 GHz



Radiated Measurement Test Set-Up Frequency Above 1 GHz



11.4 TEST DEVIATION

There is no deviation with the original standard.

11.5 EUT OPERATION DURING TEST

The measurements shall be performed during continuously transmitting.

11.6 TEST RESULTS

Please refer to the Appendix H

12. RECEIVER SPURIOUS EMISSIONS

12.1 APPLIED PROCEDURES / LIMIT

Clause	4.3.2.10
Test Item	Receiver spurious emissions
Limit	The spurious emissions of the receiver shall not exceed the values given in below table. These limits are e.r.p for emissions up to 1GHz and e.i.r.p for emissions above 1GHz.

Frequency range	Maximum power	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12,75 GHz	-47 dBm	1 MHz

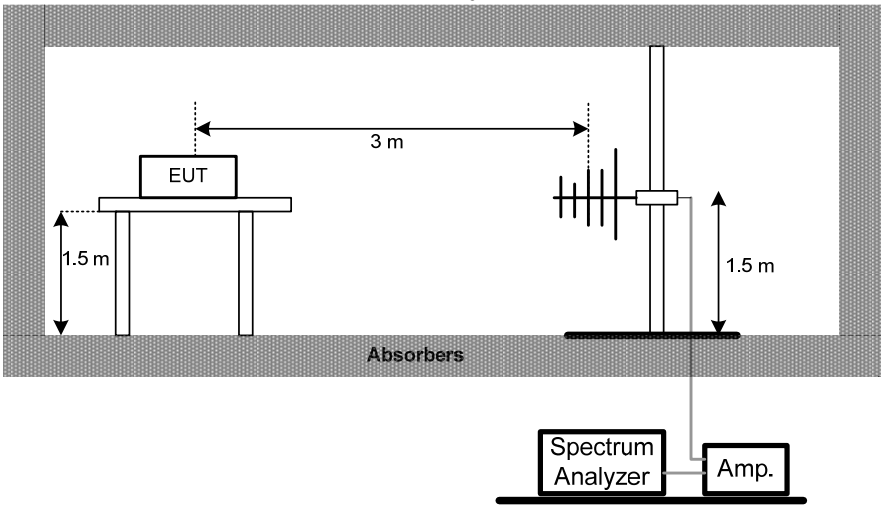
12.2 TEST PROCEDURES

Please refer to chapter 5.4.10 of ETSI EN 300 328 V2.1.1.

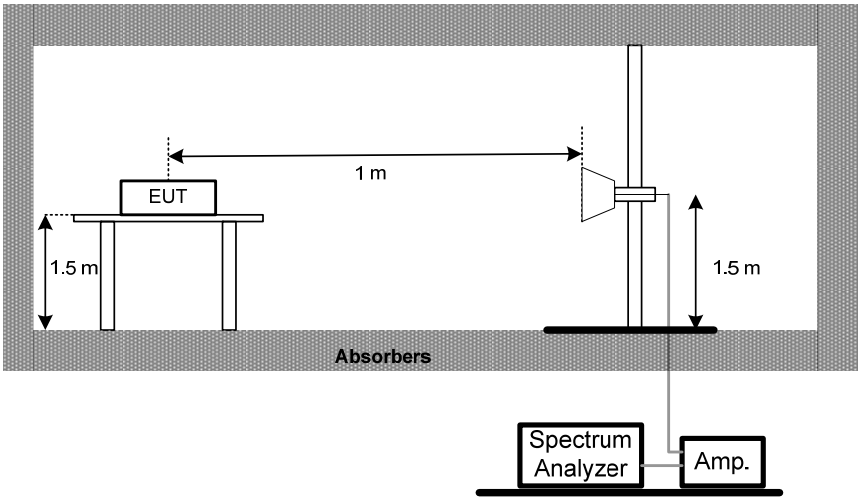
Test Method	
☐ Conducted Measurement	☑ Radiated Measurement
Test Channels	
☐ Lowest, Middle and highest Channel	☑ Lowest and highest Channel
☐ Two Adjacent Hopping Channel	☐ Two Hopping Channel
Environmental conditions	
☑ Normal	☐ Normal and Extreme

12.3 TEST SETUP LAYOUT

Radiated Measurement Test Set-Up Frequency Below 1 GHz



Radiated Measurement Test Set-Up Frequency Above 1 GHz



12.4 TEST DEVIATION

There is no deviation with the original standard.

12.5 EUT OPERATION DURING TEST

The measurements shall be performed during continuously receiving.

12.6 TEST RESULTS

Please refer to the Appendix I.

13. RECEIVER BLOCKING

13.1 APPLIED PROCEDURES / LIMIT

<table>
<tr><td>Clause</td><td>4.3.2.11</td></tr>
<tr><td>Test Item</td><td>Receiver Blocking</td></tr>
<tr><td>Limit</td><td>
While maintaining the minimum performance criteria as defined in clause 4.3.2.11.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in table 14, table 15 or table 16.

Receiver Category 1
Table 14 contains the Receiver Blocking parameters for Receiver Category 1 equipment.
Table 14: Receiver Blocking parameters for Receiver Category 1 equipment
<table>
<tr><th>Wanted signal mean power from companion device (dBm)</th><th>Blocking signal frequency (MHz)</th><th>Blocking signal power (dBm) (see note 2)</th><th>Type of blocking signal</th></tr>
<tr><td>P_{min} + 6 dB</td><td>2 380
2 503,5</td><td>-53</td><td>CW</td></tr>
<tr><td>P_{min} + 6 dB</td><td>2 300
2 330
2 360</td><td>-47</td><td>CW</td></tr>
<tr><td>P_{min} + 6 dB</td><td>2 523,5
2 553,5
2 583,5
2 613,5
2 643,5
2 673,5</td><td>-47</td><td>CW</td></tr>
<tr><td colspan="4">NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.
NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.</td></tr>
</table>
Receiver Category 2
Table 15 contains the Receiver Blocking parameters for Receiver Category 2 equipment.
Table 15: Receiver Blocking parameters receiver category 2 equipment
<table>
<tr><th>Wanted signal mean power from companion device (dBm)</th><th>Blocking signal frequency (MHz)</th><th>Blocking signal power (dBm) (see note 2)</th><th>Type of blocking signal</th></tr>
<tr><td>P_{min} + 6 dB</td><td>2 380
2 503,5</td><td>-57</td><td>CW</td></tr>
<tr><td>P_{min} + 6 dB</td><td>2 300
2 583,5</td><td>-47</td><td>CW</td></tr>
<tr><td colspan="4">NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence o any blocking signal.
NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.</td></tr>
</table>
</td></tr>
</table>

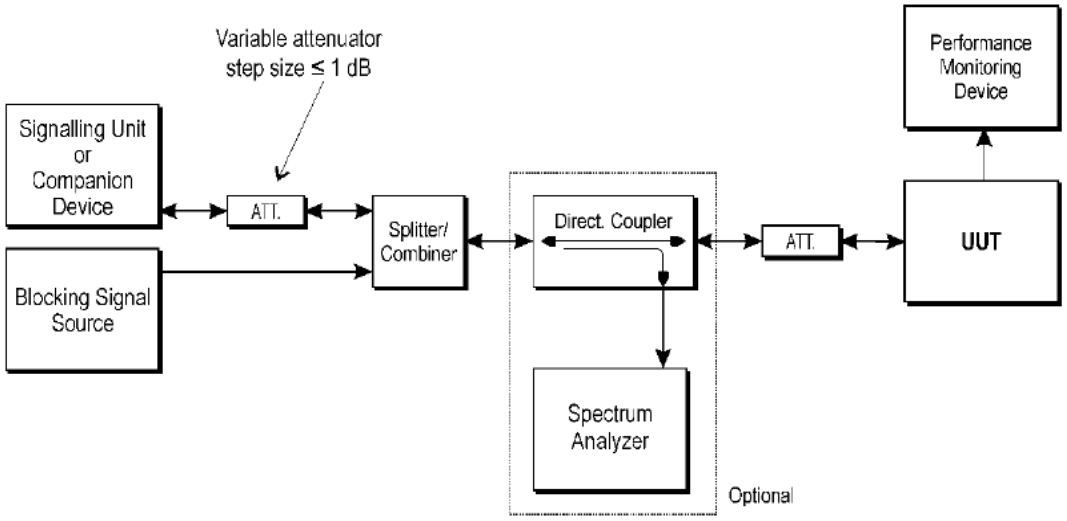
<table>
<tr><td>Limit</td><td>Receiver Category 3
Table 16 contains the Receiver Blocking parameters for Receiver Category 3 equipment.
Table 16: Receiver Blocking parameters receiver category 3 equipment
<table>
<tr><th>Wanted signal mean power from companion device (dBm)</th><th>Blocking signal frequency (MHz)</th><th>Blocking signal power (dBm) (see note 2)</th><th>Type of blocking signal</th></tr>
<tr><td>P_{min} + 12 dB</td><td>2 380
2 503,5</td><td>-57</td><td>CW</td></tr>
<tr><td>P_{min} + 12 dB</td><td>2 300
2 583,5</td><td>-47</td><td>CW</td></tr>
<tr><td colspan="4">NOTE 1: P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.3.2.11.3 in the absence of any blocking signal.
NOTE 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the levels have to be corrected by the actual antenna assembly gain.</td></tr>
</table></td></tr>
</table>

13.2 TEST PROCEDURES

Please refer to chapter 5.4.11 of ETSI EN 300 328 V2.1.1.

Test Method	
☑ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☐ Lowest, Middle and highest Channel	☑ Lowest and highest Channel
☐ Two Adjacent Hopping Channel	☐ Two Hopping Channel
Environmental conditions	
☑ Normal	☐ Normal and Extreme

13.3 TEST SETUP LAYOUT



13.4 TEST DEVIATION

There is no deviation with the original standard.

13.5 EUT OPERATION DURING TEST

The measurements shall be performed during continuously receiving.

13.6 TEST RESULTS

Please refer to the Appendix J.

14. INFORMATION AS REQUIRED BY EN 300 328 V2.1.1, CLAUSE 5.4.1 FOR

In accordance with EN 300 328, clause 5.4.1, the following information is provided by the supplier.

14.1 The type of modulation used by the equipment:

☐ FHSS

☒ other forms of modulation

14.2 In case of FHSS modulation:

(1) In case of non-Adaptive Frequency Hopping equipment:

The number of Hopping Frequencies: N/A

(2) In case of Adaptive Frequency Hopping Equipment:

The maximum number of Hopping Frequencies: N/A

The minimum number of Hopping Frequencies: N/A

(3) The (average) Dwell Time: N/A

14.3 Adaptive / non-adaptive equipment:

☐ non-adaptive Equipment

☒ adaptive Equipment without the possibility to switch to a non-adaptive mode

☐ adaptive Equipment which can also operate in a non-adaptive mode

14.4 In case of adaptive equipment:

The Channel Occupancy Time implemented by the equipment: 2.16 ms

☒ The equipment has implemented an LBT based DAA mechanism

* In case of equipment using modulation different from FHSS:

☐ The equipment is Frame Based equipment

☒ The equipment is Load Based equipment

☐ The equipment can switch dynamically between Frame Based and Load Based equipment

The CCA time implemented by the equipment: 109 µs

☐ The equipment has implemented a non-LBT based DAA mechanism

☐ The equipment can operate in more than one adaptive mode

14.5 The worst case operational mode for each of the following tests:

(1) RF Output Power: 12.84 dBm

(2) Power Spectral Density: 3.45 dBm/MHz

(3) Duty cycle, Tx-Sequence, Tx-gap: N/A

(4) Accumulated Transmit time, Frequency Occupation & Hopping Sequence (only for FHSS equipment): N/A

(5) Hopping Frequency Separation (only for FHSS equipment) : N/A

(6) Medium Utilisation: N/A

(7) Adaptivity : PASS , Receiver Blocking: PASS

(8) Nominal Channel Bandwidth: 36.432 MHz

(9) Transmitter unwanted emissions in the OOB domain: -40.14 dBm

(10) Transmitter unwanted emissions in the spurious domain: -63.46 dBm

(11) Receiver spurious emissions: -61.06 dBm

14.6 The different transmit operating modes (tick all that apply):

☒ Operating mode 1: Single Antenna Equipment

☒ Equipment with only 1 antenna

☐ Equipment with 2 diversity antennas but only 1 antenna active at any moment in time

☐ Smart Antenna Systems with 2 or more antennas, but operating in a (legacy) mode where only 1 antenna is used. (e.g. IEEE 802.11™ [i.3] legacy mode in smart antenna systems)

☐ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming

☐ Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)

☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1

☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2

NOTE: Add more lines if more channel bandwidths are supported.

☐ Operating mode 3: Smart Antenna Systems - Multiple Antennas with beam forming

☐ Single spatial stream / Standard throughput (e.g. IEEE 802.11™ [i.3] legacy mode)

☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 1

☐ High Throughput (> 1 spatial stream) using Occupied Channel Bandwidth 2

NOTE: Add more lines if more channel bandwidths are supported.

14.7 In case of Smart Antenna Systems:

(1) The number of Receive chains: N/A

(2) The number of Transmit chains: N/A

☒ symmetrical power distribution

☐ asymmetrical power distribution

In case of beam forming, the maximum (additional) beam forming gain: N/A

NOTE: The additional beam forming gain does not include the basic gain of a single antenna.

14.8 Operating Frequency Range(s) of the equipment:

(1) Operating Frequency Range 1: 2412 MHz to 2472 MHz

NOTE: Add more lines if more Frequency Ranges are supported.

14.9 Nominal Channel Bandwidth(s):

(1) Nominal Channel Bandwidth 1: 20 MHz

(2) Nominal Channel Bandwidth 2: 40 MHz

NOTE: Add more lines if more channel bandwidths are supported.

14.10 Type of Equipment (stand-alone, combined, plug-in radio device, etc.):

☒ Stand-alone

☐ Combined Equipment (Equipment where the radio part is fully integrated within another type of equipment)

☐ Plug-in radio device (Equipment intended for a variety of host systems)

☐ Other _____

14.11 The extreme operating conditions that apply to the equipment:

Operating temperature range: 0 ° C to 40 ° C

Details provided are for the: ☒ stand-alone equipment

☐ combined (or host) equipment

☐ test jig

14.12 The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices:

Details provided are for the: ☒ stand-alone equipment

☐ combined (or host) equipment

☐ test jig

Supply voltage ☒ DC State DC voltage 5 V

☐ DC State AC voltage __ V

In case of DC, indicate the type of power source

☐ Internal Power Supply

☐ External Power Supply or AC/DC adapter

☐ Battery

☒ Other: USB Port

14.13 Describe the test modes available which can facilitate testing:

The measurements shall be performed during continuously transmitting and normal operation.

14.14 The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], IEEE 802.15.4™ [i.4], proprietary, etc.):

IEEE 802.11™ [i.3]

15. MEASUREMENT INSTRUMENTS LIST

RF Output Power					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Power Sensor	Agilent	U2021XA	MY53020007	Jul. 31, 2017
2	Power Sensor	Agilent	U2021XA	MY53130004	Jul. 31, 2017
3	Power Sensor	Agilent	U2021XA	MY53260025	Jul. 31, 2017
4	Power Sensor	Agilent	U2021XA	MY53180019	Jul. 31, 2017
5	Usb Digitizer	Agilent	U2531A	5258020007	Jul. 31, 2017
6	Test Cable	emci	EMC104-SM-SM-9000(0.01GHz-26.5GHz)	C-100	N/A
7	Test Cable	emci	EMC80-NM-NM-12000(9KHz-1GHz)	C-65	N/A
8	Const Temp. & Humidity Chamber	Giant Force	ITH-225-20-S	IAB0309-001	Sep. 04, 2017
9	Measurement Software	Keysight	EN300328v2.1.1(v1.01.00)	N/A	N/A

Power Spectral Density					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 26, 2018
2	Test Cable	emci	EMC104-SM-SM-9000(0.01GHz-26.5GHz)	C-100	N/A
3	Measurement Software	Keysight	EN300328v2.1.1(v1.01.00)	N/A	N/A

Adaptivity					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	MXG Analog Signal Generator	Agilent	N5181A	MY49060710	Sep. 04, 2017
2	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 26, 2018
3	POWER SPLITTER	Mini-Circuits	ZN4PD1-63-S+	SF9335D1045-2	Feb. 15, 2018
4	POWER SPLITTER	Mini-Circuits	ZFRSC-183-S+	SF601301339-1	Feb. 20, 2018
5	Coupler	Mini-Circuits	ZADC-10-63-S+	SF631801334	Feb. 15, 2018
6	EXG-B RF Vector Signal Generator	Agilent	N5172B	MY53050758	Mar. 26, 2018
7	WIFI communication tester	Keysight	AD211	TW54033508	N/A
8	Measurement Software	Keysight	EN300328v2.1.1(v1.01.00)	N/A	N/A

Occupied Channel Bandwidth					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 26, 2018
2	Test Cable	emci	EMC104-SM-SM-9000(0.01GHz-26.5GHz)	C-100	N/A
3	Measurement Software	Keysight	EN300328v2.1.1(v1.01.00)	N/A	N/A

Transmitter Unwanted Out Of Band Domain					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 26, 2018
2	Test Cable	emci	EMC104-SM-SM-9000(0.01GHz-26.5GHz)	C-100	N/A
3	Const Temp. & Humidity Chamber	Giant Force	ITH-225-20-S	IAB0309-001	Sep. 04, 2017
4	Measurement Software	Keysight	EN300328v2.1.1(v1.01.00)	N/A	N/A

Transmitter and Receiver Spurious Emission (Conducted Measurement)					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 26, 2018
2	Test Cable	emci	EMC104-SM-SM-9000(0.01GHz-26.5GHz)	C-100	N/A
3	Measurement Software	Keysight	EN300328v2.1.1(v1.01.00)	N/A	N/A

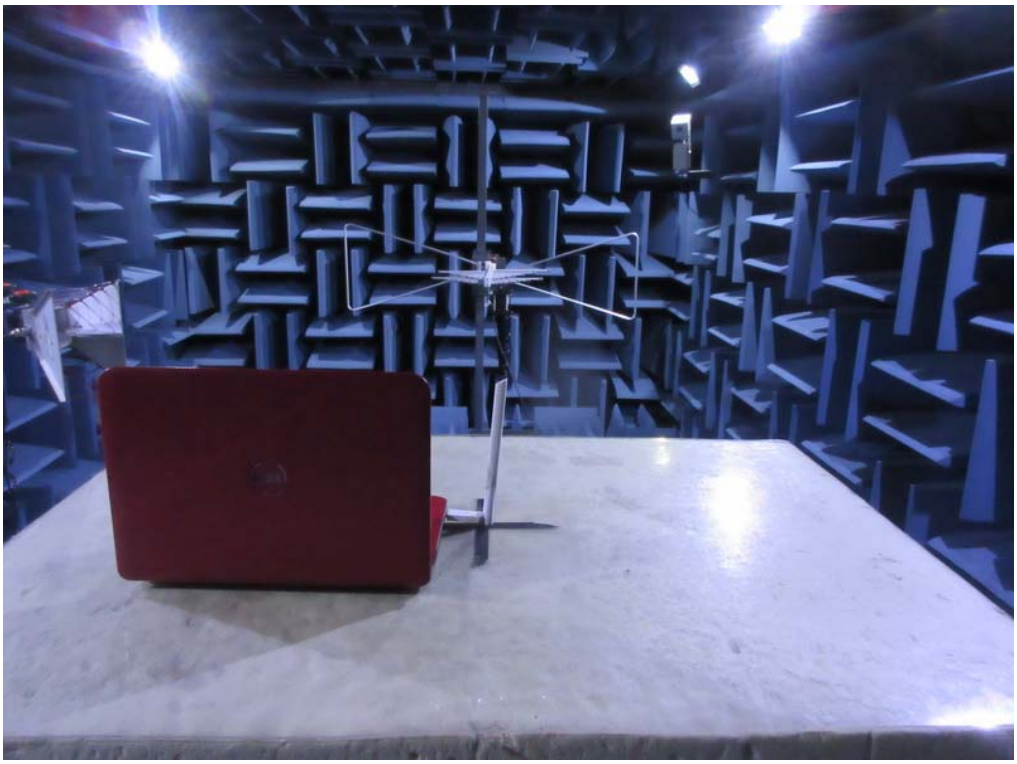
Transmitter and Receiver Spurious Emission (Radiated Measurement)					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 26, 2018
2	Microwave Preamplifier With Adaptor	EMC INSTRUMENT	EMC012645B	980221	Sep. 04, 2017
3	Amplifier	Agilent	8449B	3008A02274	Mar. 09, 2018
4	Double Ridged Guide Antenna	ETS·LINDGREN	3115	00075846	Mar. 26, 2018
5	Antenna	SCHWARZBECK	VULB 9160	9160-3231	Mar. 26, 2018
6	Test Cable	emci	EMC104-SM-SM-9000(0.01GHz-26.5GHz)	C-100	N/A
7	Test Cable	emci	EMC80-NM-NM-12000(9KHz-1GHz)	C-65	N/A
8	Controller	CT	SC100	N/A	N/A
9	Measurement Software	Farad	EZ-EMC Ver.NB-03A1-01	N/A	N/A

Receiver Blocking					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EXA Spectrum Analyzer	Agilent	N9010A	MY50520044	Mar. 26, 2018
2	MXG Vector Signal Generator	Agilent	N5172B	MY53050758	Mar. 26, 2018
3	MXG Analog Signal Generator	Agilent	N5181A	MY49060710	Oct. 10, 2017
4	POWER SPLITTER	Mimi-Circuits	ZFRSC-183-S+	SF601301339-1	Mar. 09, 2018
5	POWER SPLITTER	Mimi-Circuits	ZN4PD1-63-S+	SF9335D1045-2	Mar. 09, 2018
6	COUPLER	Mimi-Circuits	ZADC-10-63-S+	SF631801334	Feb. 22, 2018
7	WIFI communication tester	Keysight	AD211	TW54033508	N/A
8	Measurement Software	Keysight	EN300328v2.1.1(v1.01.00)	N/A	N/A

Remark: “N/A” denotes no model name, serial no. or calibration specified.
All calibration period of equipment list is one year.

16. EUT TEST PHOTO

Radiated Measurement



APPENDIX A - RF OUTPUT POWER

Test Mode:	TX Mode_ 802.11b Mode

Test Conditions		EIRP Power (dBm)			Number Of Bursts		
		CH01	CH07	CH13	CH01	CH07	CH13
T nom (°C)	25.00	12.51	12.41	12.43	11.00	11.00	11.00
T min (°C)	0.00	12.54	12.39	12.37	11.00	11.00	11.00
T max (°C)	40.00	12.45	12.36	12.41	11.00	11.00	11.00
Max EIRP Power		12.54			Min Number		11.00
Limits		20dBm (-10dBW)			⩾10		
Result		Complies			Complies		

Test Mode:	TX Mode_ 802.11g Mode

Test Conditions		EIRP Power (dBm)			Number Of Bursts		
		CH01	CH07	CH13	CH01	CH07	CH13
T nom (°C)	25.00	12.55	12.57	12.84	11.00	11.00	11.00
T min (°C)	0.00	12.65	12.68	12.82	11.00	11.00	11.00
T max (°C)	40.00	12.42	12.45	12.77	11.00	11.00	11.00
Max EIRP Power		12.84			Min Number		11.00
Limits		20dBm (-10dBW)			⩾10		
Result		Complies			Complies		

Test Mode:	TX Mode_ 802.11n 20M Mode

Test Conditions		EIRP Power (dBm)			Number Of Bursts		
		CH01	CH07	CH13	CH01	CH07	CH13
T nom (°C)	25.00	12.47	12.43	12.76	11.00	11.00	11.00
T min (°C)	0.00	12.56	12.54	12.74	11.00	11.00	11.00
T max (°C)	40.00	12.38	12.25	12.56	11.00	11.00	11.00
Max EIRP Power		12.76			Min Number		11.00
Limits		20dBm (-10dBW)			⩾10		
Result		Complies			Complies		

Test Mode:	TX Mode_ 802.11n 40M Mode

Test Conditions		EIRP Power (dBm)			Number Of Bursts		
		CH03	CH07	CH11	CH03	CH07	CH11
T nom (°C)	25.00	12.54	12.78	12.61	11.00	11.00	11.00
T min (°C)	0.00	12.67	12.73	12.74	11.00	11.00	11.00
T max (°C)	40.00	12.39	12.76	12.46	11.00	11.00	11.00
Max EIRP Power		12.78			Min Number		11.00
Limits		20dBm (-10dBW)			⩾10		
Result		Complies			Complies		

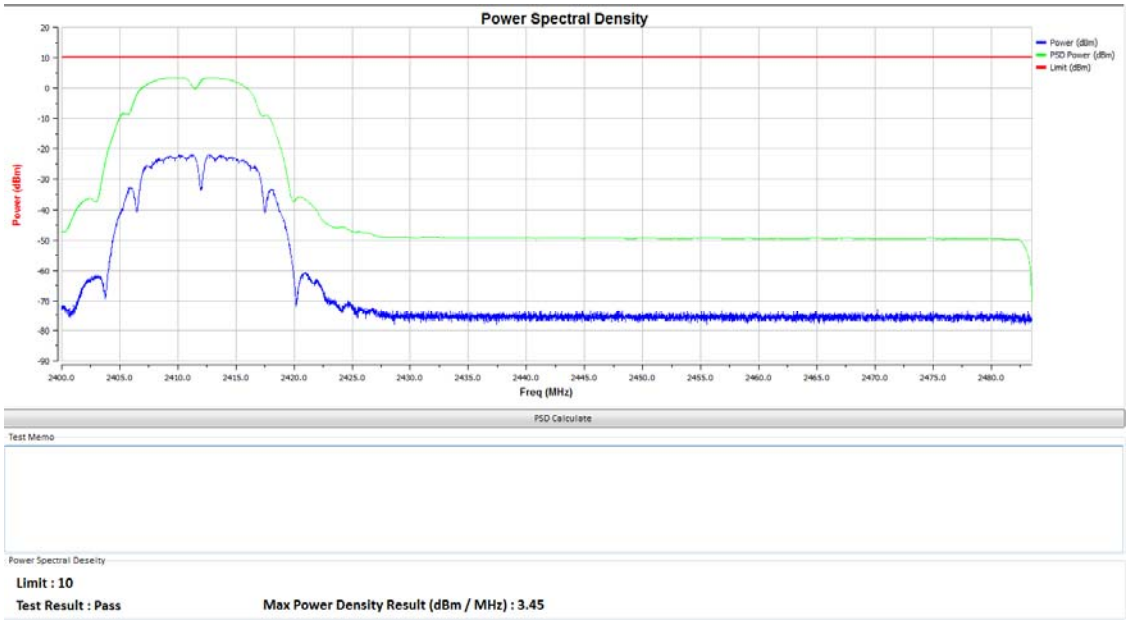
Note: EIRP Power = output power conducted + G ant

APPENDIX B - POWER SPECTRAL DENSITY

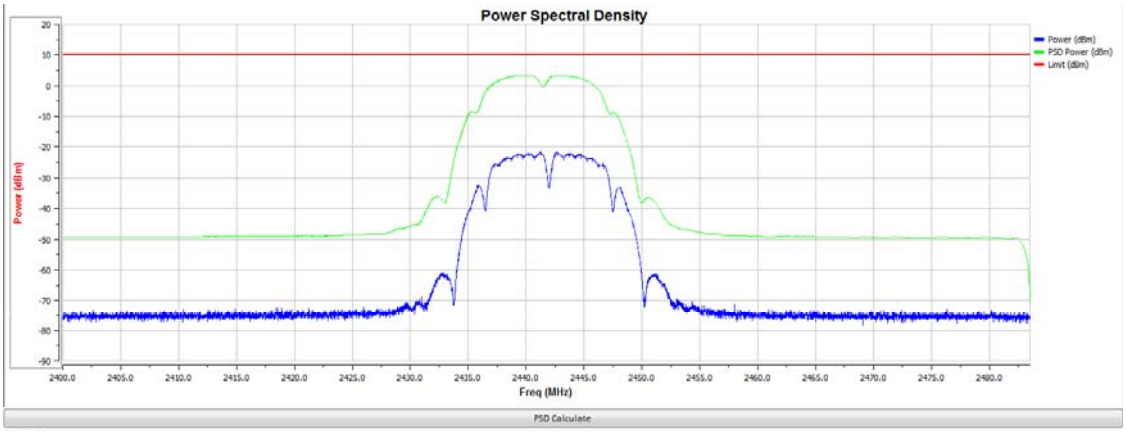
Test Mode:	TX Mode_ 802.11b Mode

Frequency (MHz)	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
2412	3.45	10.00	Pass
2442	3.35	10.00	Pass
2472	3.40	10.00	Pass

802.11b Mode 2412



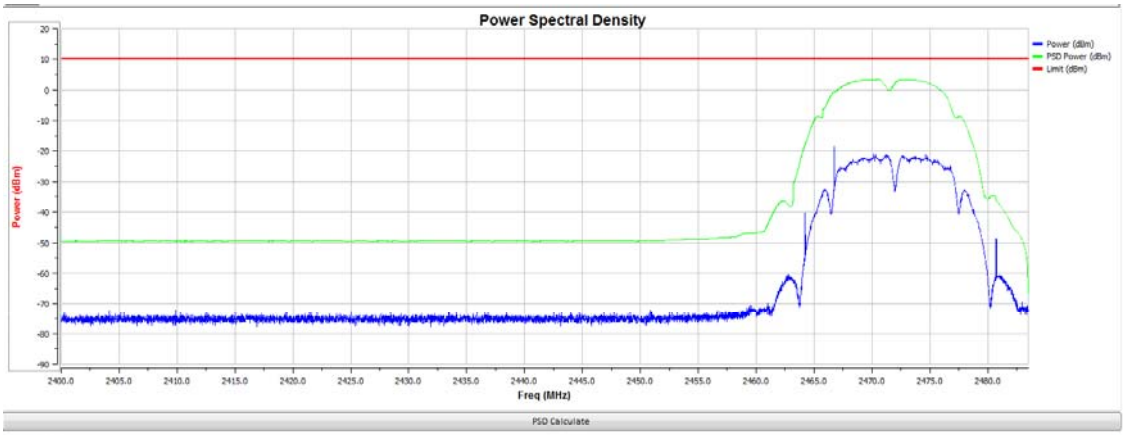
802.11b Mode 2442



Limit : 10

Test Result : Pass **Max Power Density Result (dBm / MHz) : 3.35**

802.11b Mode 2472



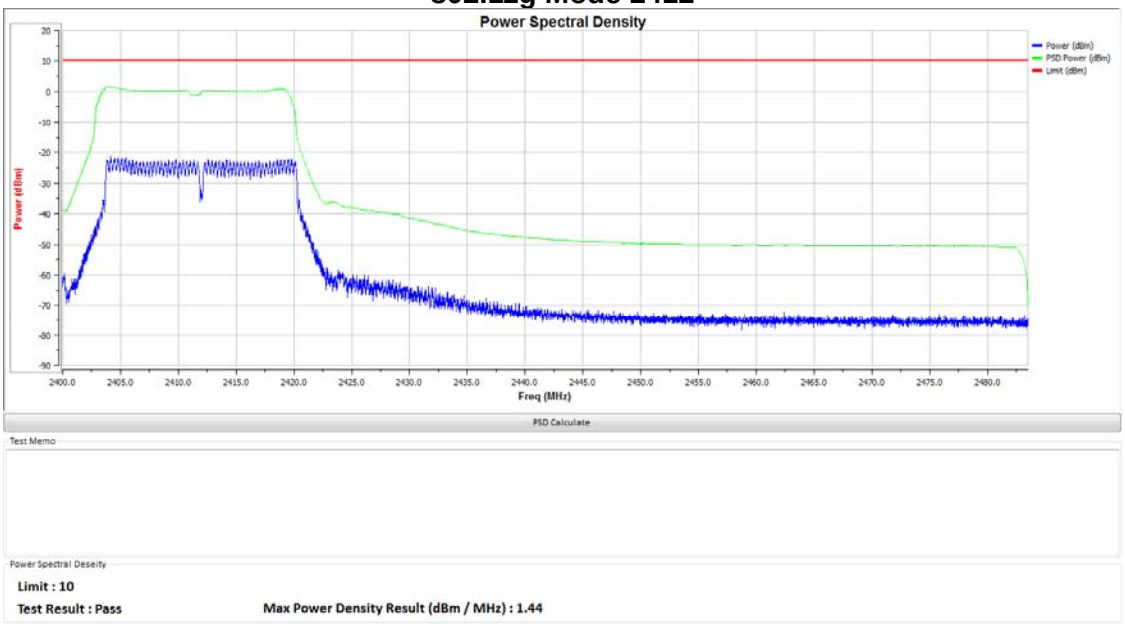
Limit : 10

Test Result : Pass **Max Power Density Result (dBm / MHz) : 3.40**

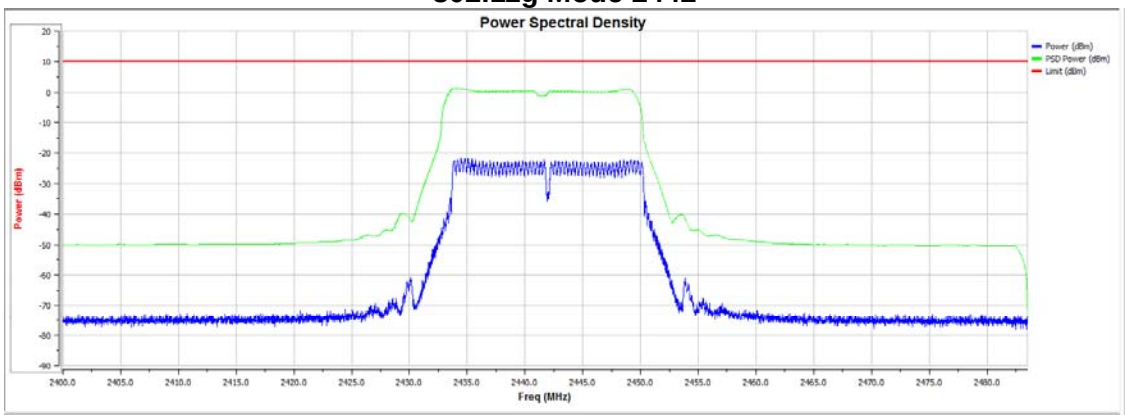
Test Mode:	TX Mode_ 802.11g Mode

Frequency (MHz)	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
2412	1.44	10.00	Pass
2442	1.37	10.00	Pass
2472	1.45	10.00	Pass

802.11g Mode 2412



802.11g Mode 2442



PSD Calculate

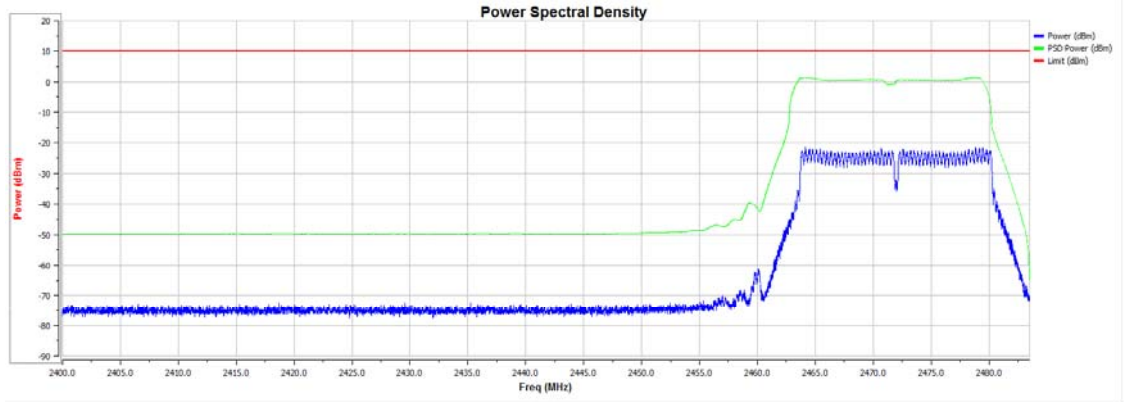
Test Memo

Power Spectral Deseity

Limit : 10

Test Result : Pass **Max Power Density Result (dBm / MHz) : 1.37**

802.11g Mode 2472



PSD Calculate

Test Memo

Power Spectral Deseity

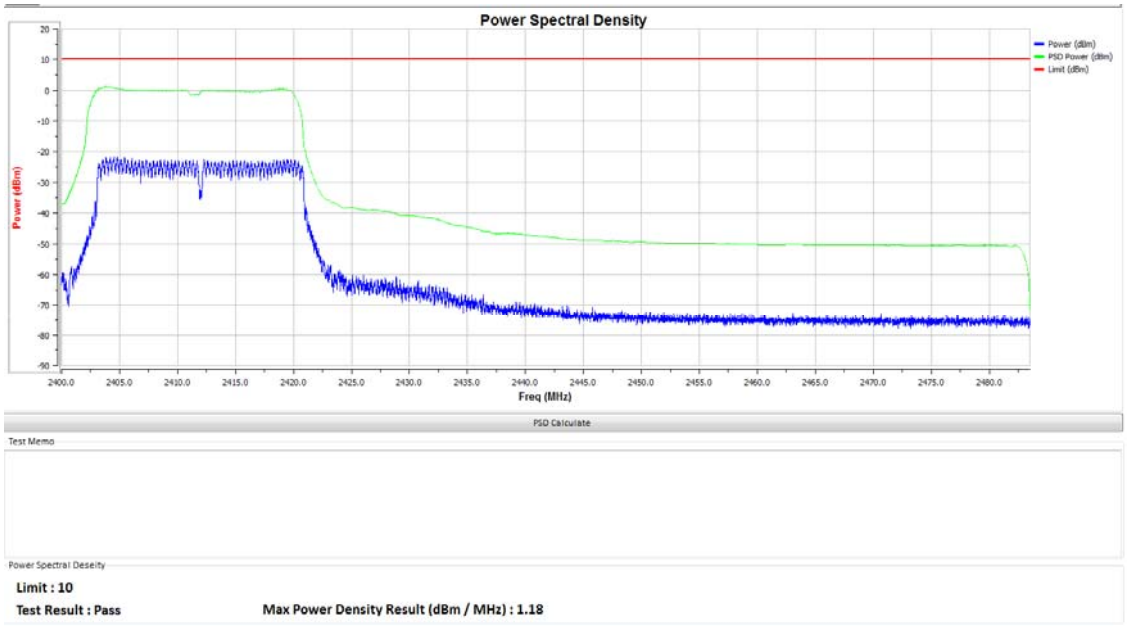
Limit : 10

Test Result : Pass **Max Power Density Result (dBm / MHz) : 1.45**

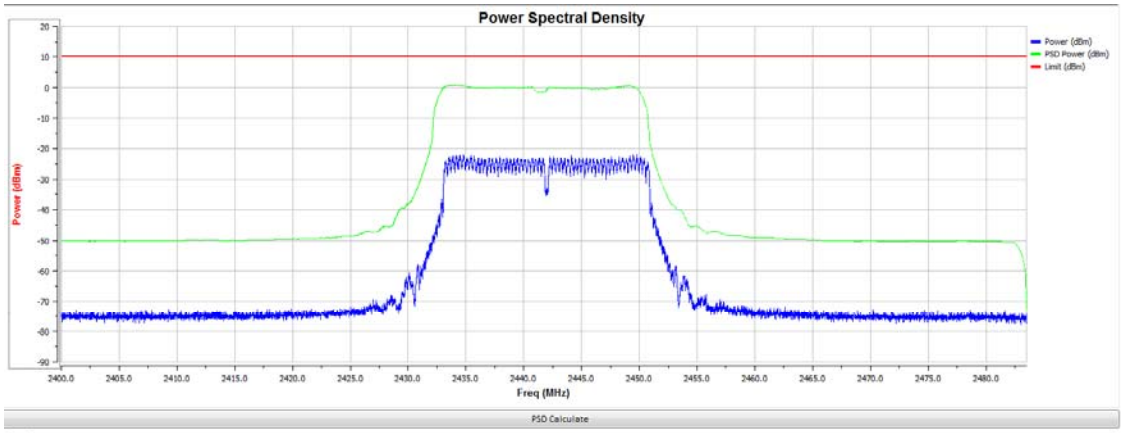
Test Mode:	TX Mode_ 802.11n 20M Mode

Frequency (MHz)	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
2412	1.18	10.00	Pass
2442	0.94	10.00	Pass
2472	1.19	10.00	Pass

802.11n 20M Mode 2412



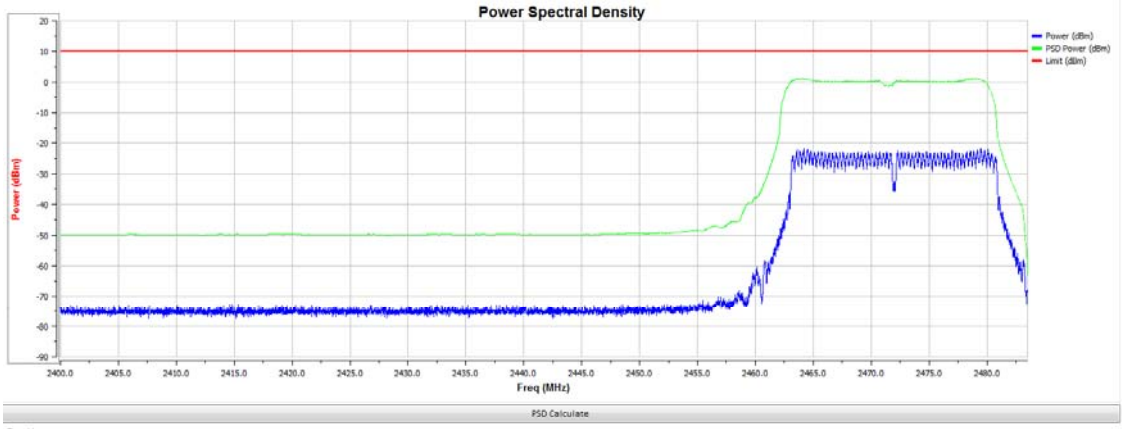
802.11n 20M Mode 2442



Limit : 10

Test Result : Pass **Max Power Density Result (dBm / MHz) : 0.94**

802.11n 20M Mode 2472



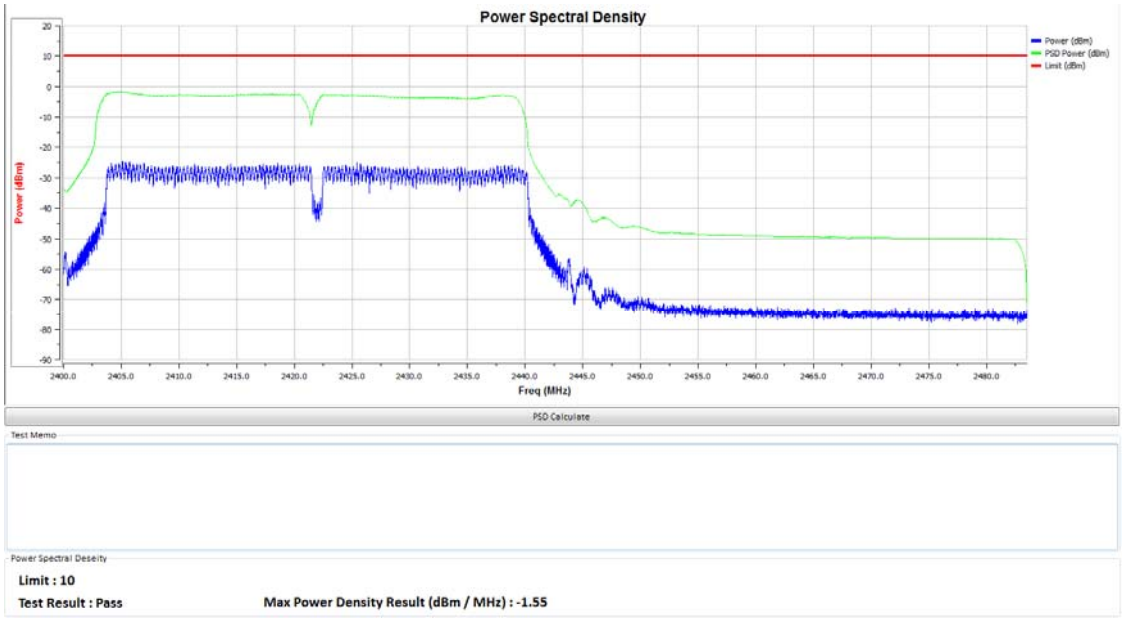
Limit : 10

Test Result : Pass **Max Power Density Result (dBm / MHz) : 1.19**

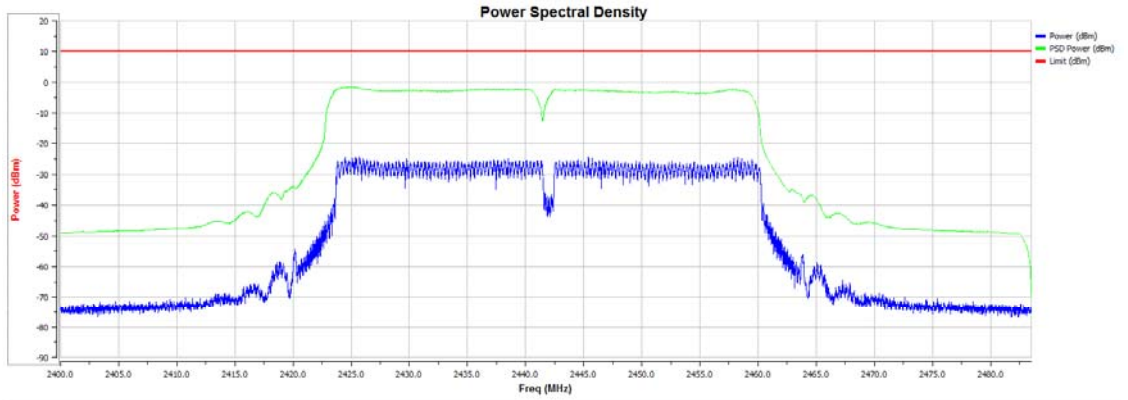
Test Mode:	TX Mode_ 802.11n 40M Mode

Frequency (MHz)	Power Density (dBm/MHz)	Max. Limit (dBm/MHz)	Result
2422	-1.55	10.00	Pass
2442	-1.51	10.00	Pass
2462	-1.95	10.00	Pass

802.11n 40M Mode 2422



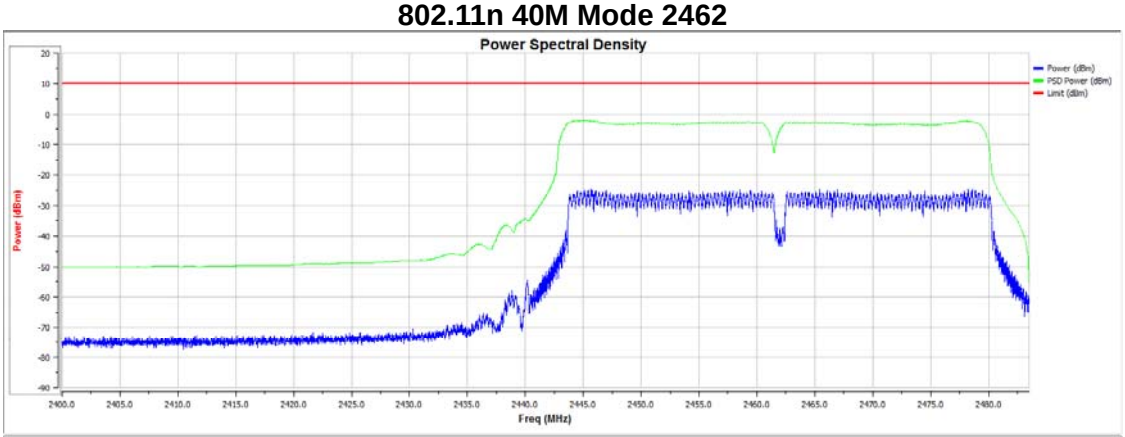
802.11n 40M Mode 2442



Limit : 10

Test Result : Pass **Max Power Density Result (dBm / MHz) : -1.51**

802.11n 40M Mode 2462



Limit : 10

Test Result : Pass **Max Power Density Result (dBm / MHz) : -1.95**

APPENDIX C - DUTY CYCLE, TX-SEQUENCE, TX-GAP

Test Mode: N/A

Note: “N/A” denotes test is not applicable to this device.

APPENDIX D - MEDIUM UTILISATION (MU) FACTOR

Test Mode: N/A

Note: “N/A” denotes test is not applicable to this device.

APPENDIX E - ADAPTIVITY

1. List of measurements

UUT Operational Mode	Frame Based Equipment	
	Load Based Equipment (CCA using 'energy detect')	√
	Load Based Equipment (CCA not using any of the mechanisms referenced)	

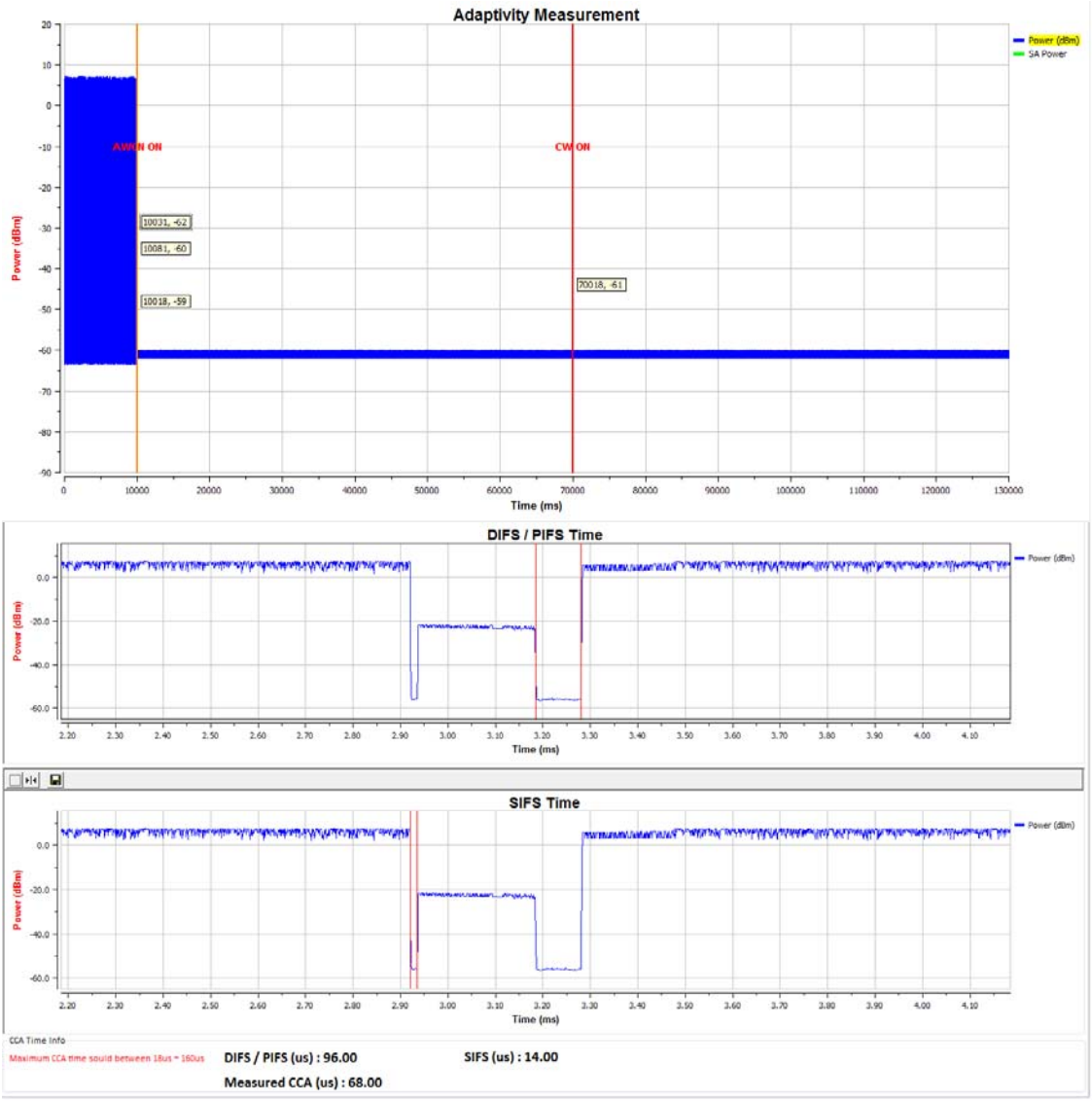
Clause	Test Parameter	Remarks	Pass / Fail
4.3.2.6.3.2.2	Adaptive (Frame Based Equipment)	Not Applicable	N/A
4.3.2.6.3.2.3	Adaptive (Load Based Equipment)	Applicable	Pass
4.3.2.6.4	Short Control Signaling Transmissions	Applicable	Pass

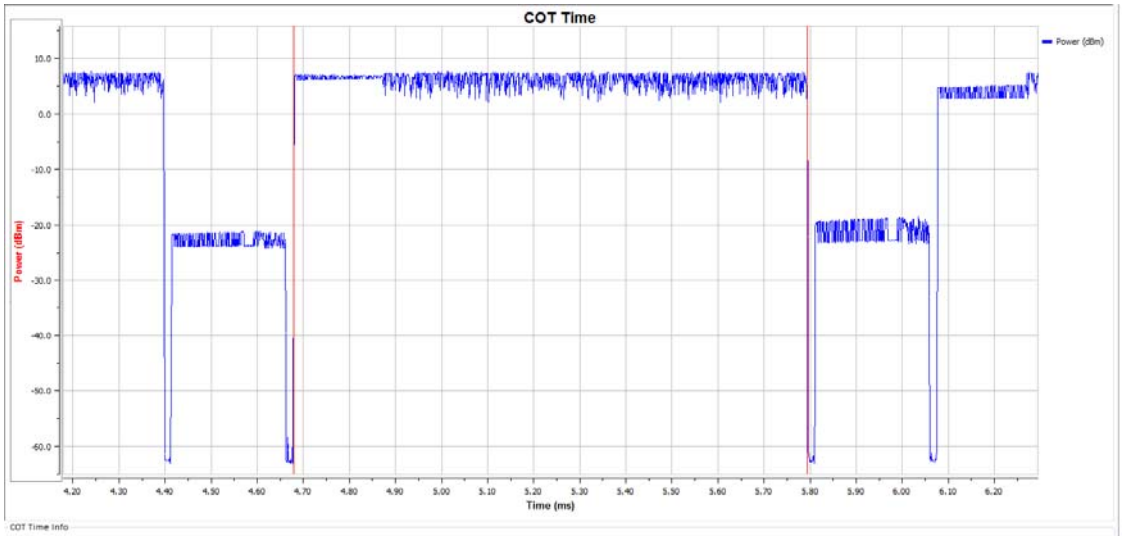
Test Mode:	TX Mode_ 802.11b Mode

Channel Occupancy Time and Clear Channel Assessment Measured Results		
Freq.(MHz)	Channel Occupancy Time (ms)	Clear Channel Assessment (us)
2412	1.12	68.00
2472	2.04	46.00
Limit	13	18~160
Note: Channel Occupancy Time and Clear Channel Assessment follow as IEEE Std. 802.11-2012 and IEEE 802.11n-2012 Specification without restriction.		

Adaptivity		
Adaptivity Detection Threshold Level	2412 MHz	-62.68 dBm/MHz
	2472 MHz	-62.89 dBm/MHz
Freq.(MHz)	Adaptivity	Short Control Signalling Transmissions (ms)
2412	Pass	0
2472	Pass	0
Limit	N/A	5
Result	Pass	
Note: Threshold Level = -70 dBm/MHz + 10 x $\log_{10}$ (100 mW/Pout) (Pout in mW e.i.r.p.) Short Control Signalling Transmissions = 50 (ms) * Duty cycle (%)		

802.11b Mode 2412

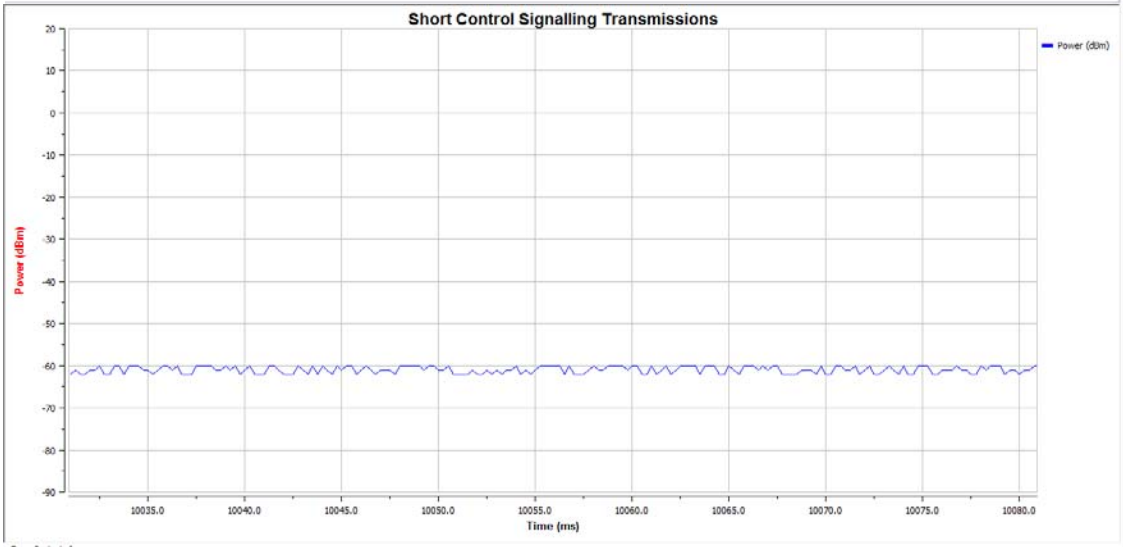




COT Time Info

Max Channel Occupancy Time (ms) : 1.12

***Please make sure the COT less than 13ms. or it will be failed.**



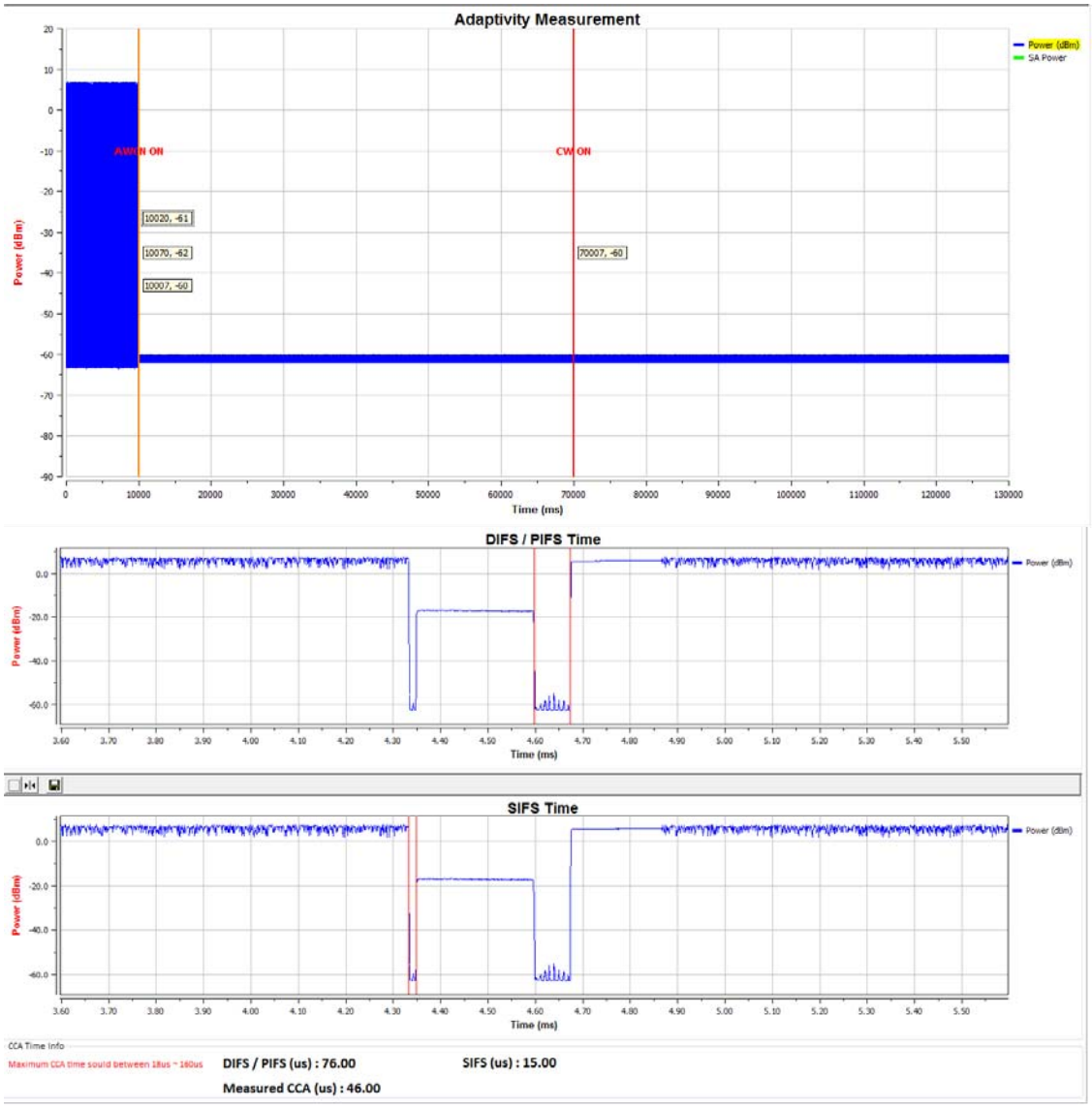
Duty Cycle Info

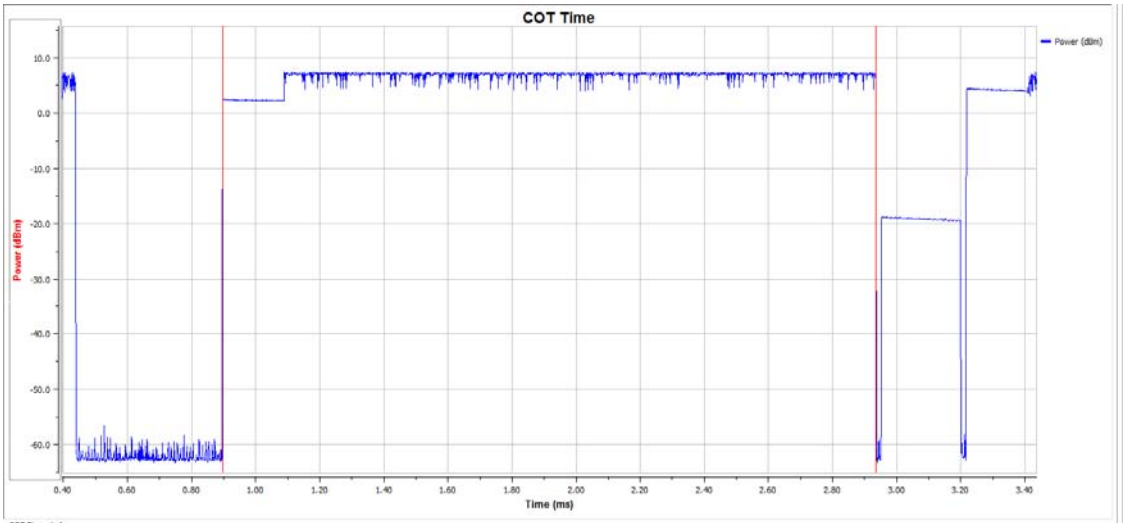
Test Result : Pass

Duty Cycle (%) : 0.00

***The Duty Cycle must less than 10% in every 50ms after AWGN signal was on.**

802.11b Mode 2472

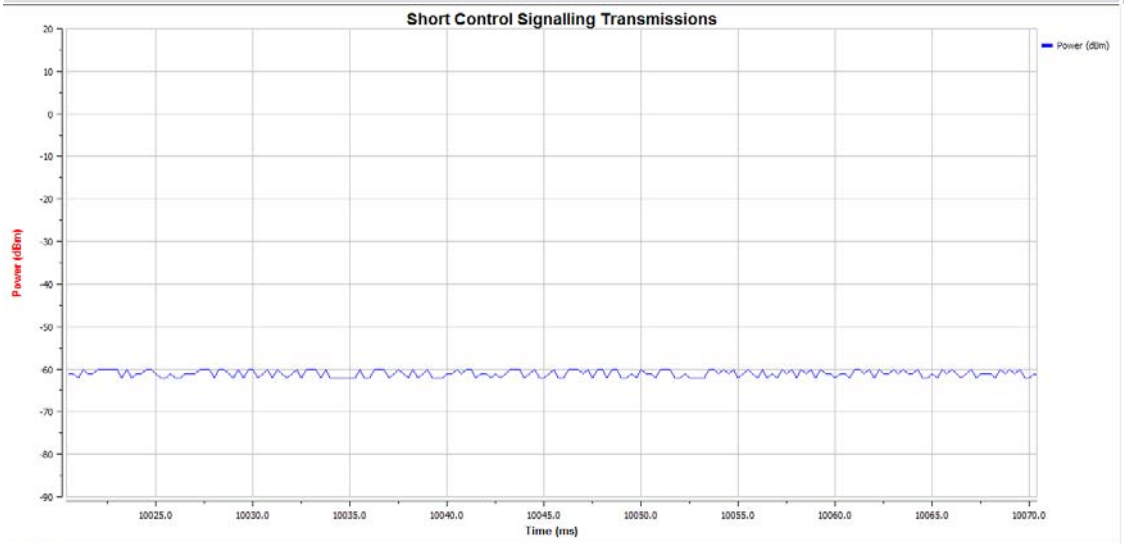




COT Time Info

Max Channel Occupancy Time (ms) : 2.04

*Please make sure the COT less than 13ms. or it will be falied.



Duty Cycle Info

Test Result : Pass

Duty Cycle (%) : 0.00

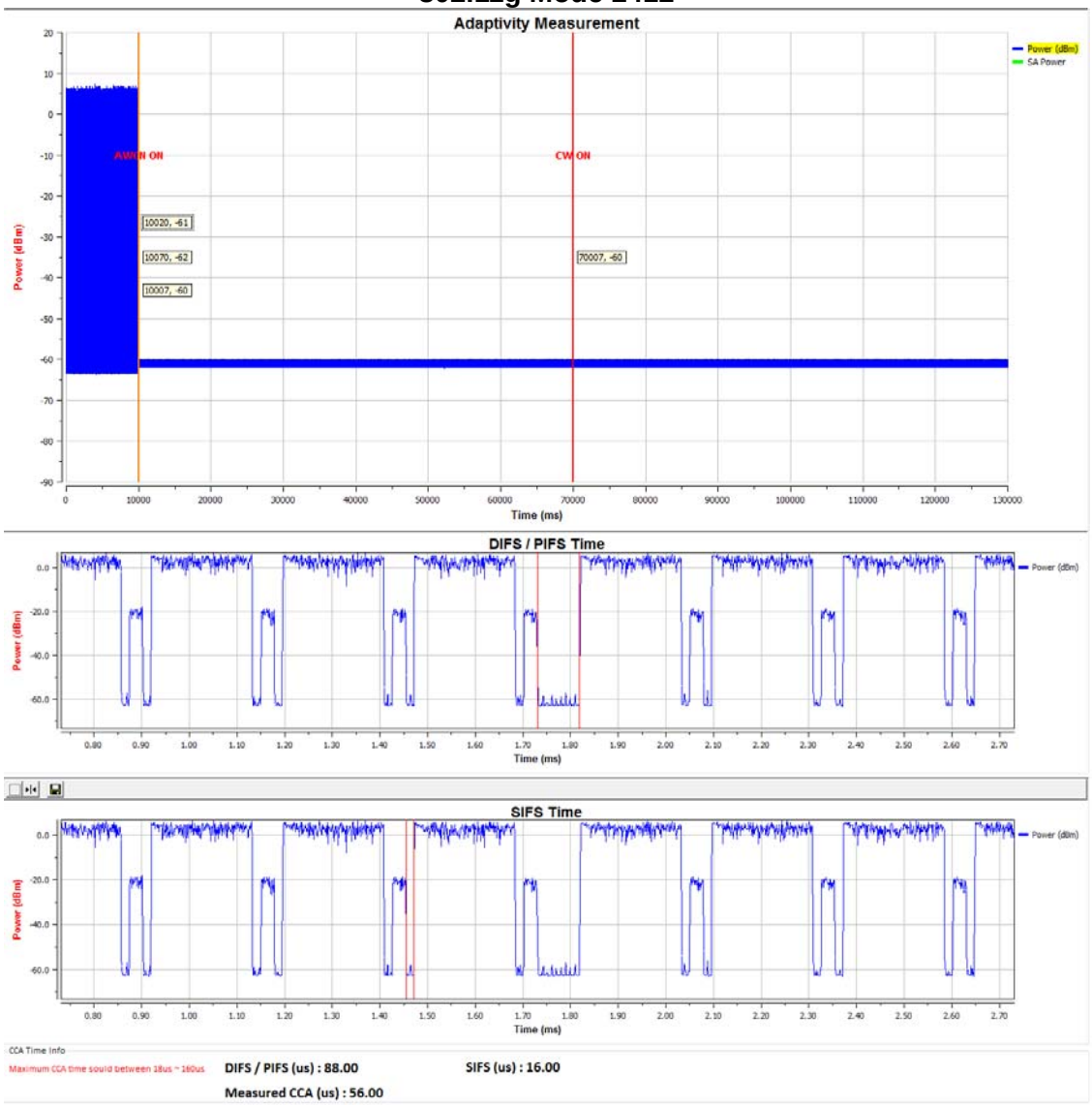
*The Duty Cycle must less than 10% in every 50ms after AWGN signal was on.

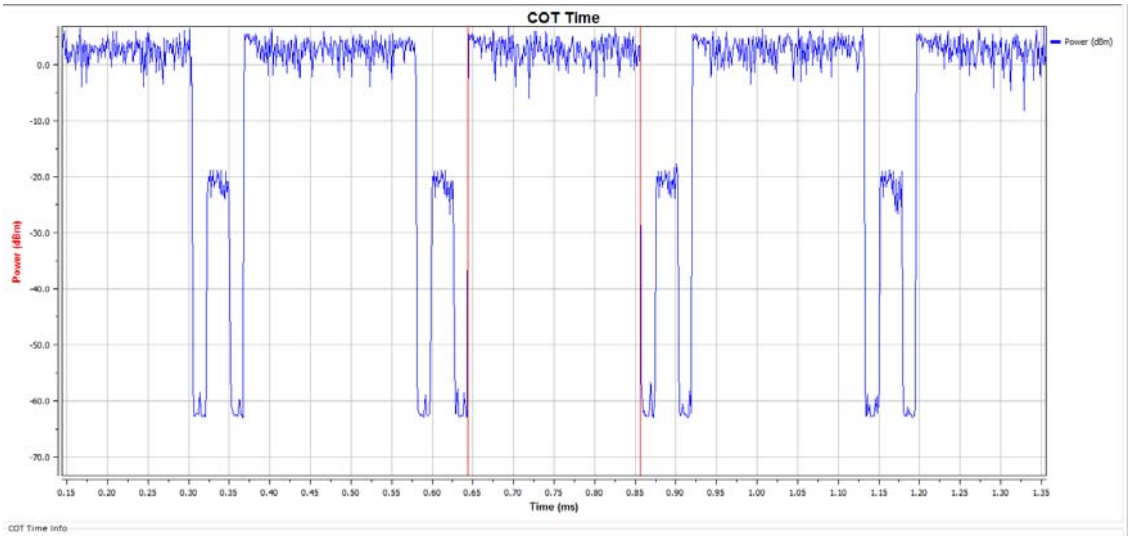
Test Mode:	TX Mode_ 802.11g Mode

Channel Occupancy Time and Clear Channel Assessment Measured Results		
Freq.(MHz)	Channel Occupancy Time (ms)	Clear Channel Assessment (us)
2412	0.21	56.00
2472	0.24	75.00
Limit	13	18~160
Note: Channel Occupancy Time and Clear Channel Assessment follow as IEEE Std. 802.11-2012 and IEEE 802.11n-2012 Specification without restriction.		

Adaptivity		
Adaptivity Detection Threshold Level	2412 MHz	-62.65 dBm/MHz
	2472 MHz	-62.92 dBm/MHz
Freq.(MHz)	Adaptivity	Short Control Signalling Transmissions (ms)
2412	Pass	0
2472	Pass	0
Limit	N/A	5
Result	Pass	
Note: Threshold Level = -70 dBm/MHz + 10 x $\log_{10}$ (100 mW/Pout) (Pout in mW e.i.r.p.) Short Control Signalling Transmissions = 50 (ms) * Duty cycle (%)		

802.11g Mode 2412





COT Time Info

Max Channel Occupancy Time (ms) : 0.21

*Please make sure the COT less than 13ms. or it will be falied.

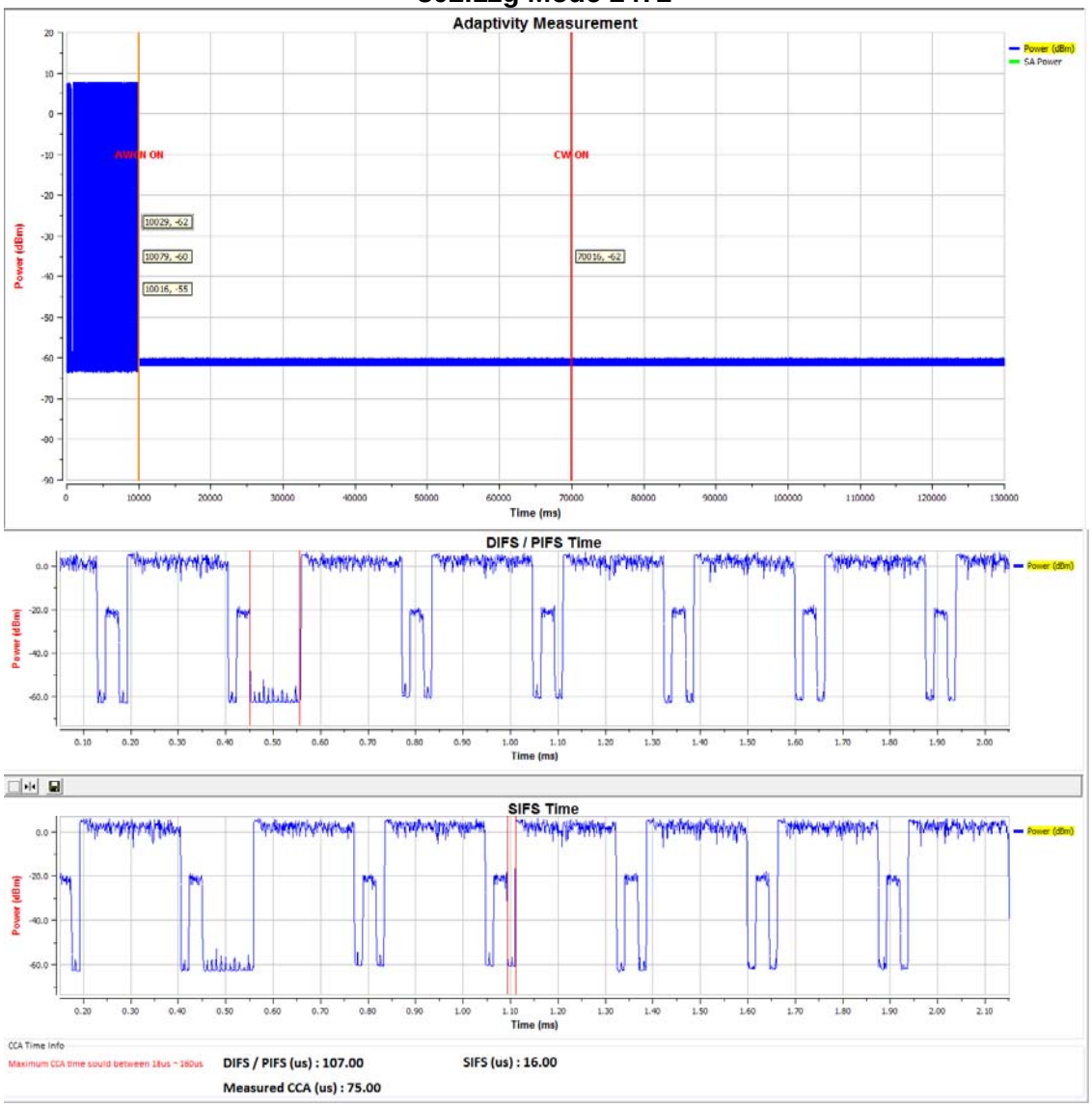
Duty Cycle Info

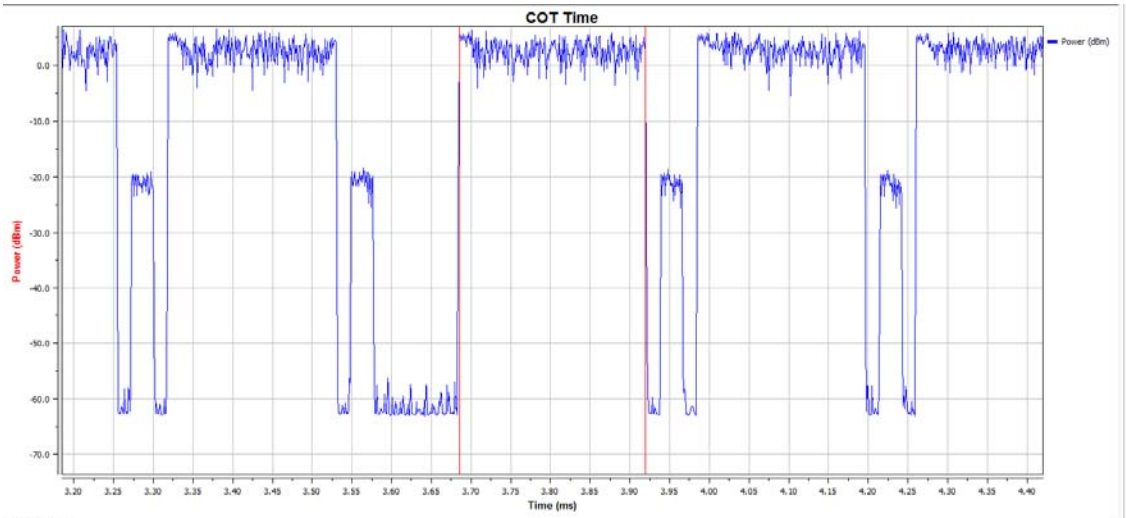
Test Result : Pass

Duty Cycle (%) : 0.00

*The Duty Cycle must less than 10% in every 50ms after AWGN signal was on.

802.11g Mode 2472





COT Time Info

Max Channel Occupancy Time (ms) : 0.24

*Please make sure the COT less than 13ms. or it will be failed.

Duty Cycle Info

Test Result : Pass

Duty Cycle (%) : 0.00

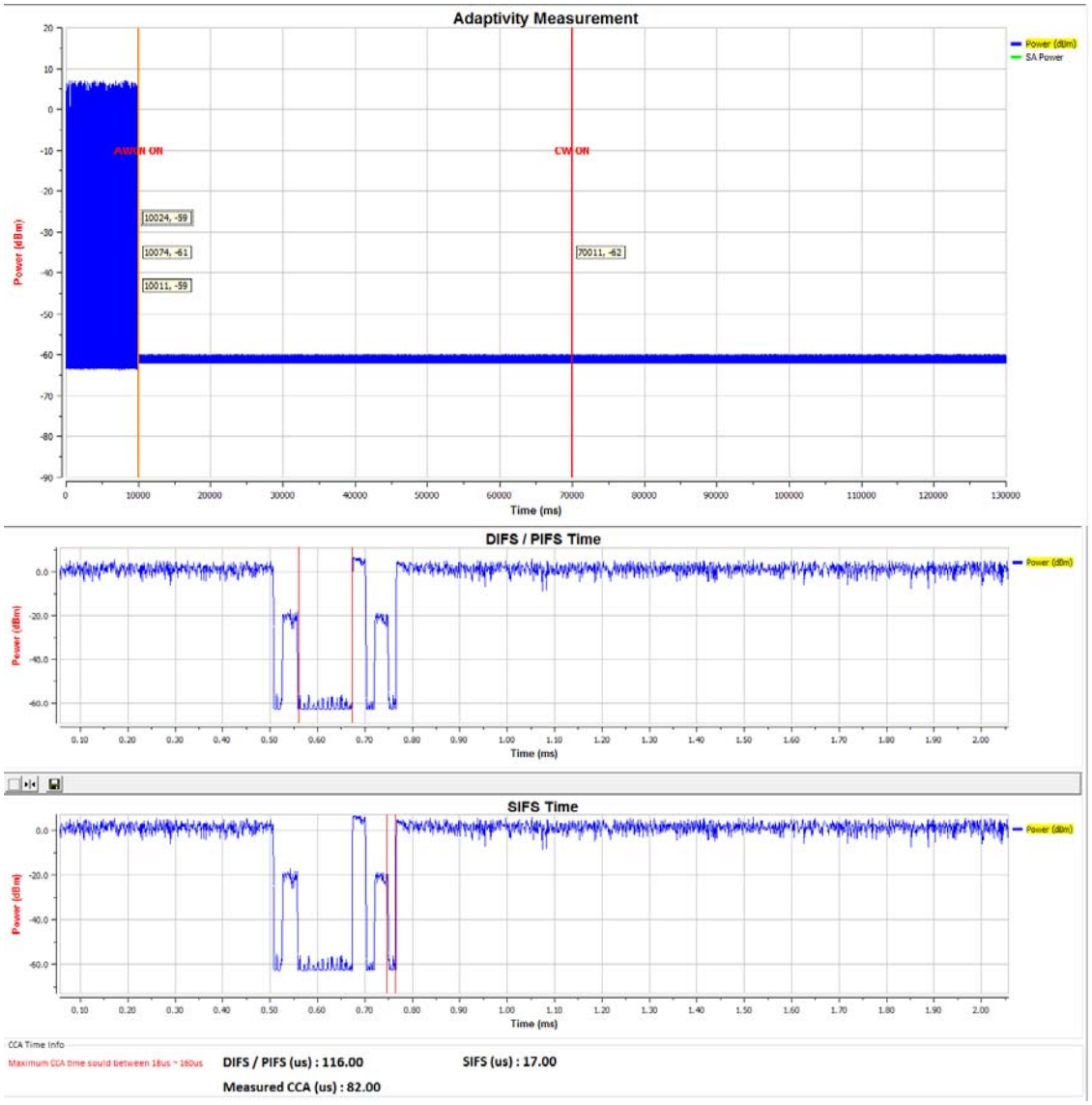
*The Duty Cycle must less than 10% in every 50ms after AWGN signal was on.

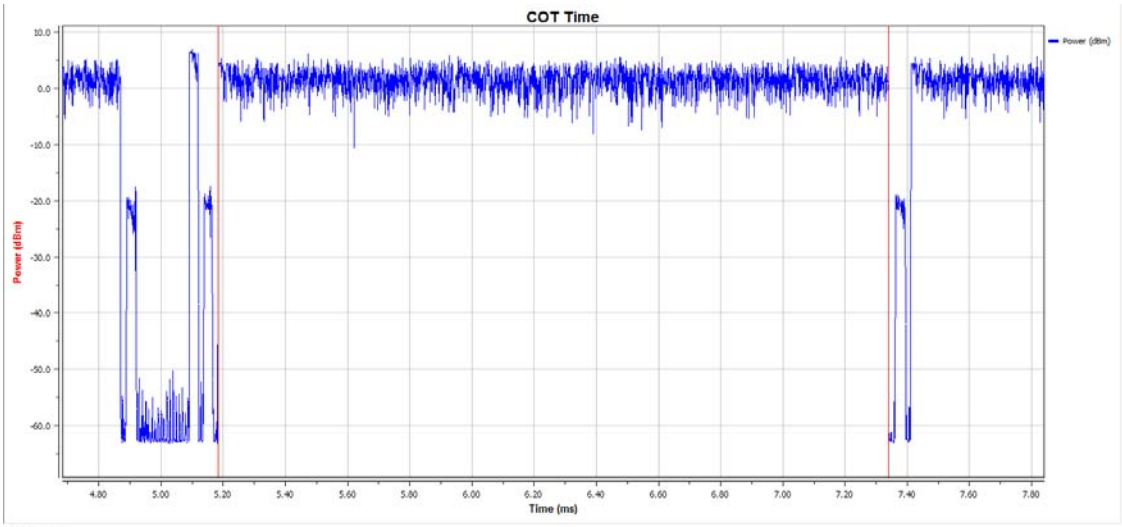
Test Mode:	TX Mode_ 802.11n 20M Mode

Channel Occupancy Time and Clear Channel Assessment Measured Results		
Freq.(MHz)	Channel Occupancy Time (ms)	Clear Channel Assessment (us)
2412	2.16	82.00
2472	2.16	20.00
Limit	13	18~160
Note: Channel Occupancy Time and Clear Channel Assessment follow as IEEE Std. 802.11-2012 and IEEE 802.11n-2012 Specification without restriction.		

Adaptivity		
Adaptivity Detection Threshold Level	2412 MHz	-62.56 dBm/MHz
	2472 MHz	-62.94 dBm/MHz
Freq.(MHz)	Adaptivity	Short Control Signalling Transmissions (ms)
2412	Pass	0
2472	Pass	0
Limit	N/A	5
Result	Pass	
Note: Threshold Level = -70 dBm/MHz + 10 x $\log_{10}$ (100 mW/Pout) (Pout in mW e.i.r.p.) Short Control Signalling Transmissions = 50 (ms) * Duty cycle (%)		

802.11n 20M Mode 2412

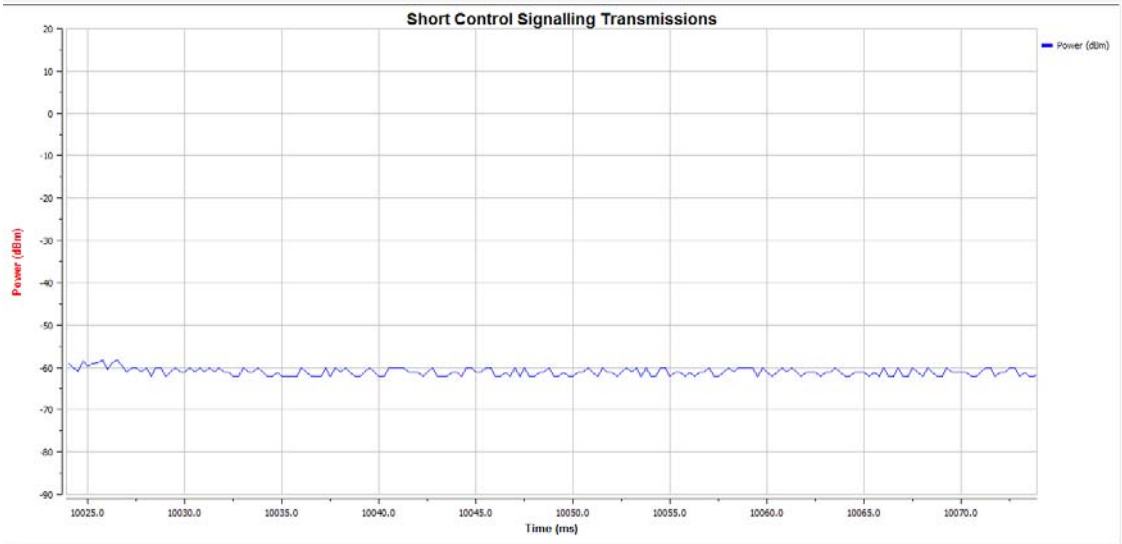




COT Time Info

Max Channel Occupancy Time (ms) : 2.16

*Please make sure the COT less than 13ms. or it will be failed.



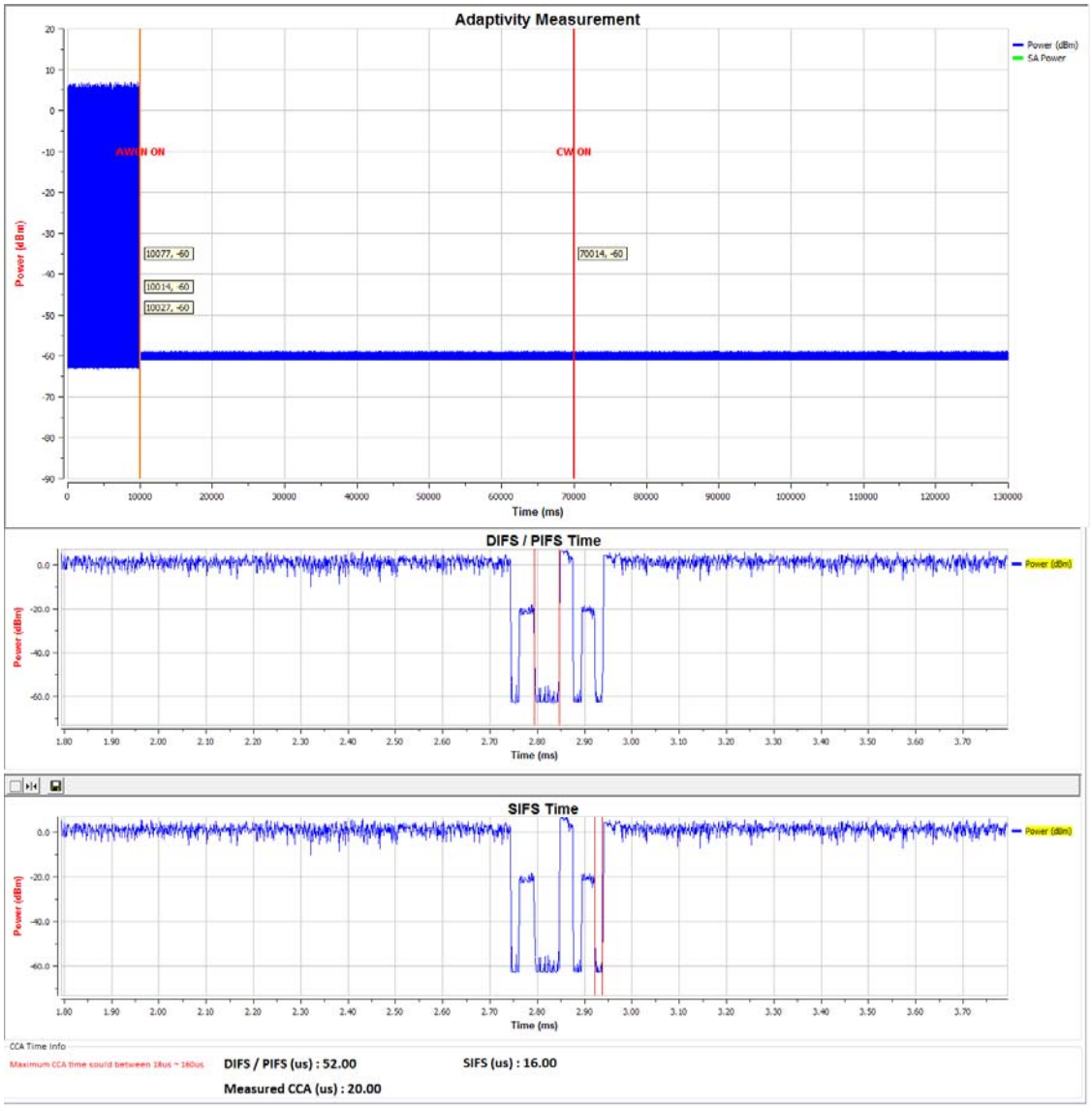
Duty Cycle Info

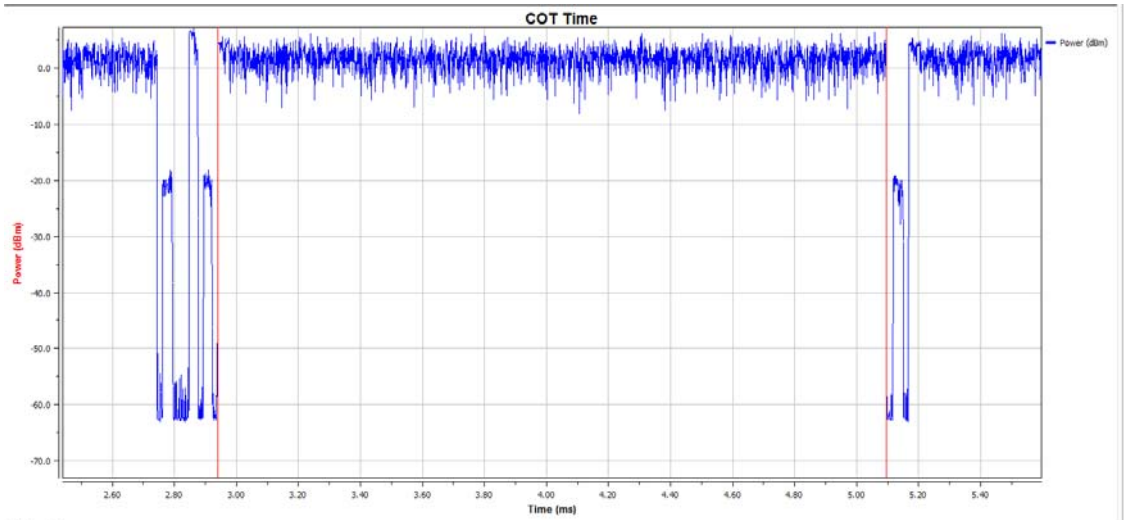
Test Result : Pass

Duty Cycle (%) : 0.00

*The Duty Cycle must less than 10% in every 50ms after AWGN signal was on.

802.11n 20M Mode 2472

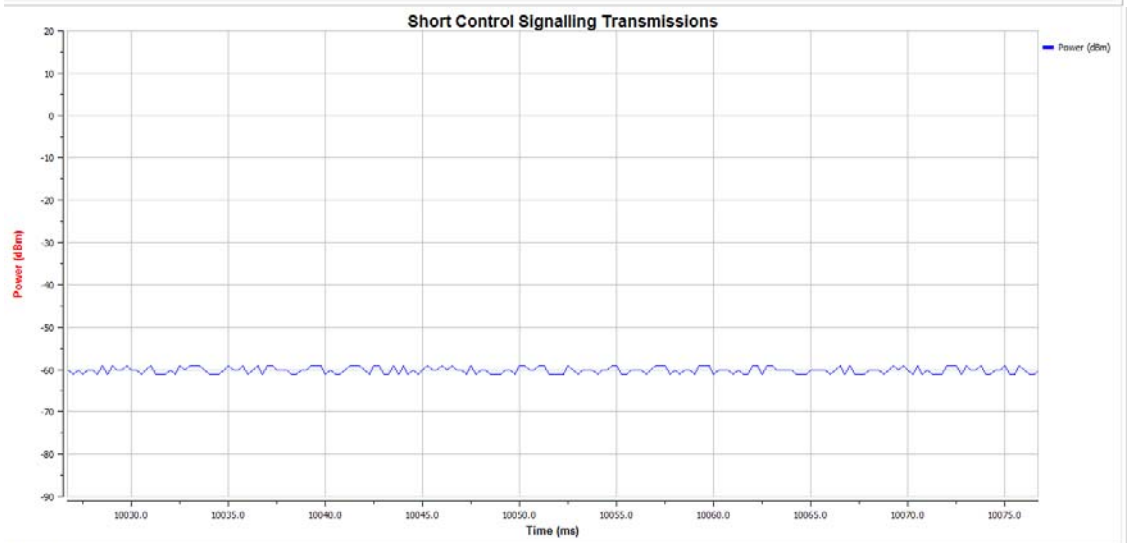




COT Time Info

Max Channel Occupancy Time (ms) : 2.16

*Please make sure the COT less than 13ms. or it will be failed.



Duty Cycle Info

Test Result : Pass

Duty Cycle (%) : 0.00

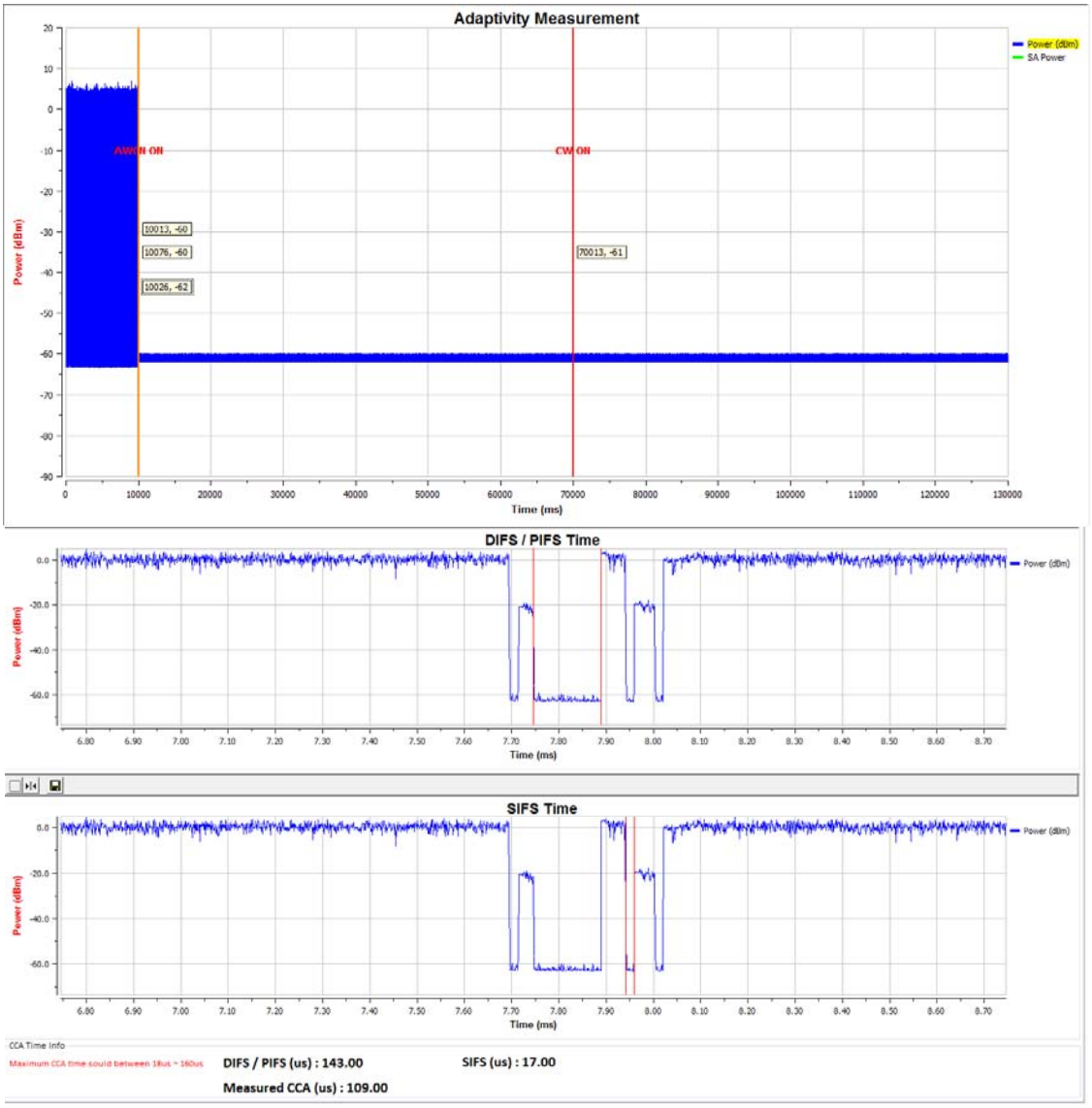
*The Duty Cycle must less than 10% in every 50ms after AWGN signal was on.

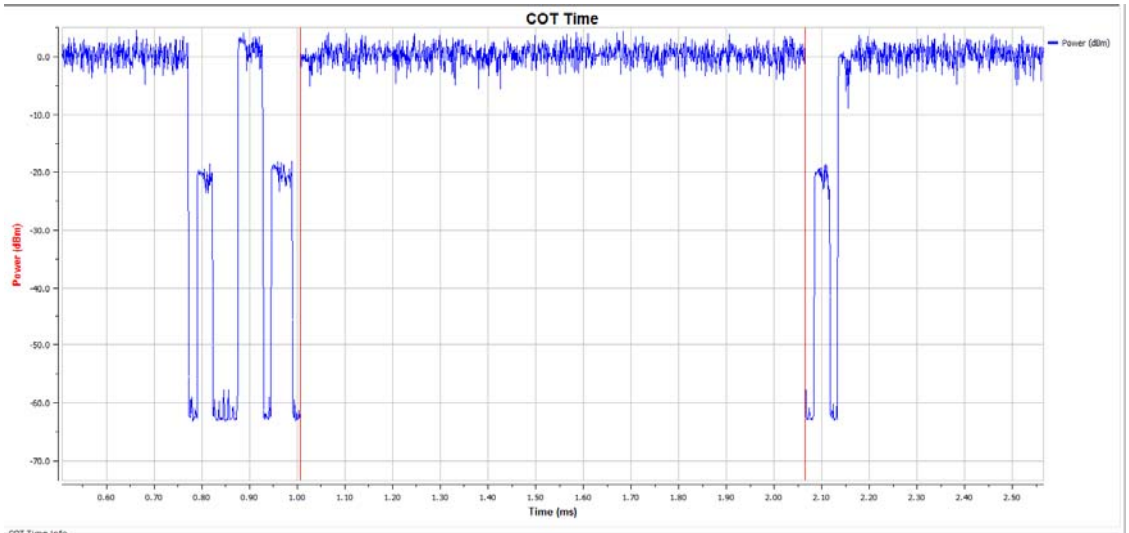
Test Mode:	TX Mode_ 802.11n 40M Mode

Channel Occupancy Time and Clear Channel Assessment Measured Results		
Freq.(MHz)	Channel Occupancy Time (ms)	Clear Channel Assessment (us)
2422	1.06	109.00
2462	1.06	64.00
Limit	13	18~160
Note: Channel Occupancy Time and Clear Channel Assessment follow as IEEE Std. 802.11-2012 and IEEE 802.11n-2012 Specification without restriction.		

Adaptivity		
Adaptivity Detection Threshold Level	2422 MHz	-62.67 dBm/MHz
	2462 MHz	-62.74 dBm/MHz
Freq.(MHz)	Adaptivity	Short Control Signalling Transmissions (ms)
2422	Pass	0
2462	Pass	0
Limit	N/A	5
Result	Pass	
Note: Threshold Level = -70 dBm/MHz + 10 x $\log_{10}$ (100 mW/Pout) (Pout in mW e.i.r.p.) Short Control Signalling Transmissions = 50 (ms) * Duty cycle (%)		

802.11n 40M Mode 2422

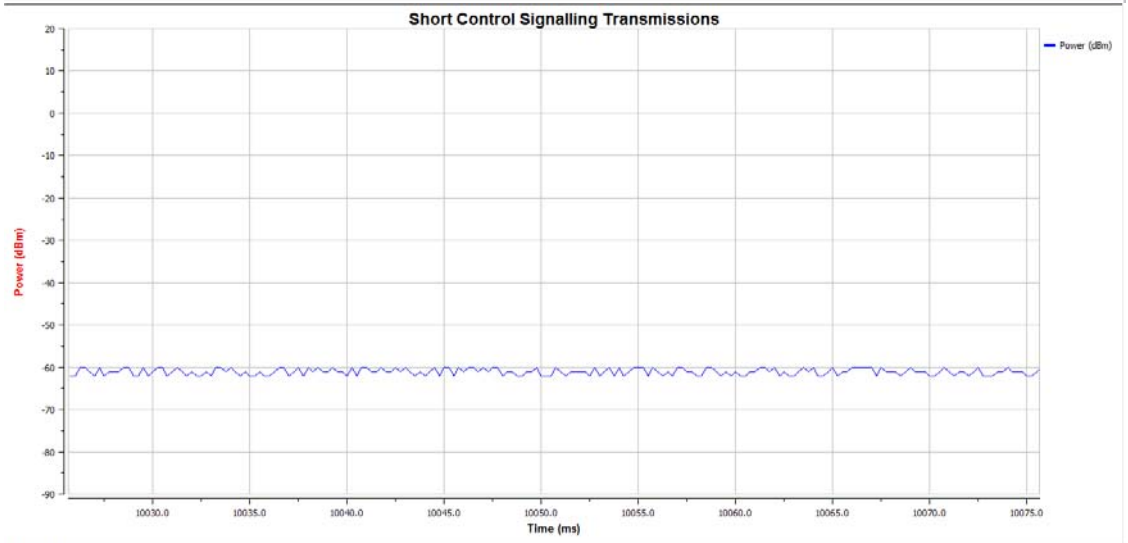




COT Time Info

Max Channel Occupancy Time (ms) : 1.06

*Please make sure the COT less than 13ms. or it will be falied.



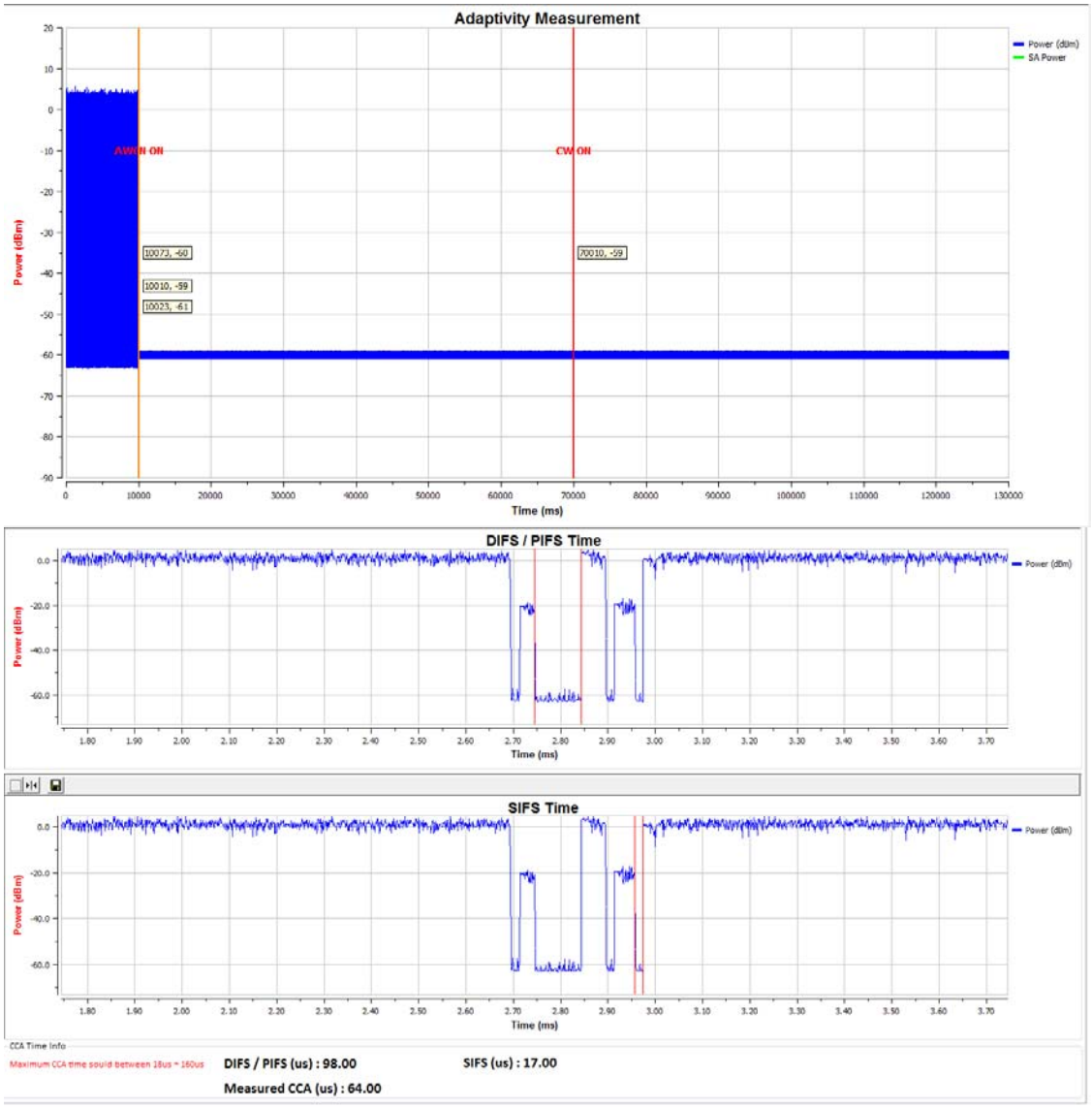
Duty Cycle Info

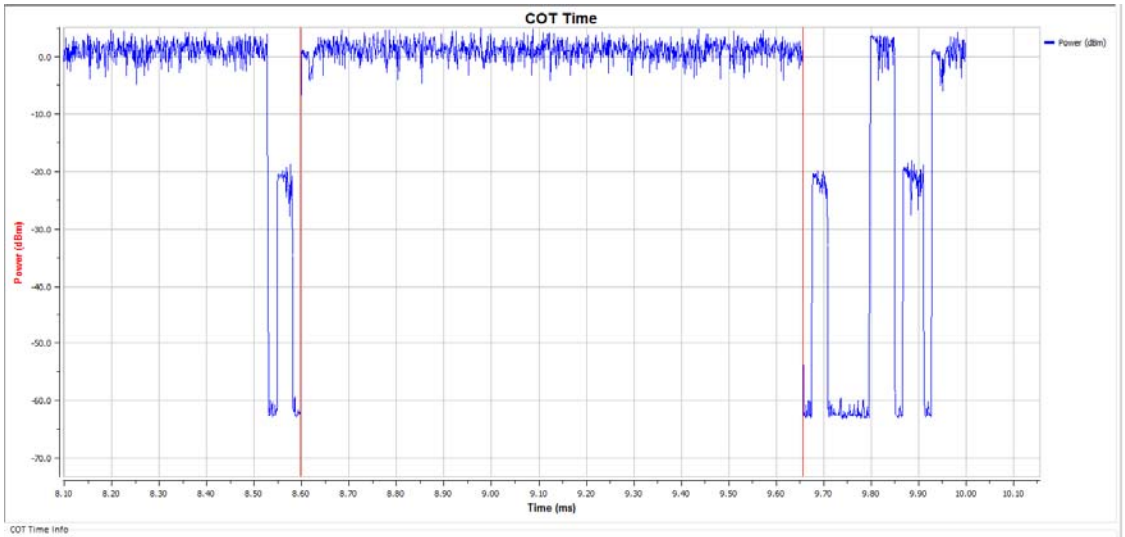
Test Result : Pass

Duty Cycle (%) : 0.00

*The Duty Cycle must less than 10% In every 50ms after AWGN signal was on.

802.11n 40M Mode 2462

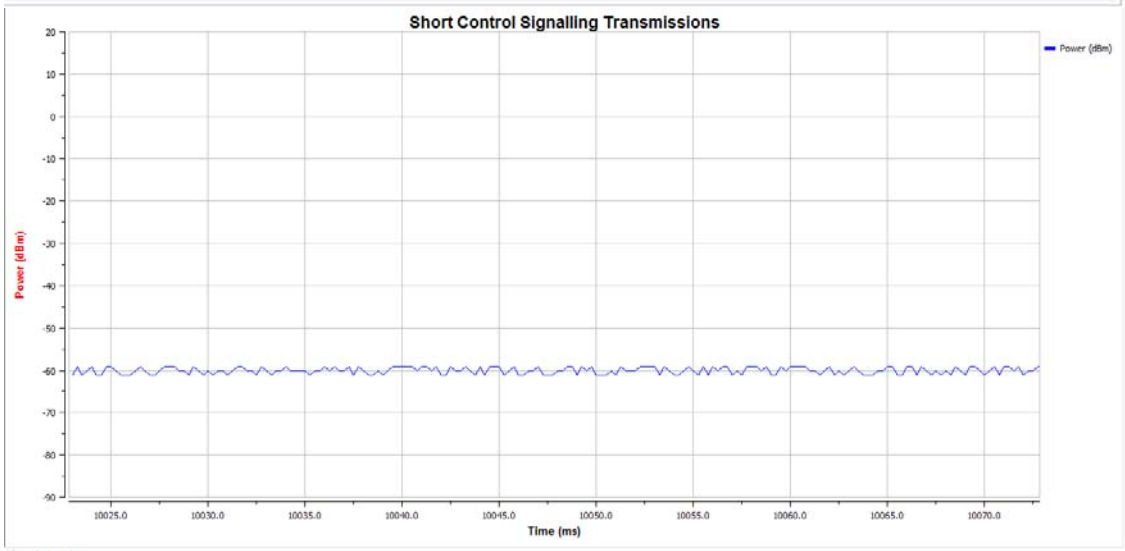




COT Time Info

Max Channel Occupancy Time (ms) : 1.06

*Please make sure the COT less than 13ms. or it will be falied.



Duty Cycle Info

Test Result : Pass

Duty Cycle (%) : 0.00

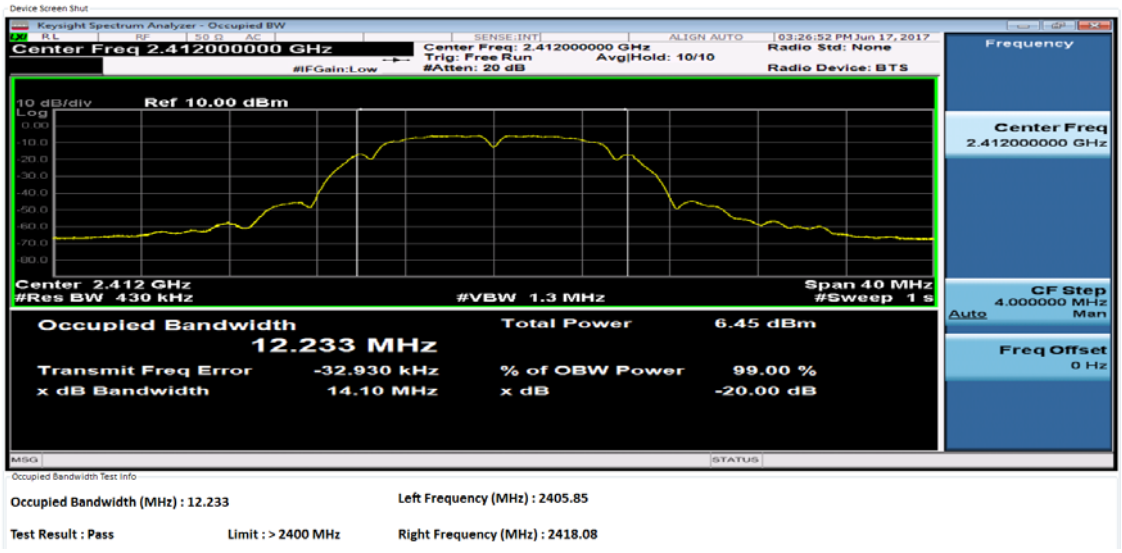
*The Duty Cycle must less than 10% in every 50ms after AWGN signal was on.

APPENDIX F - OCCUPIED CHANNEL BANDWIDTH

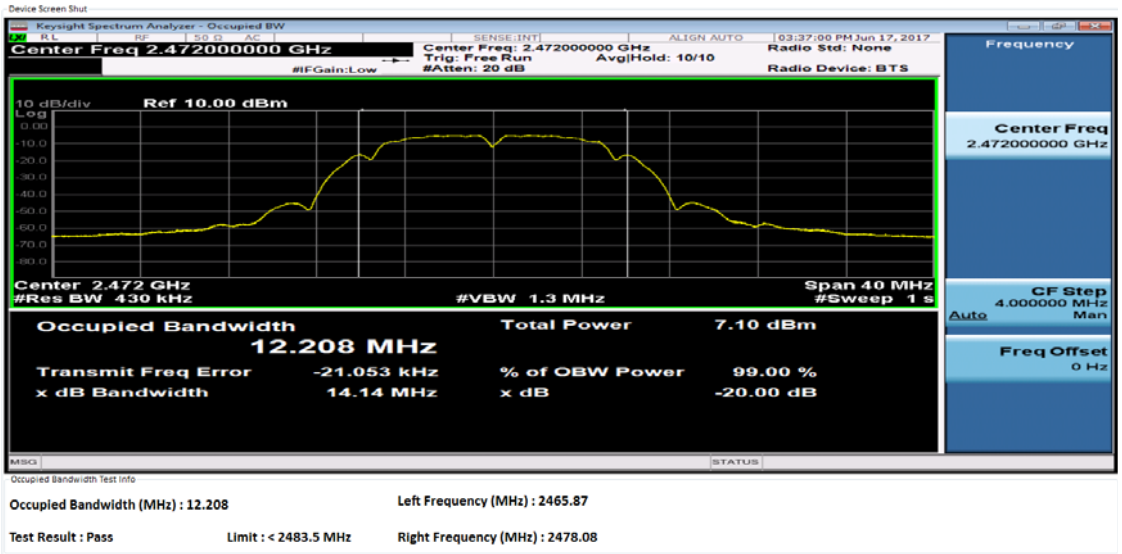
Test Mode:	TX Mode_ 802.11b Mode

Frequency (MHz)	Occupied Channel Bandwidth (MHz)	F_L at 99% BW (MHz)	F_H at 99% BW (MHz)	Result
2412	12.233	2405.85	-	Pass
2472	12.208	-	2478.08	
N/A		F_L>2400	F_H<2483.5	

802.11b Mode_2412



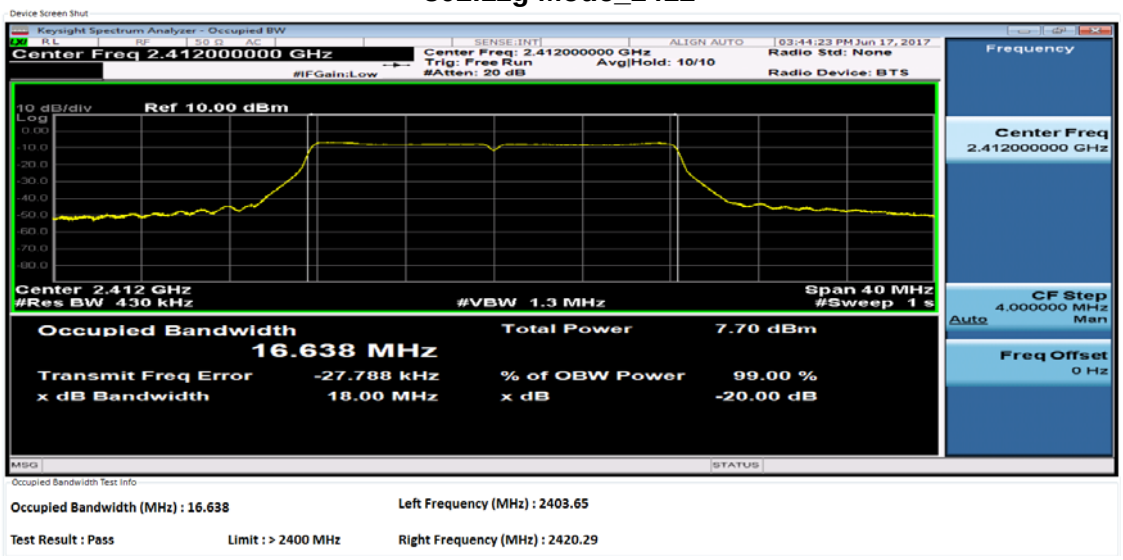
802.11b Mode_2472



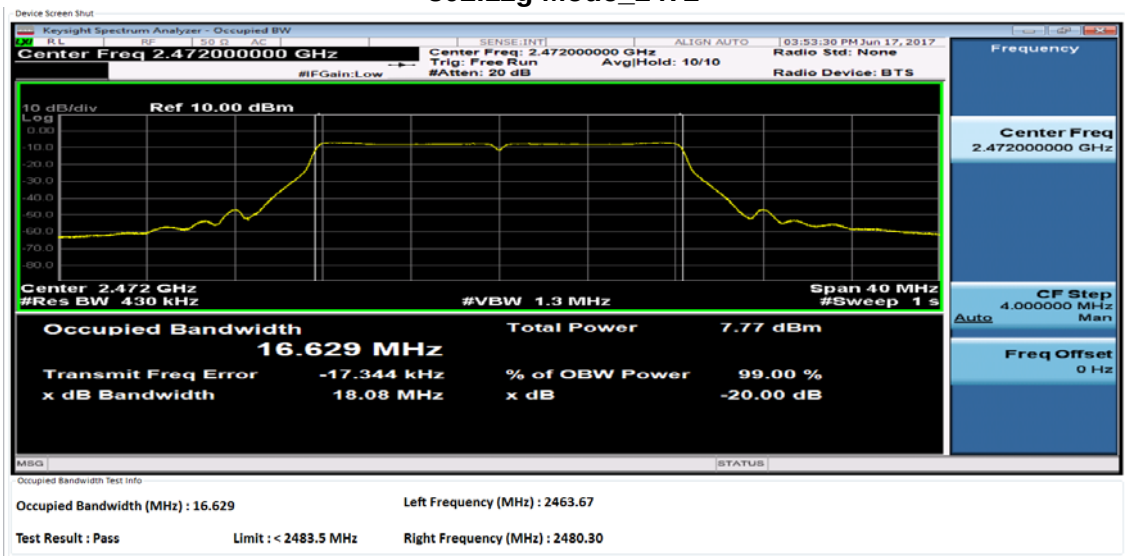
Test Mode:	TX Mode_ 802.11g Mode

Frequency (MHz)	Occupied Channel Bandwidth (MHz)	F_L at 99% BW (MHz)	F_H at 99% BW (MHz)	Result
2412	16.638	2403.65	-	Pass
2472	16.629	-	2480.30	
N/A		F_L>2400	F_H<2483.5	

802.11g Mode_2412



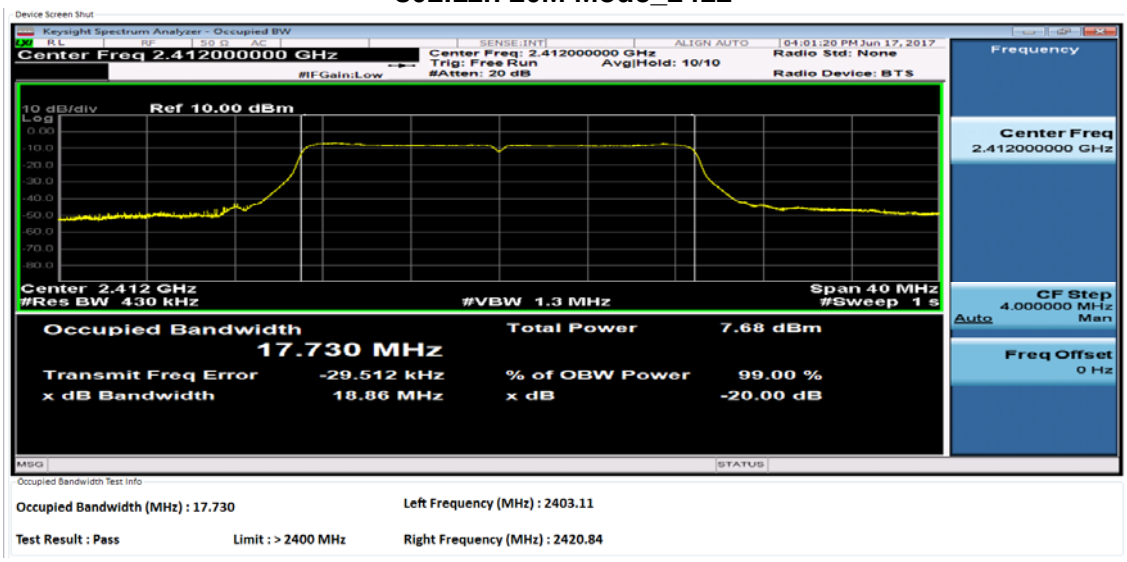
802.11g Mode_2472



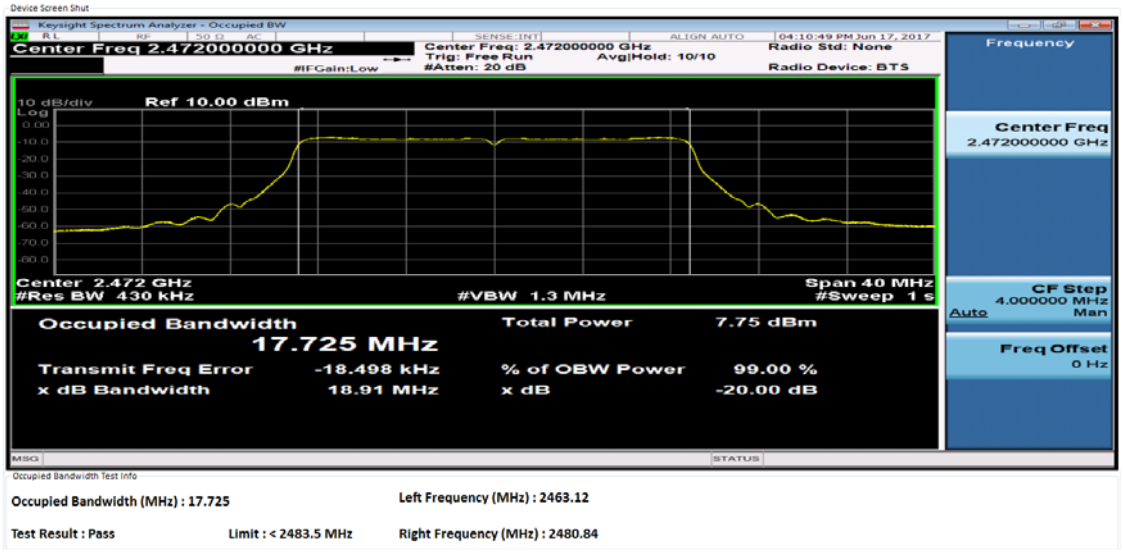
Test Mode:	TX Mode_ 802.11n 20M Mode

Frequency (MHz)	Occupied Channel Bandwidth (MHz)	F_L at 99% BW (MHz)	F_H at 99% BW (MHz)	Result
2412	17.730	2403.11	-	Pass
2472	17.725	-	2480.84	
N/A		F_L>2400	F_H<2483.5	

802.11n 20M Mode_2412



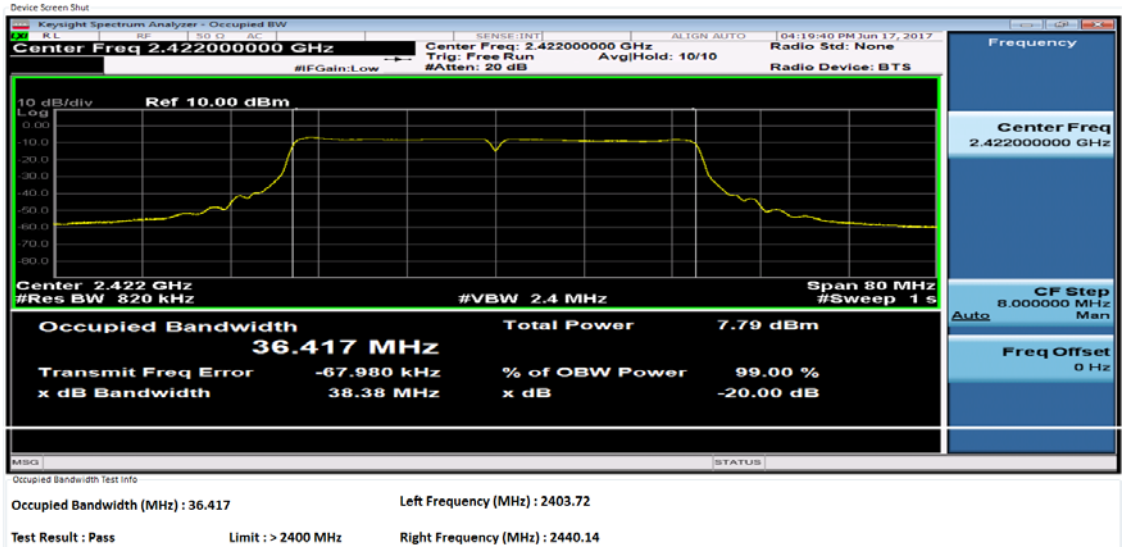
802.11n 20M Mode_2472



Test Mode:	TX Mode_ 802.11n 40M Mode

Frequency (MHz)	Occupied Channel Bandwidth (MHz)	F_L at 99% BW (MHz)	F_H at 99% BW (MHz)	Result
2422	36.417	2403.72	-	Pass
2462	36.432	-	2480.18	
N/A		F_L>2400	F_H<2483.5	

802.11n 40M Mode_2422

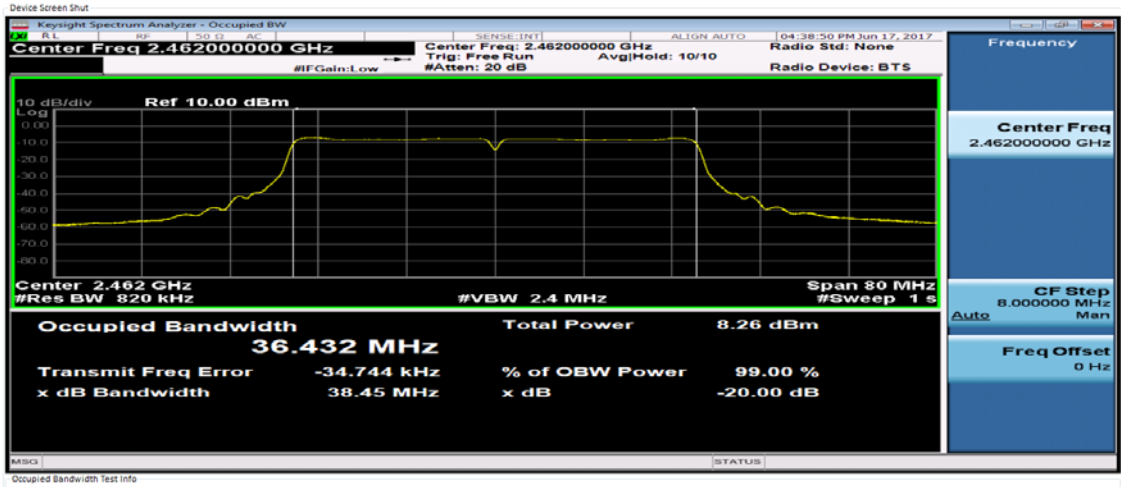


Occupied Bandwidth Test Info

Occupied Bandwidth (MHz) : 36.417 Left Frequency (MHz) : 2403.72

Test Result : Pass Limit : > 2400 MHz Right Frequency (MHz) : 2440.14

802.11n 40M Mode_2462



Occupied Bandwidth Test Info

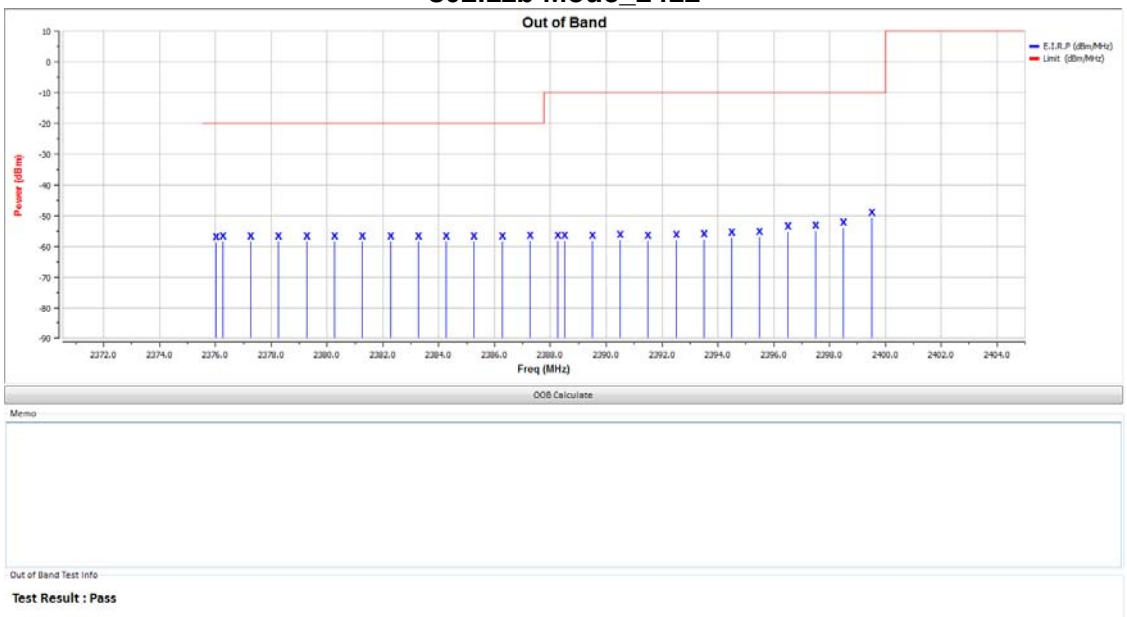
Occupied Bandwidth (MHz) : 36.432 Left Frequency (MHz) : 2443.75

Test Result : Pass Limit : < 2483.5 MHz Right Frequency (MHz) : 2480.18

APPENDIX G - TRANSMITTER UNWANTED EMISSIONS IN THE OOB DOMAIN

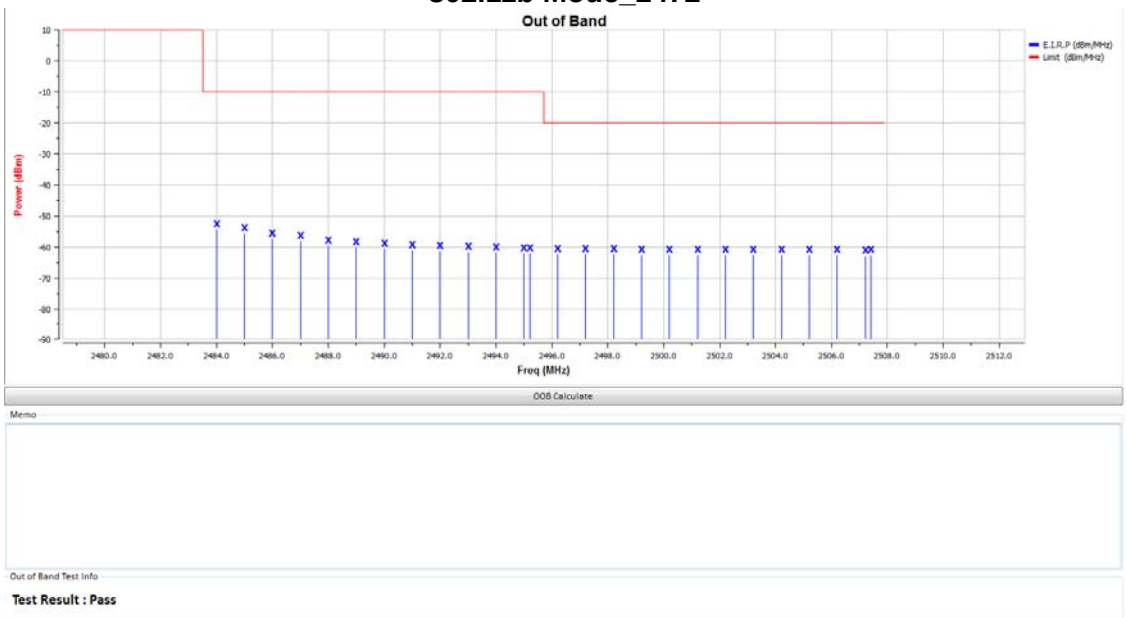
Test Mode:	TX Mode_ 802.11b Mode_ Normal Temperature

802.11b Mode_2412



Test Result : Pass

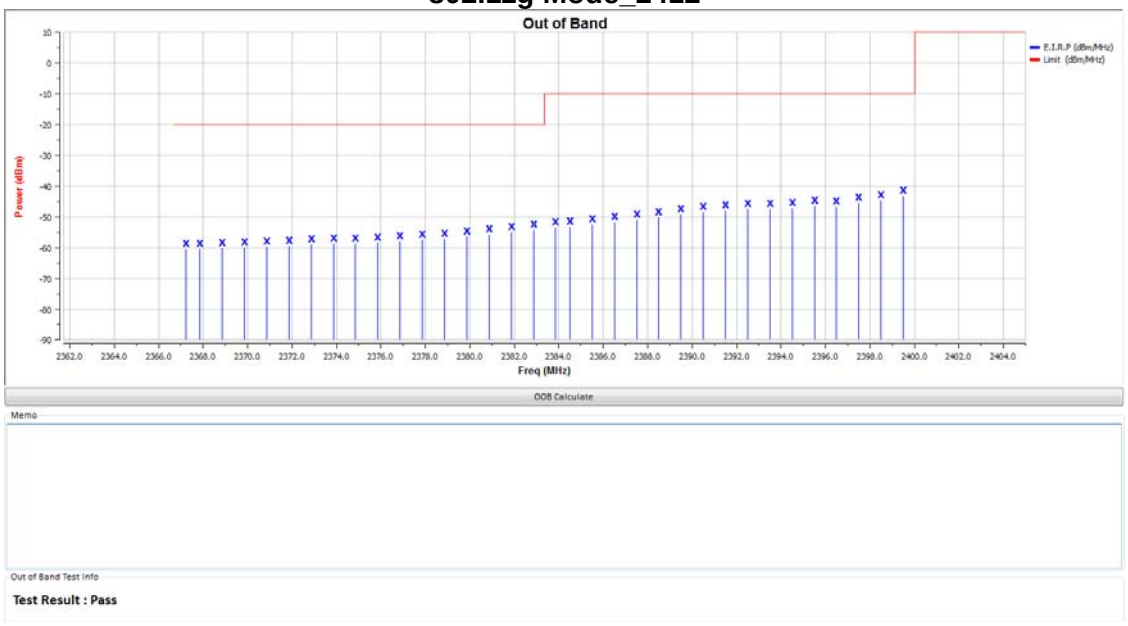
802.11b Mode_2472



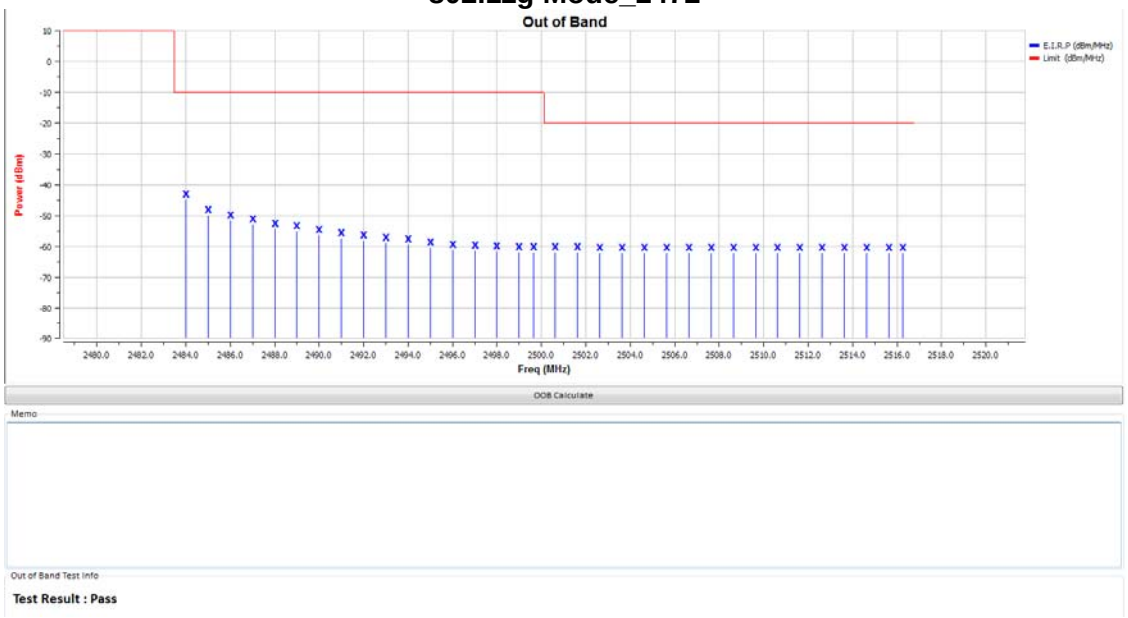
Test Result : Pass

Test Mode:	TX Mode_ 802.11g Mode_ Normal Temperature

802.11g Mode_2412

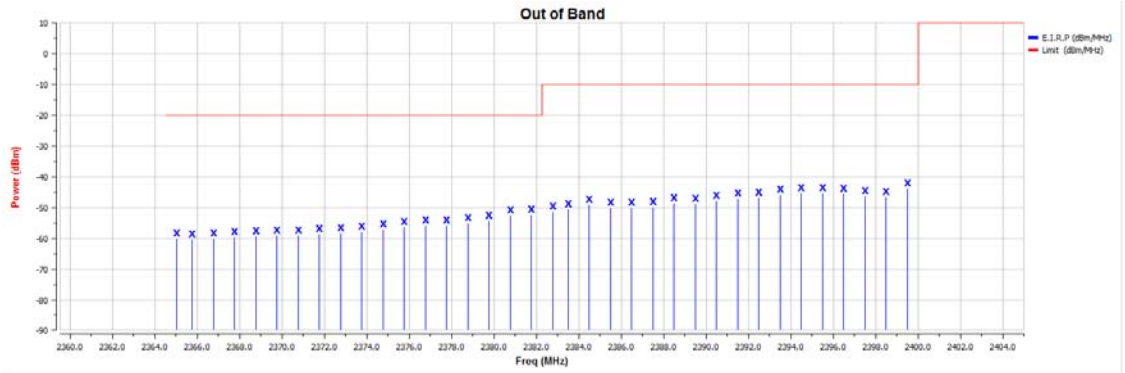


802.11g Mode_2472



Test Mode:	TX Mode_ 802.11n 20M Mode_ Normal Temperature

802.11n 20M Mode_2412



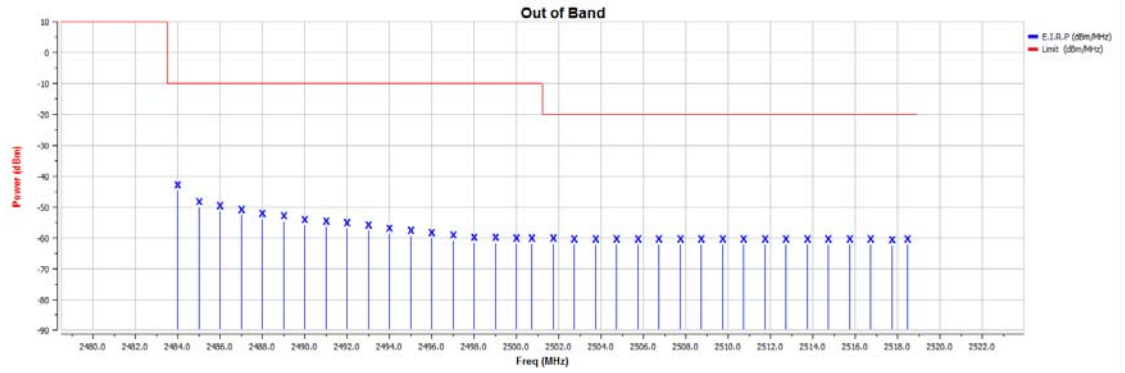
OOB Calculate

Memo

Out of Band Test Info

Test Result : Pass

802.11n 20M Mode_2472



OOB Calculate

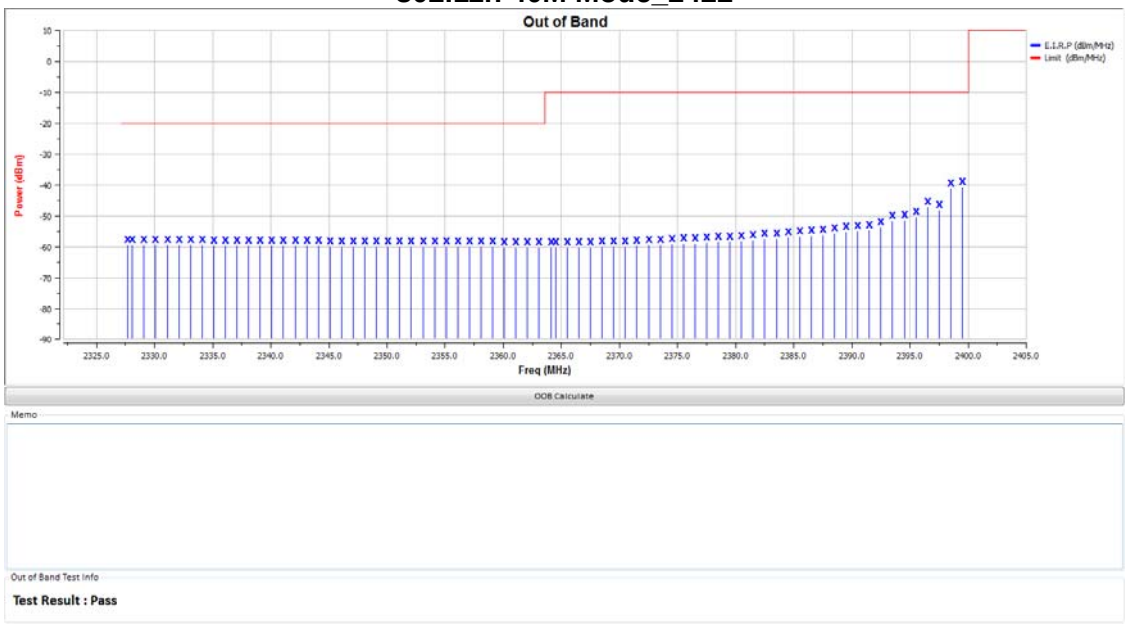
Memo

Out of Band Test Info

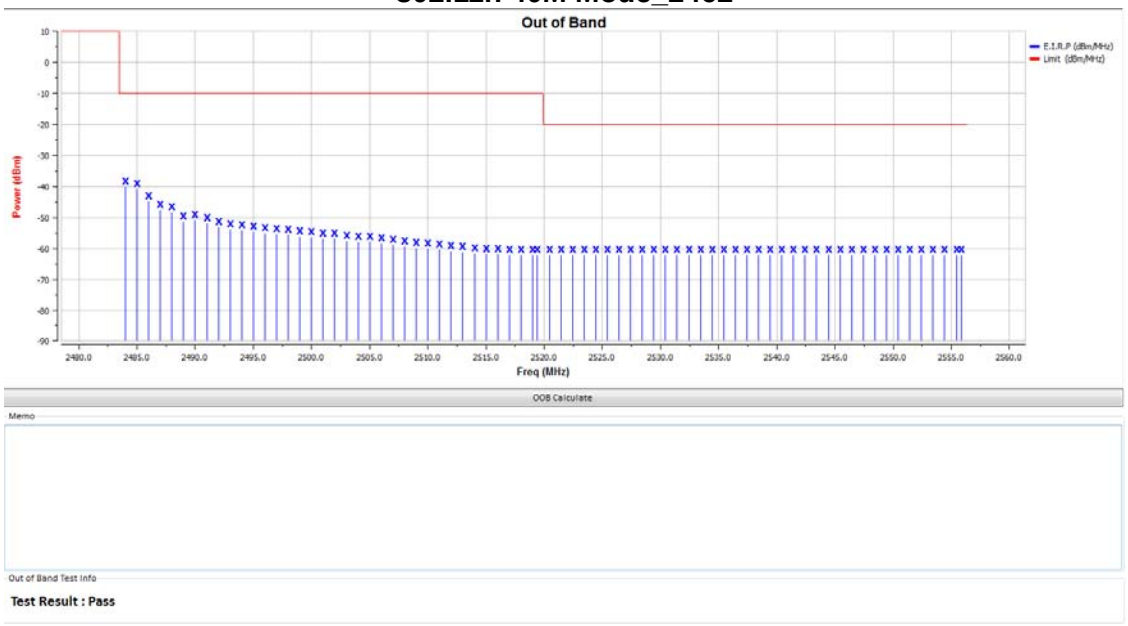
Test Result : Pass

Test Mode:	TX Mode_ 802.11n 40M Mode_ Normal Temperature

802.11n 40M Mode_2422



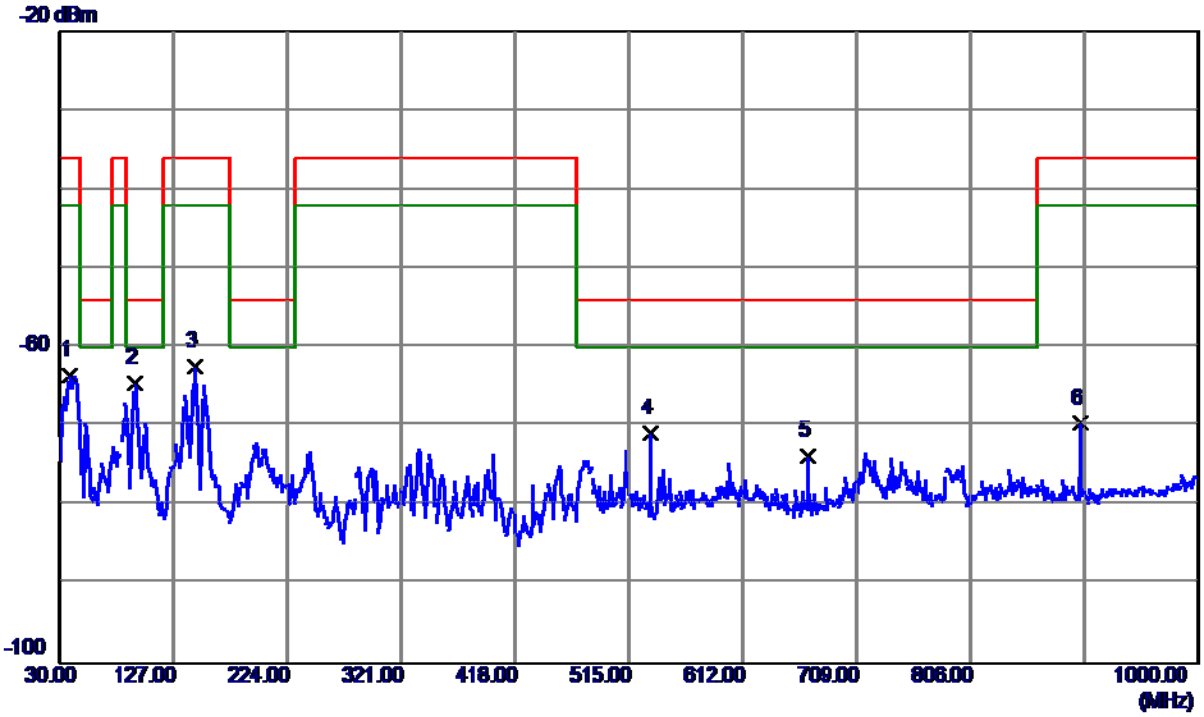
802.11n 40M Mode_2462



APPENDIX H - TRANSMITTER UNWANTED EMISSIONS IN THE SPURIOUS DOMAIN

Test Mode:	TX Mode 2412 MHz (11b)

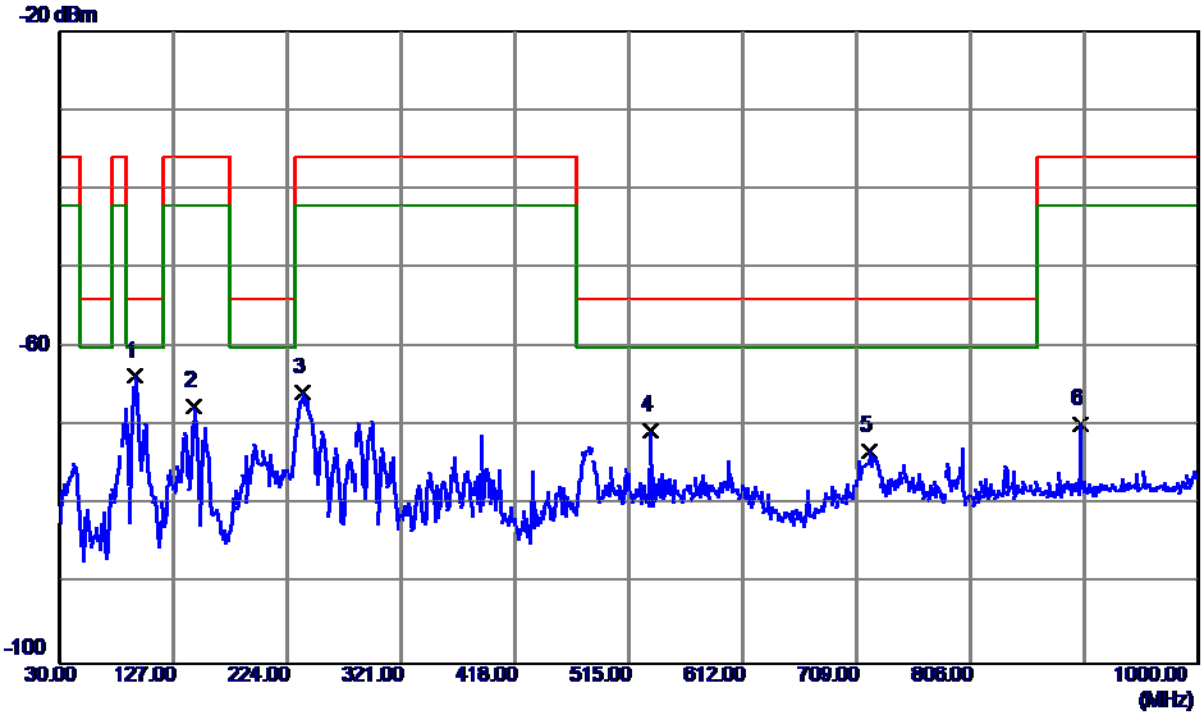
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	38.7300	-59.32	-4.14	-63.46	-36.00	-27.46	RMS	
2 *	94.8930	57.87	6.56	64.43	54.00	10.43	RMS	
3	145.0420	-61.81	-0.59	-62.40	-36.00	-26.40	RMS	
4	533.2360	-75.08	4.16	-70.92	-54.00	-16.92	RMS	
5	666.6110	-79.56	5.82	-73.74	-54.00	-19.74	RMS	
6	899.9930	-78.88	9.26	-69.62	-36.00	-33.62	RMS	

Test Mode:	TX Mode 2412 MHz (11b)

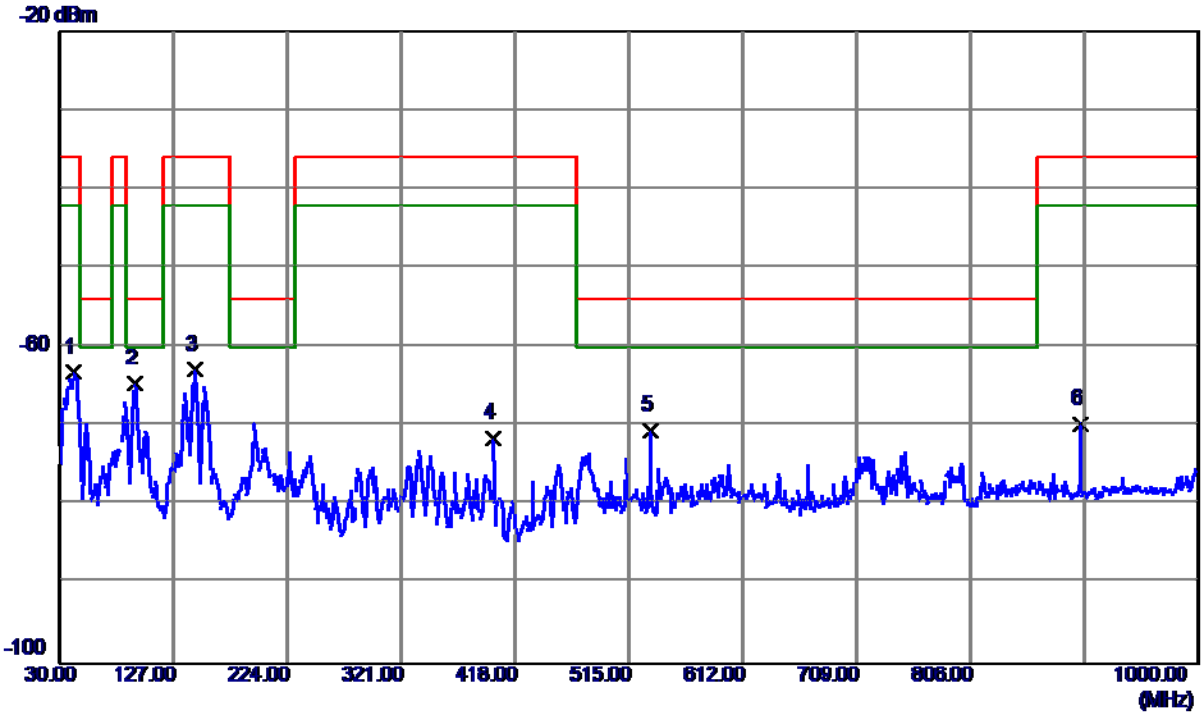
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	94.8930	-53.87	-9.82	-63.69	-54.00	-9.69	RMS	
2	144.6540	-66.87	-0.71	-67.58	-36.00	-31.58	RMS	
3	237.2890	-63.11	-2.60	-65.71	-36.00	-29.71	RMS	
4	533.2360	-74.98	4.35	-70.63	-54.00	-16.63	RMS	
5	719.9610	-80.87	7.76	-73.11	-54.00	-19.11	RMS	
6	899.9930	-79.55	9.84	-69.71	-36.00	-33.71	RMS	

Test Mode:	TX Mode 2472 MHz (11b)

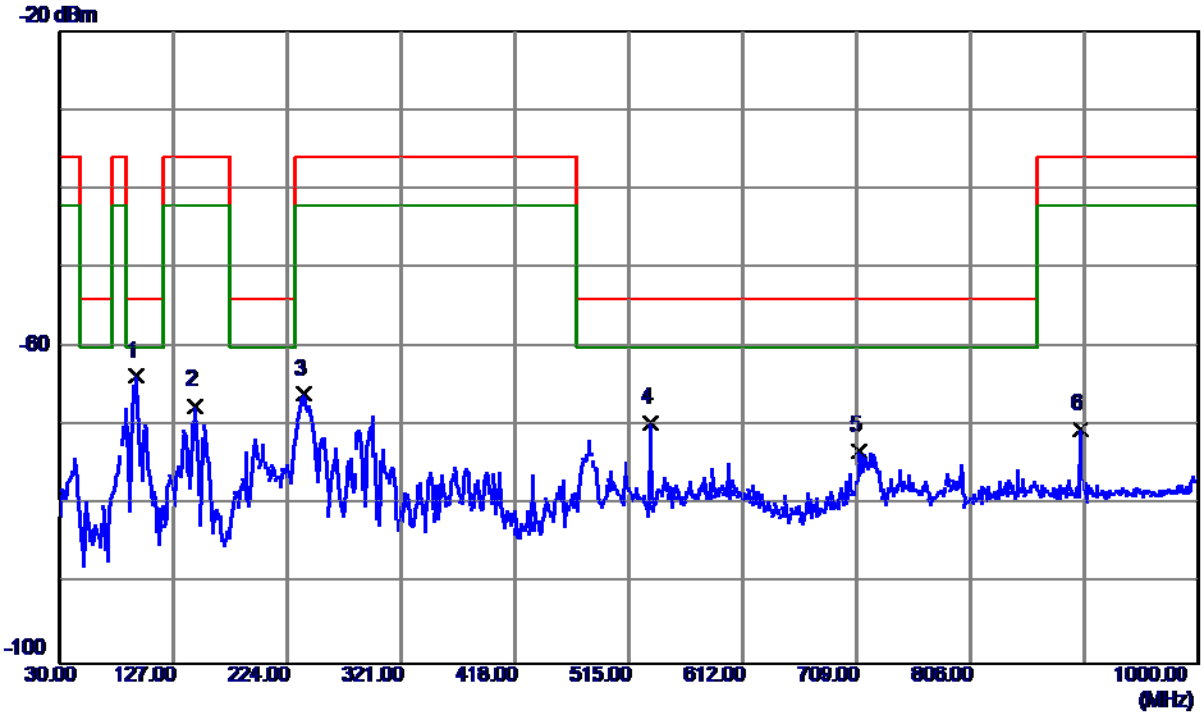
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	41.3490	-60.05	-3.22	-63.27	-36.00	-27.27	RMS	
2 *	94.8930	-58.03	-6.56	-64.59	-54.00	-10.59	RMS	
3	145.4299	-62.29	-0.57	-62.86	-36.00	-26.86	RMS	
4	399.9580	-71.45	-0.09	-71.54	-36.00	-35.54	RMS	
5	533.3330	-74.77	4.16	-70.61	-54.00	-16.61	RMS	
6	899.9930	-78.94	9.26	-69.68	-36.00	-33.68	RMS	

Test Mode:	TX Mode 2472 MHz (11b)

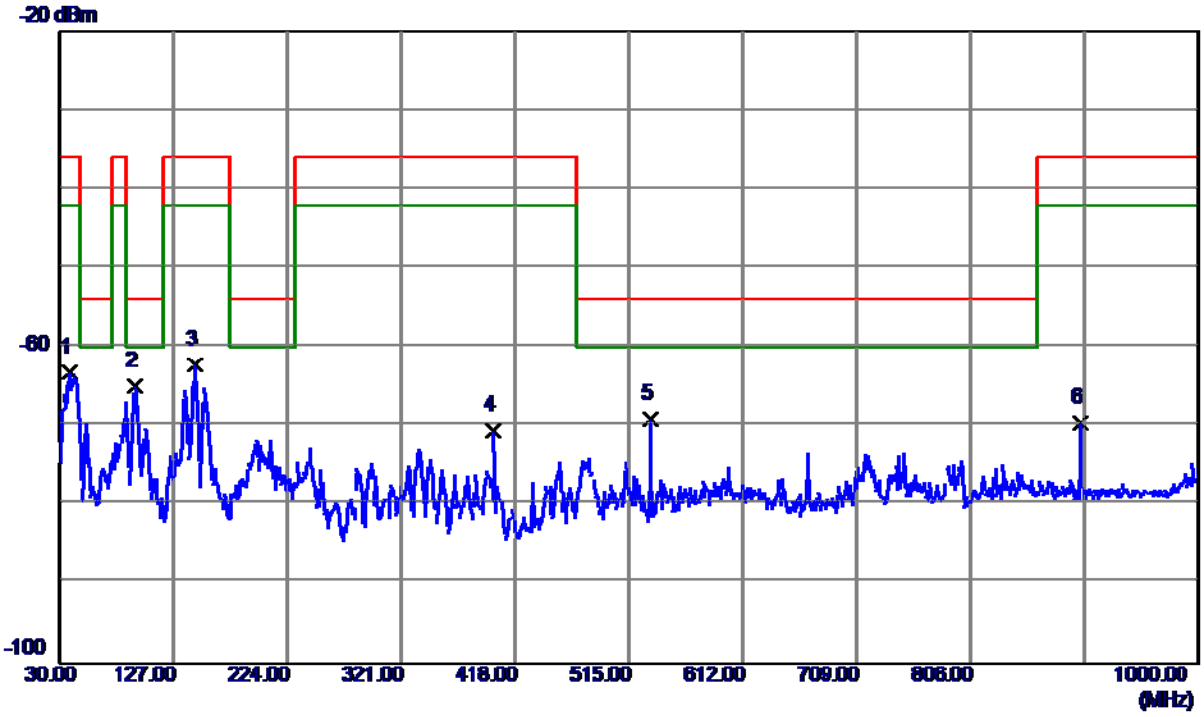
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	95.2810	-53.95	-9.71	-63.66	-54.00	-9.66	RMS	
2	145.0420	-66.74	-0.70	-67.44	-36.00	-31.44	RMS	
3	237.6770	-63.43	-2.57	-66.00	-36.00	-30.00	RMS	
4	533.3330	-73.91	4.35	-69.56	-54.00	-15.56	RMS	
5	710.8430	-80.46	7.41	-73.05	-54.00	-19.05	RMS	
6	899.9930	-80.20	9.84	-70.36	-36.00	-34.36	RMS	

Test Mode:	TX Mode 2422 MHz (11n 40M)

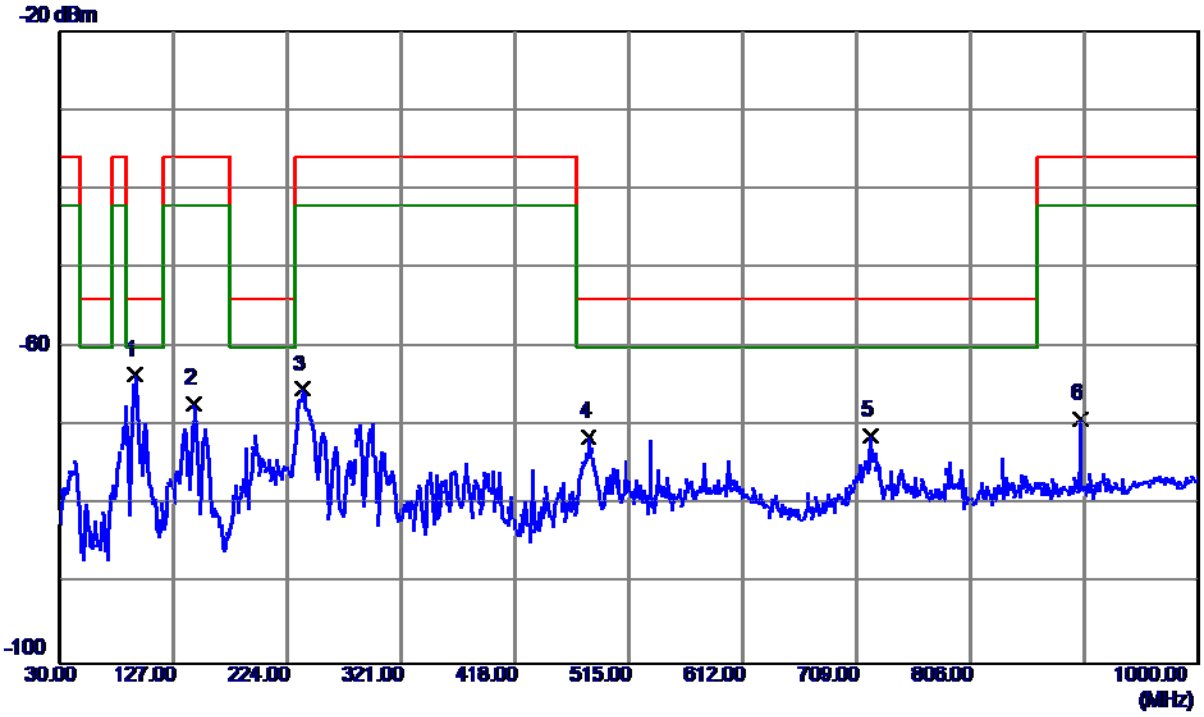
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	38.7300	-59.03	-4.14	-63.17	-36.00	-27.17	RMS	
2 *	94.8930	-58.37	-6.56	-64.93	-54.00	-10.93	RMS	
3	145.0420	-61.58	-0.59	-62.17	-36.00	-26.17	RMS	
4	399.9580	-70.46	-0.09	-70.55	-36.00	-34.55	RMS	
5	533.3330	-73.22	4.16	-69.06	-54.00	-15.06	RMS	
6	899.9930	-78.81	9.26	-69.55	-36.00	-33.55	RMS	

Test Mode:	TX Mode 2422 MHz (11n 40M)

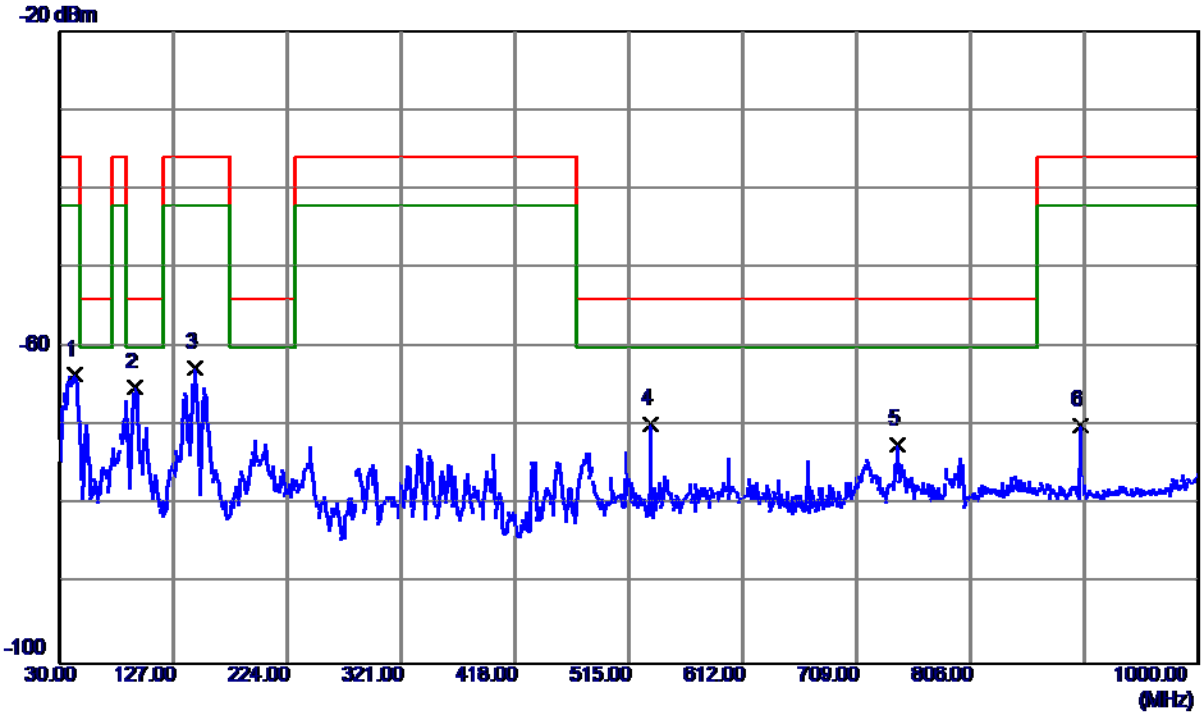
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	94.8930	-53.65	-9.82	-63.47	-54.00	-9.47	RMS	
2	144.6540	-66.53	-0.71	-67.24	-36.00	-31.24	RMS	
3	237.2890	-62.76	-2.60	-65.36	-36.00	-29.36	RMS	
4	479.9830	-74.75	3.37	-71.38	-54.00	-17.38	RMS	
5	721.1250	-79.04	7.81	-71.23	-54.00	-17.23	RMS	
6	899.9930	-79.01	9.84	-69.17	-36.00	-33.17	RMS	

Test Mode:	TX Mode 2462 MHz (11n 40M)

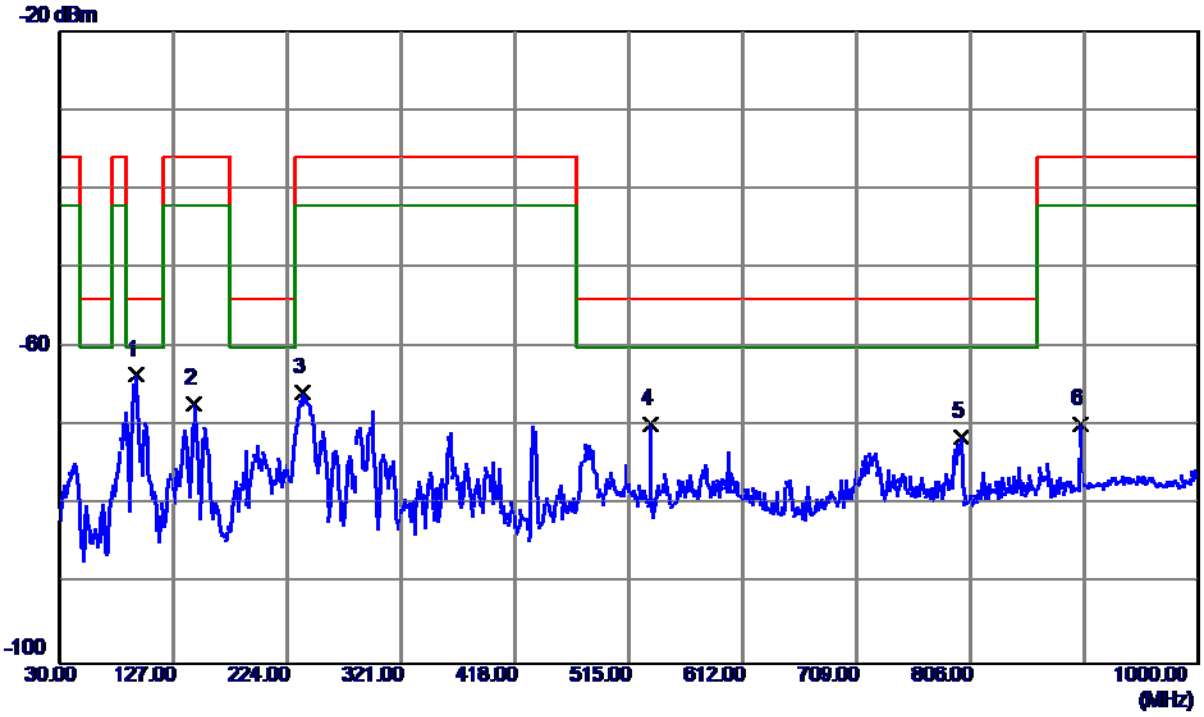
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	42.9010	-60.25	-3.29	-63.54	-36.00	-27.54	RMS	
2 *	94.5050	-58.47	-6.60	-65.07	-54.00	-11.07	RMS	
3	145.0420	-62.05	-0.59	-62.64	-36.00	-26.64	RMS	
4	533.3330	-73.86	4.16	-69.70	-54.00	-15.70	RMS	
5	743.8230	-80.75	8.46	-72.29	-54.00	-18.29	RMS	
6	899.9930	-79.20	9.26	-69.94	-36.00	-33.94	RMS	

Test Mode:	TX Mode 2462 MHz (11n 40M)

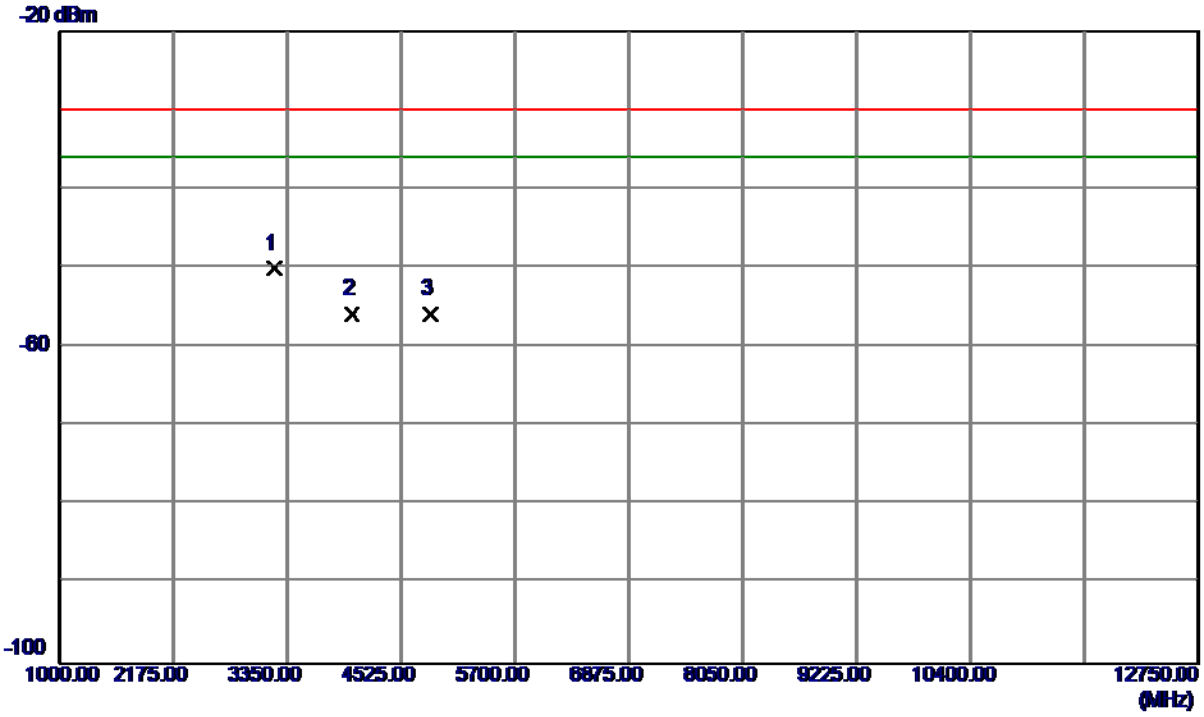
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	95.2810	-53.75	-9.71	-63.46	-54.00	-9.46	RMS	
2	144.6540	-66.46	-0.71	-67.17	-36.00	-31.17	RMS	
3	237.2890	-63.14	-2.60	-65.74	-36.00	-29.74	RMS	
4	533.3330	-74.09	4.35	-69.74	-54.00	-15.74	RMS	
5	798.8220	-79.52	8.19	-71.33	-54.00	-17.33	RMS	
6	899.9930	-79.53	9.84	-69.69	-36.00	-33.69	RMS	

Test Mode:	TX Mode 2412 MHz (11b)

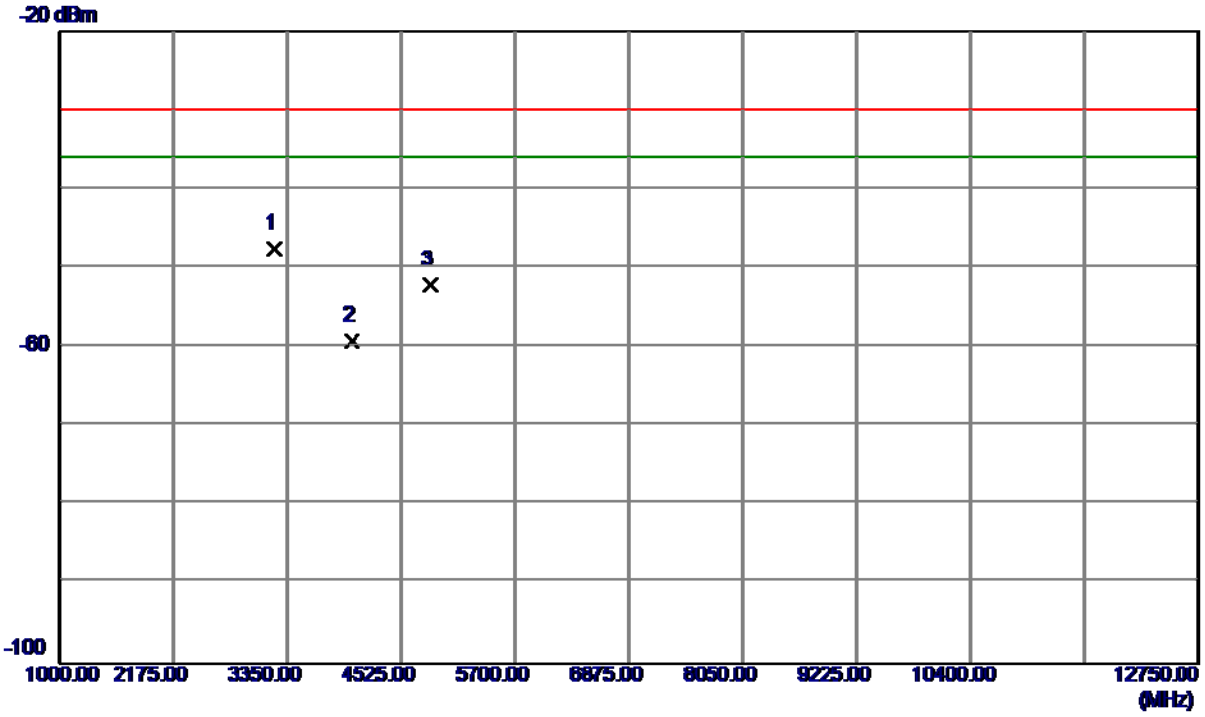
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3215.9960	-51.06	0.97	-50.09	-30.00	-20.09	RMS	
2	4018.9670	-62.46	6.58	-55.88	-30.00	-25.88	RMS	
3	4824.2330	-63.73	7.85	-55.88	-30.00	-25.88	RMS	

Test Mode:	TX Mode 2412 MHz (11b)

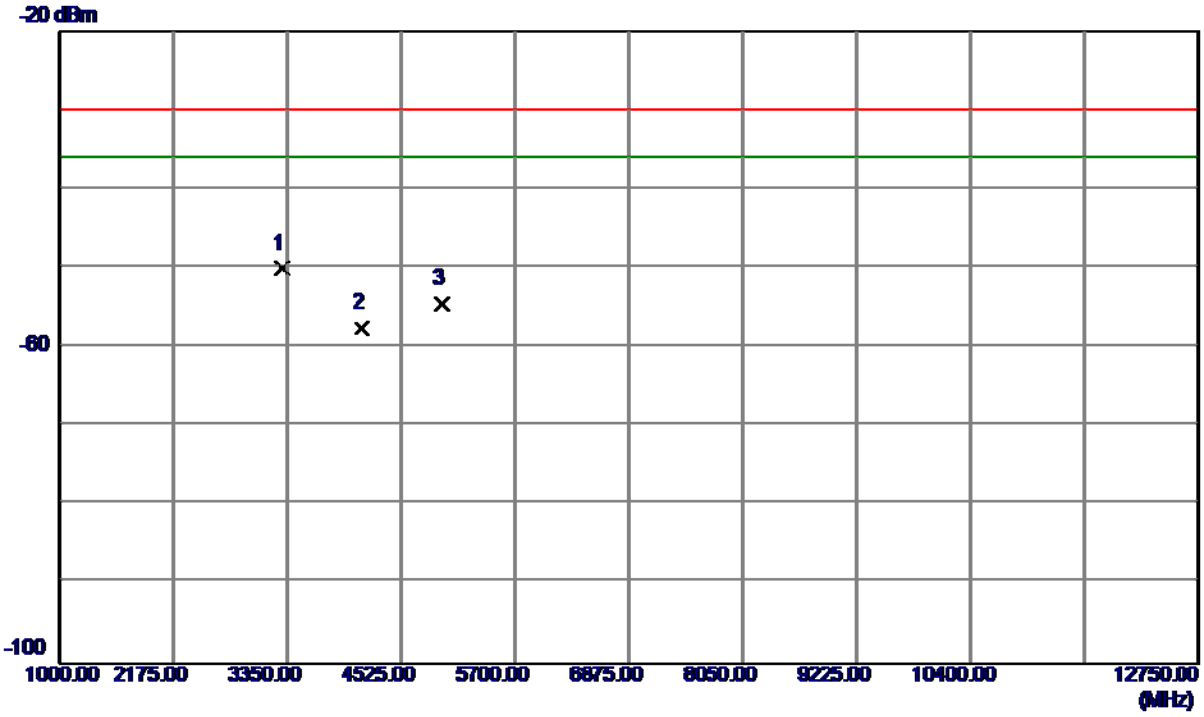
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3215.9570	-48.60	1.10	-47.50	-30.00	-17.50	RMS	
2	4018.1830	-66.12	6.86	-59.26	-30.00	-29.26	RMS	
3	4823.9680	-59.99	7.90	-52.09	-30.00	-22.09	RMS	

Test Mode:	TX Mode 2472 MHz (11b)

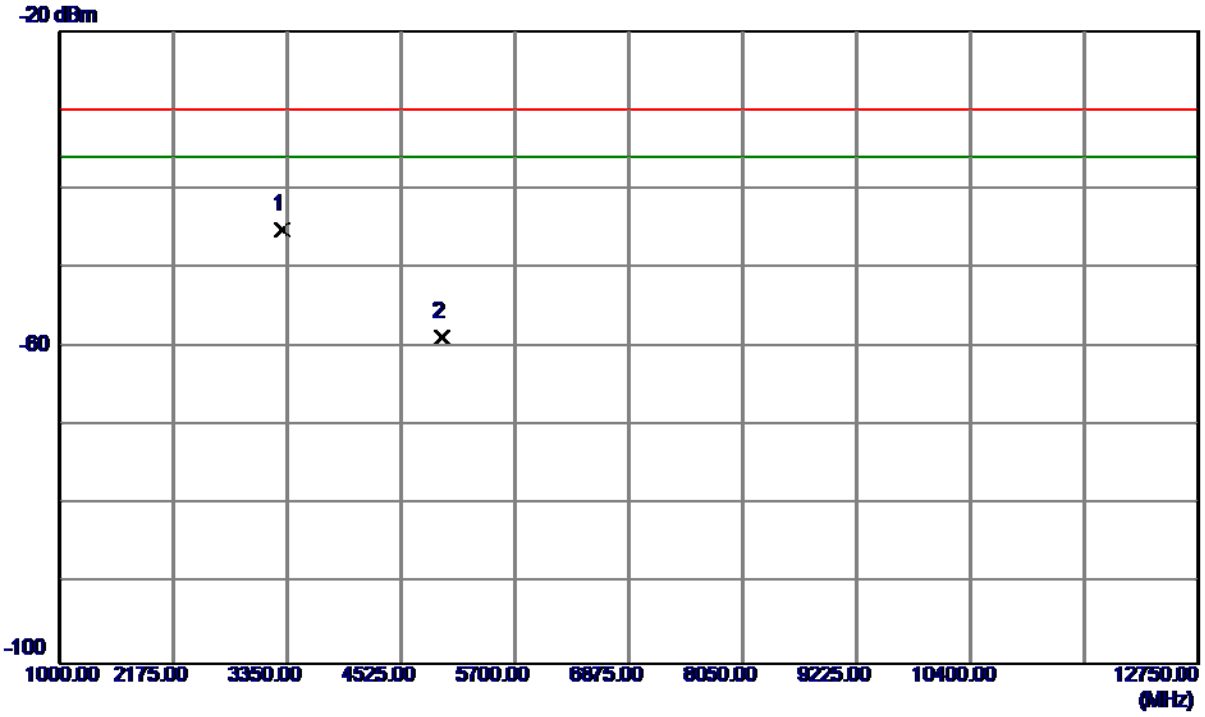
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3295.9690	-51.37	1.34	-50.03	-30.00	-20.03	RMS	
2	4120.8000	-64.26	6.65	-57.61	-30.00	-27.61	RMS	
3	4944.0830	-62.78	8.20	-54.58	-30.00	-24.58	RMS	

Test Mode:	TX Mode 2472 MHz (11b)

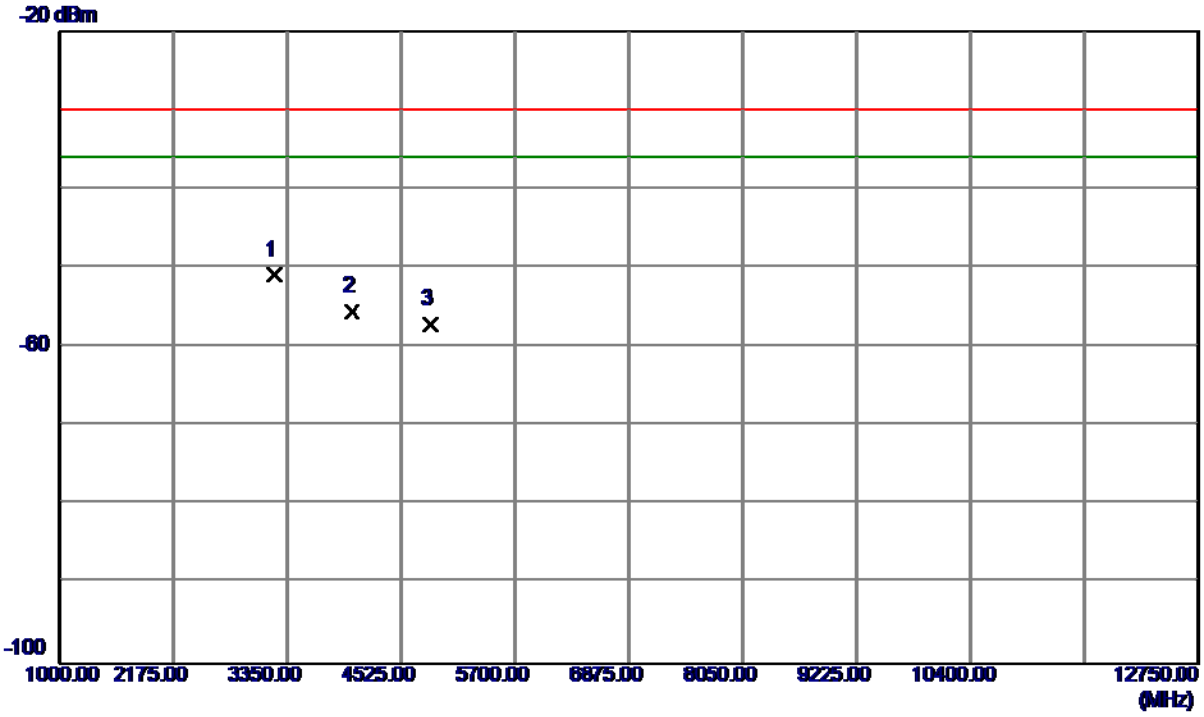
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3295.9670	-46.62	1.44	-45.18	-30.00	-15.18	RMS	
2	4944.4750	-66.95	8.22	-58.73	-30.00	-28.73	RMS	

Test Mode:	TX Mode 2412 MHz (11g)

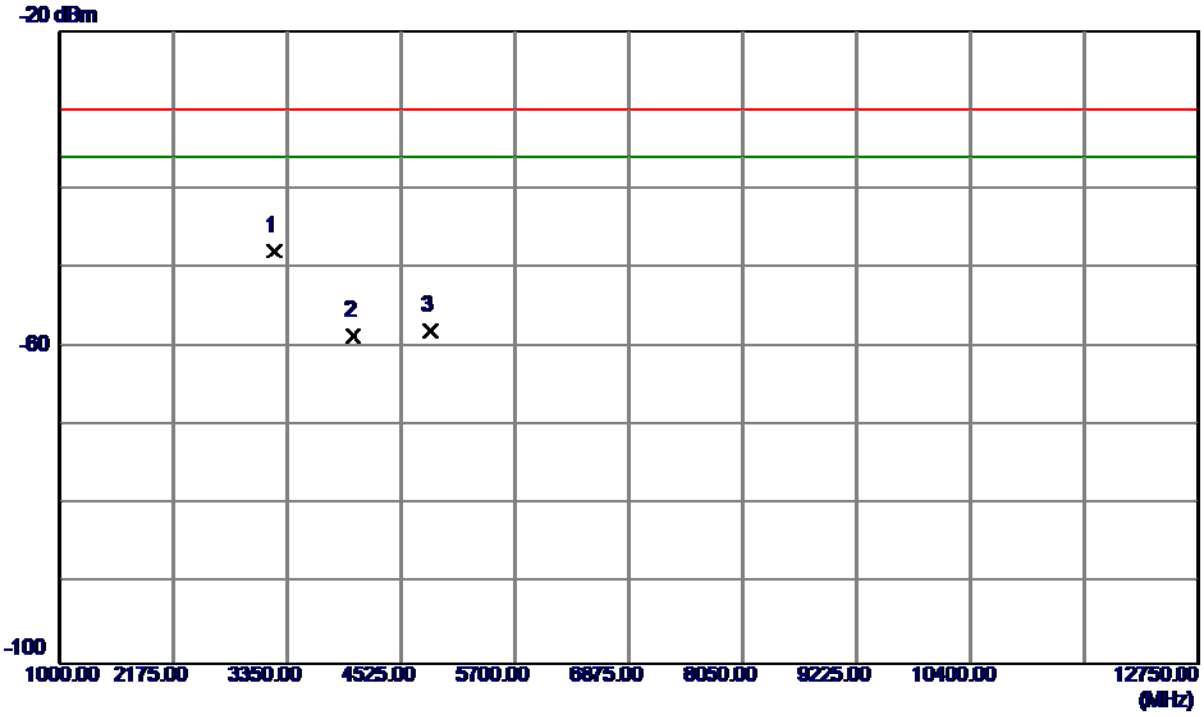
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3216.4420	-51.90	0.98	-50.92	-30.00	-20.92	RMS	
2	4015.4420	-62.17	6.58	-55.59	-30.00	-25.59	RMS	
3	4824.2330	-65.04	7.85	-57.19	-30.00	-27.19	RMS	

Test Mode:	TX Mode 2412 MHz (11g)

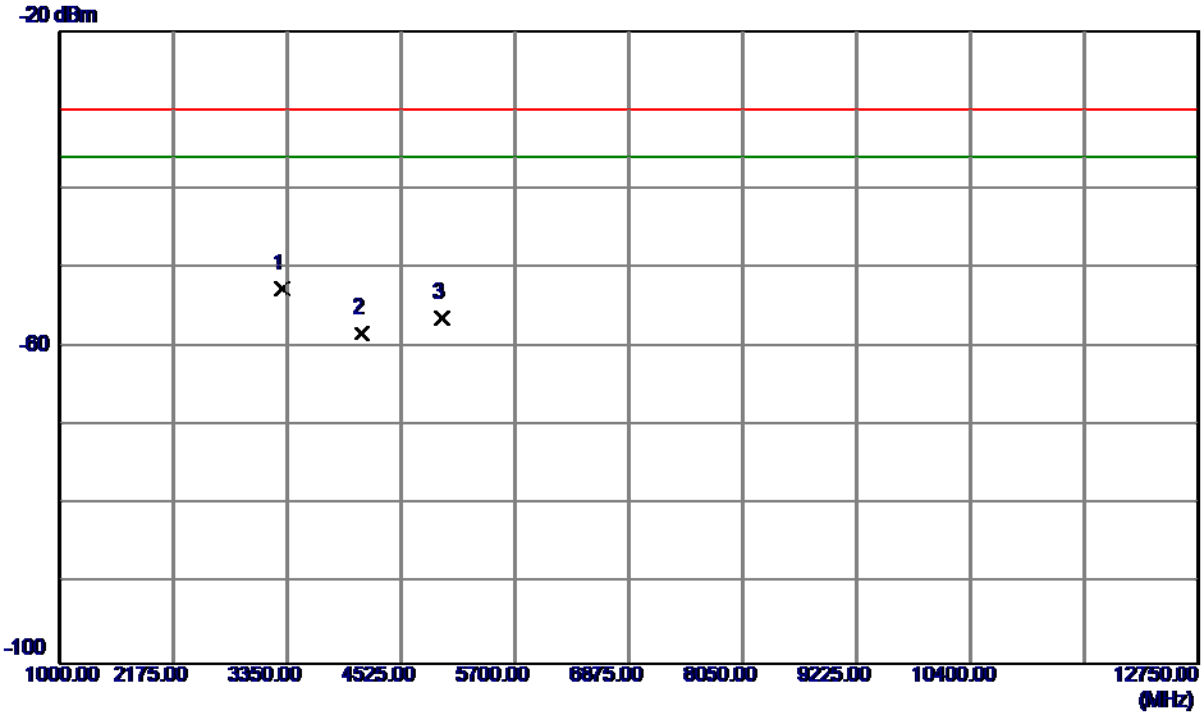
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3216.0500	-48.90	1.10	-47.80	-30.00	-17.80	RMS	
2	4025.2330	-65.36	6.86	-58.50	-30.00	-28.50	RMS	
3	4830.5000	-65.82	7.92	-57.90	-30.00	-27.90	RMS	

Test Mode:	TX Mode 2472 MHz (11g)

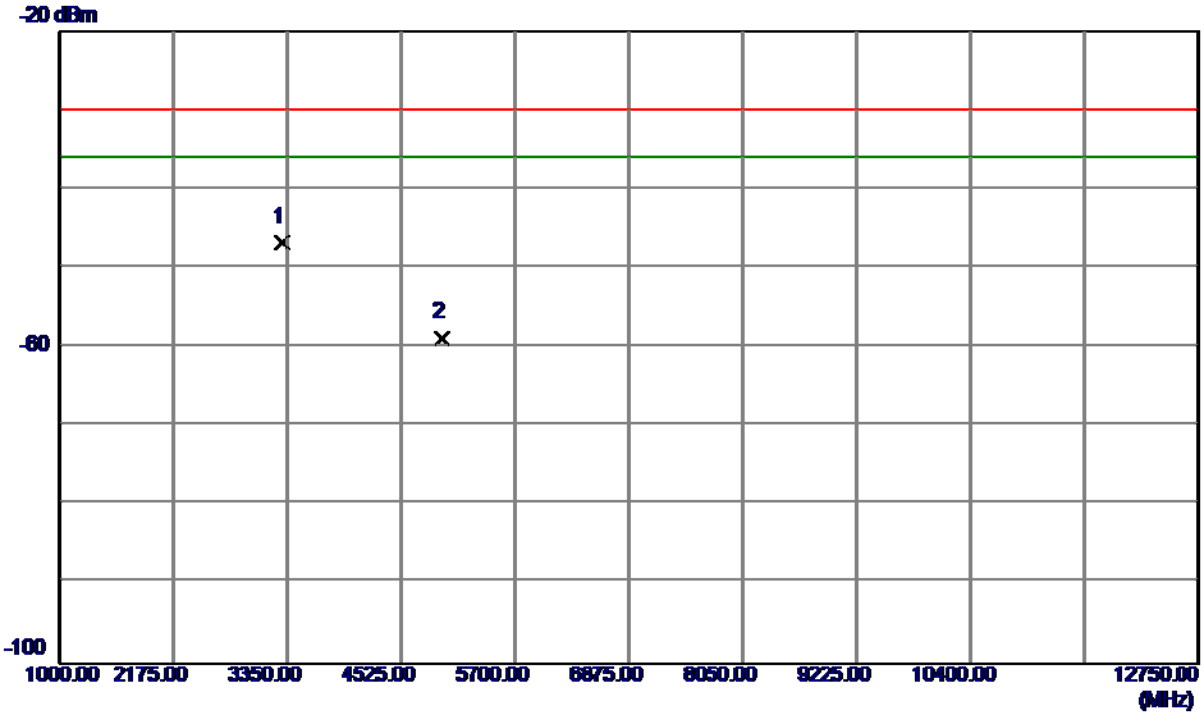
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3296.3420	-54.02	1.34	-52.68	-30.00	-22.68	RMS	
2	4115.7080	-64.86	6.65	-58.21	-30.00	-28.21	RMS	
3	4943.6920	-64.52	8.20	-56.32	-30.00	-26.32	RMS	

Test Mode:	TX Mode 2472 MHz (11g)

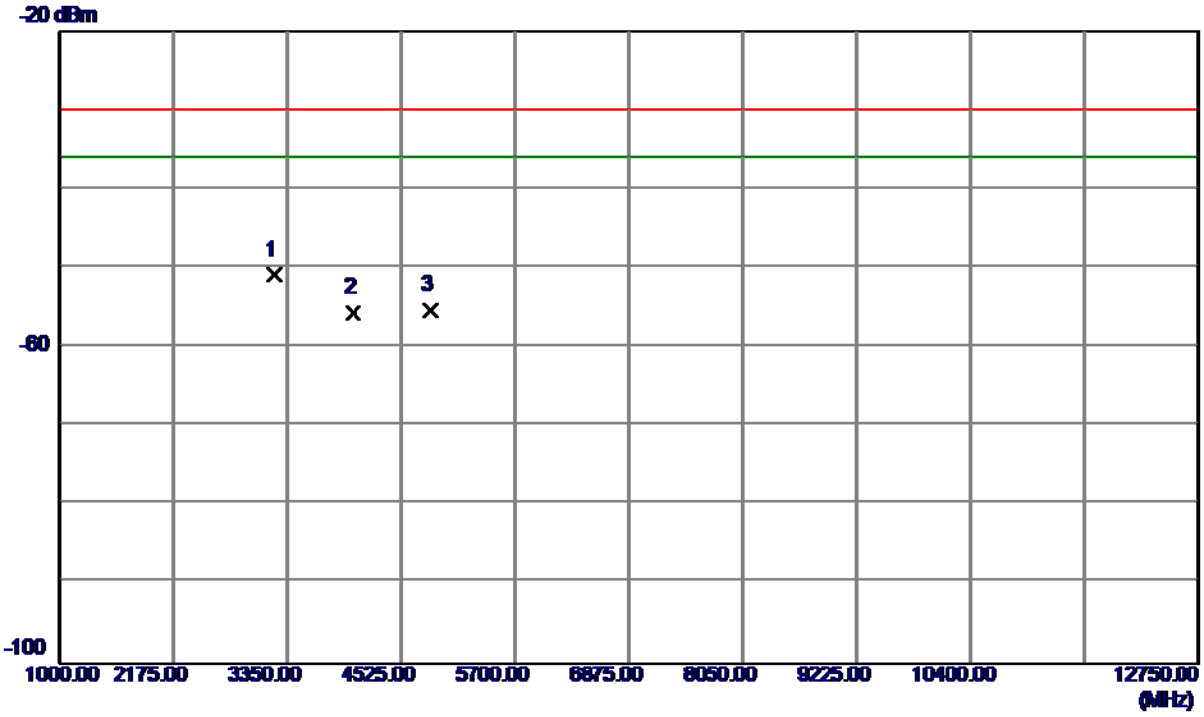
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3295.9770	-48.11	1.44	-46.67	-30.00	-16.67	RMS	
2	4945.6500	-67.02	8.22	-58.80	-30.00	-28.80	RMS	

Test Mode:	TX Mode 2412 MHz (11n 20M)

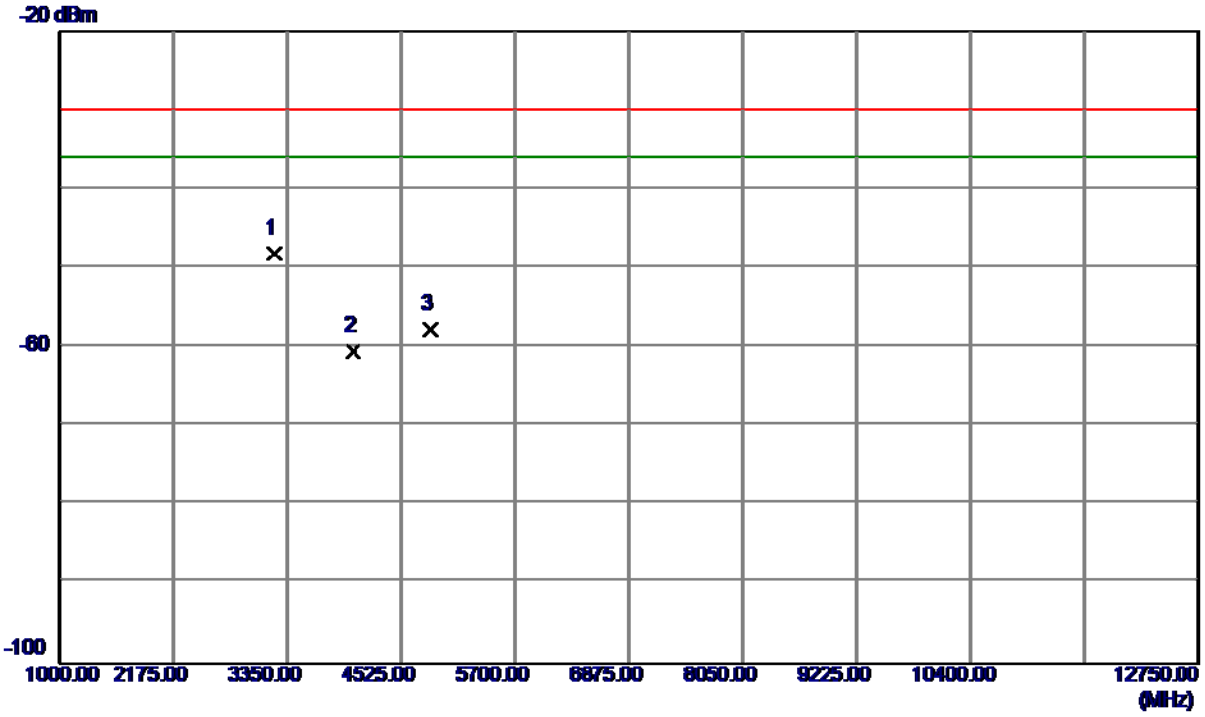
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3216.4420	-51.84	0.98	-50.86	-30.00	-20.86	RMS	
2	4023.2750	-62.32	6.59	-55.73	-30.00	-25.73	RMS	
3	4824.6250	-63.24	7.85	-55.39	-30.00	-25.39	RMS	

Test Mode:	TX Mode 2412 MHz (11n 20M)

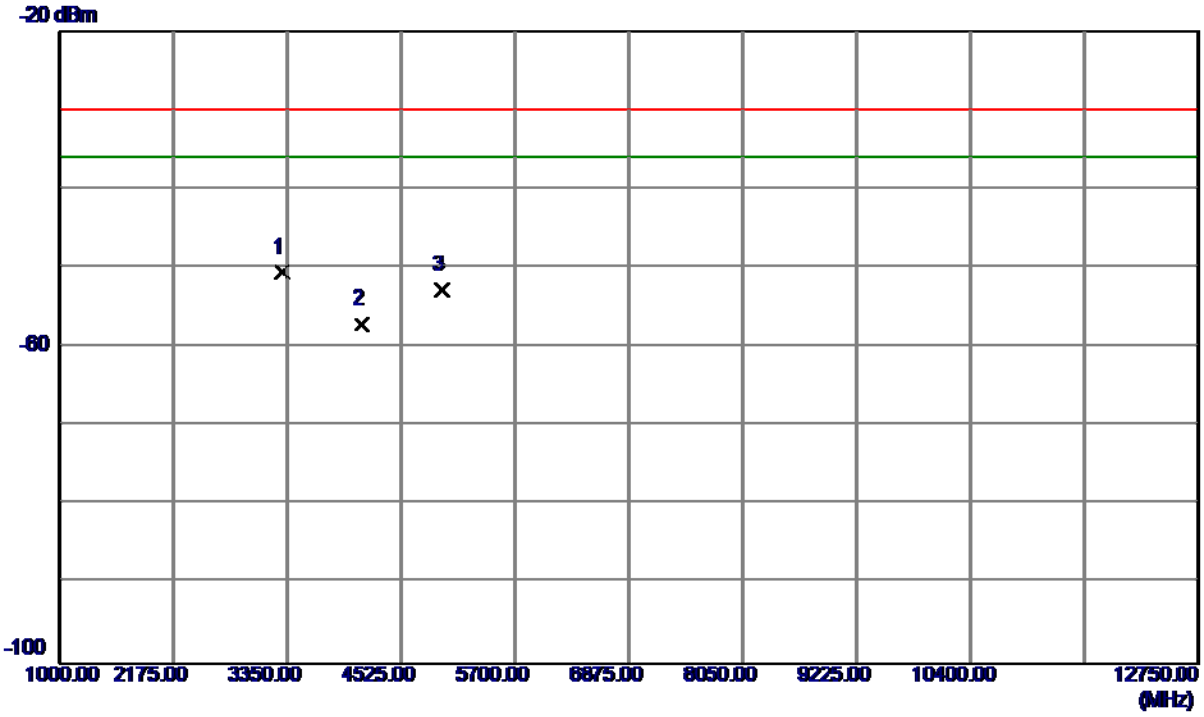
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3216.0500	-49.25	1.10	-48.15	-30.00	-18.15	RMS	
2	4027.5830	-67.33	6.86	-60.47	-30.00	-30.47	RMS	
3	4823.8420	-65.65	7.90	-57.75	-30.00	-27.75	RMS	

Test Mode:	TX Mode 2472 MHz (11n 20M)

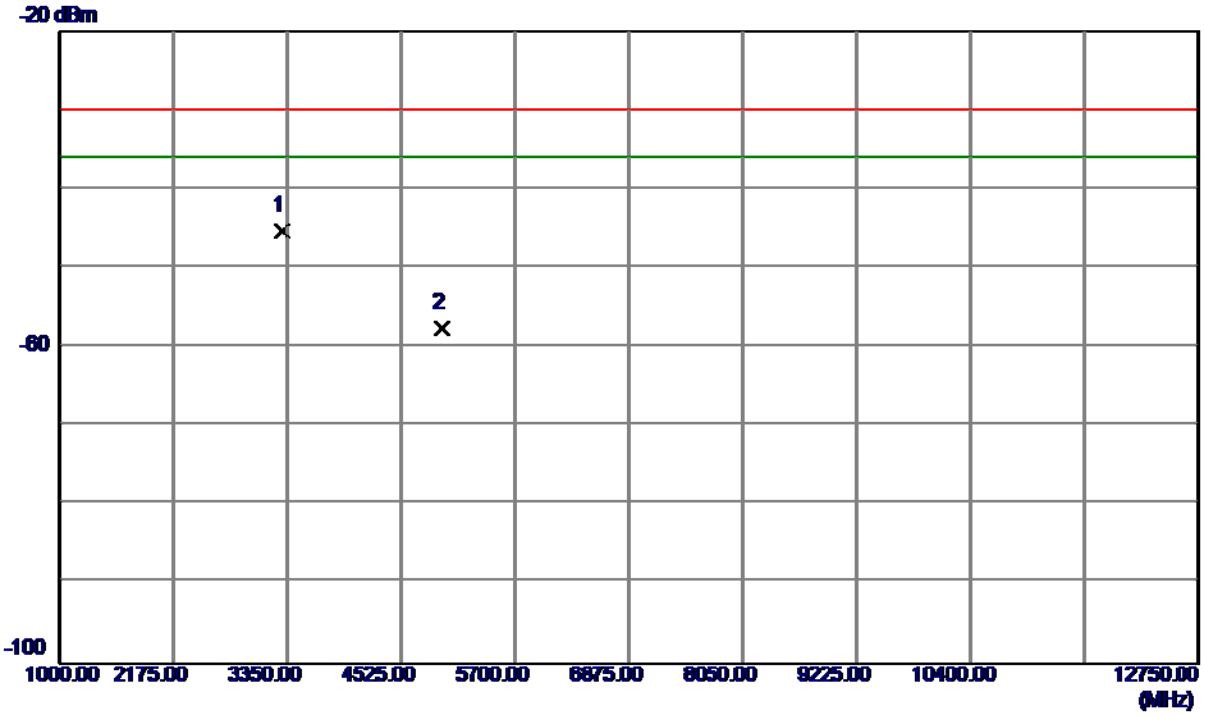
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3296.3420	-51.93	1.34	-50.59	-30.00	-20.59	RMS	
2	4123.5419	-63.83	6.66	-57.17	-30.00	-27.17	RMS	
3	4944.0830	-60.99	8.20	-52.79	-30.00	-22.79	RMS	

Test Mode:	TX Mode 2472 MHz (11n 20M)

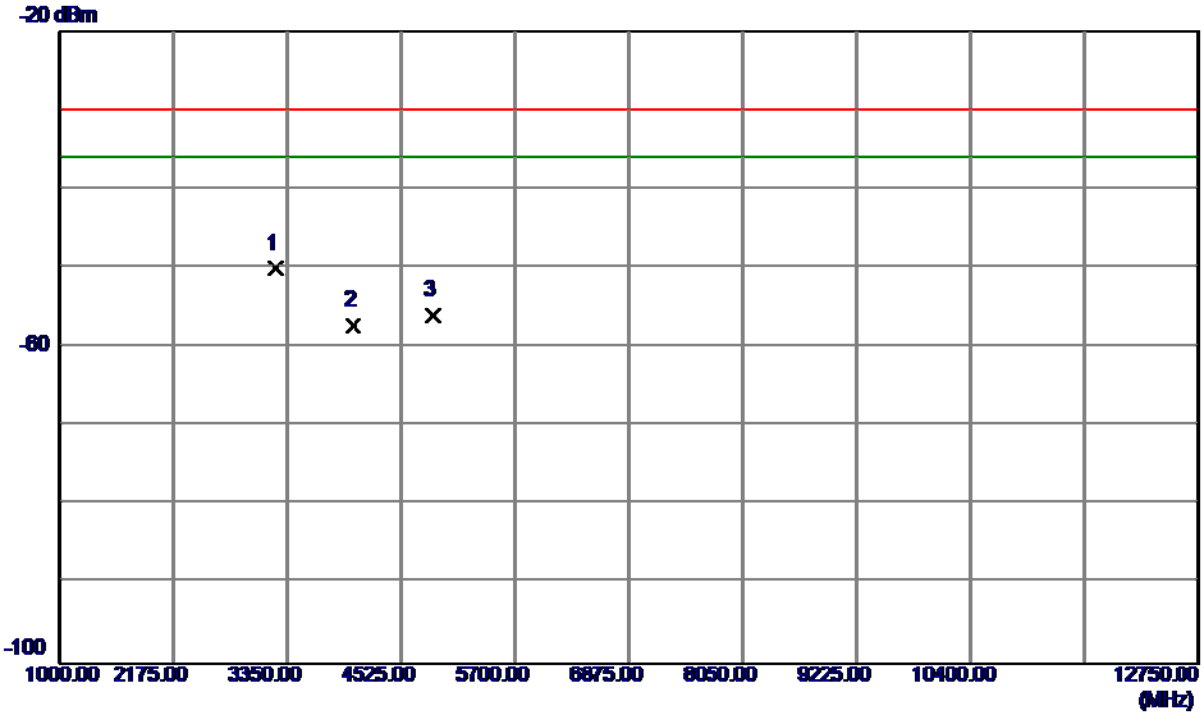
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3296.3420	-46.67	1.44	-45.23	-30.00	-15.23	RMS	
2	4940.9500	-65.84	8.21	-57.63	-30.00	-27.63	RMS	

Test Mode:	TX Mode 2422 MHz (11n 40M)

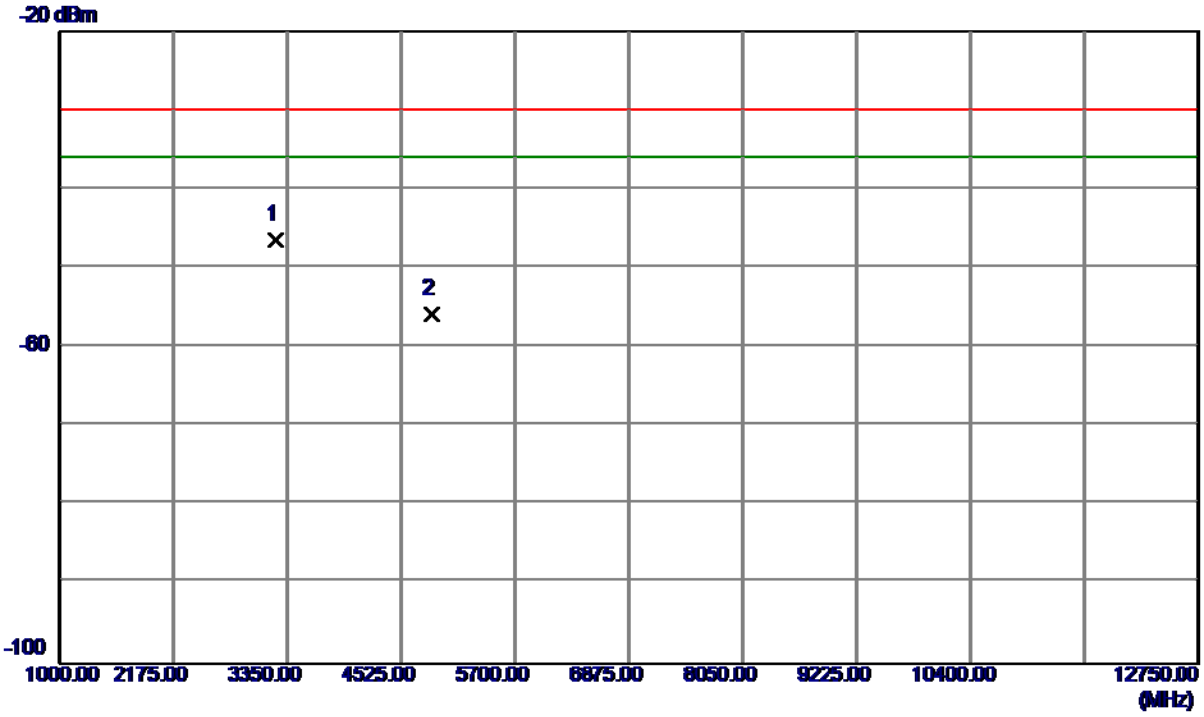
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3229.3670	-51.13	1.04	-50.09	-30.00	-20.09	RMS	
2	4033.0670	-63.86	6.59	-57.27	-30.00	-27.27	RMS	
3	4848.1250	-63.95	7.92	-56.03	-30.00	-26.03	RMS	

Test Mode:	TX Mode 2422 MHz (11n 40M)

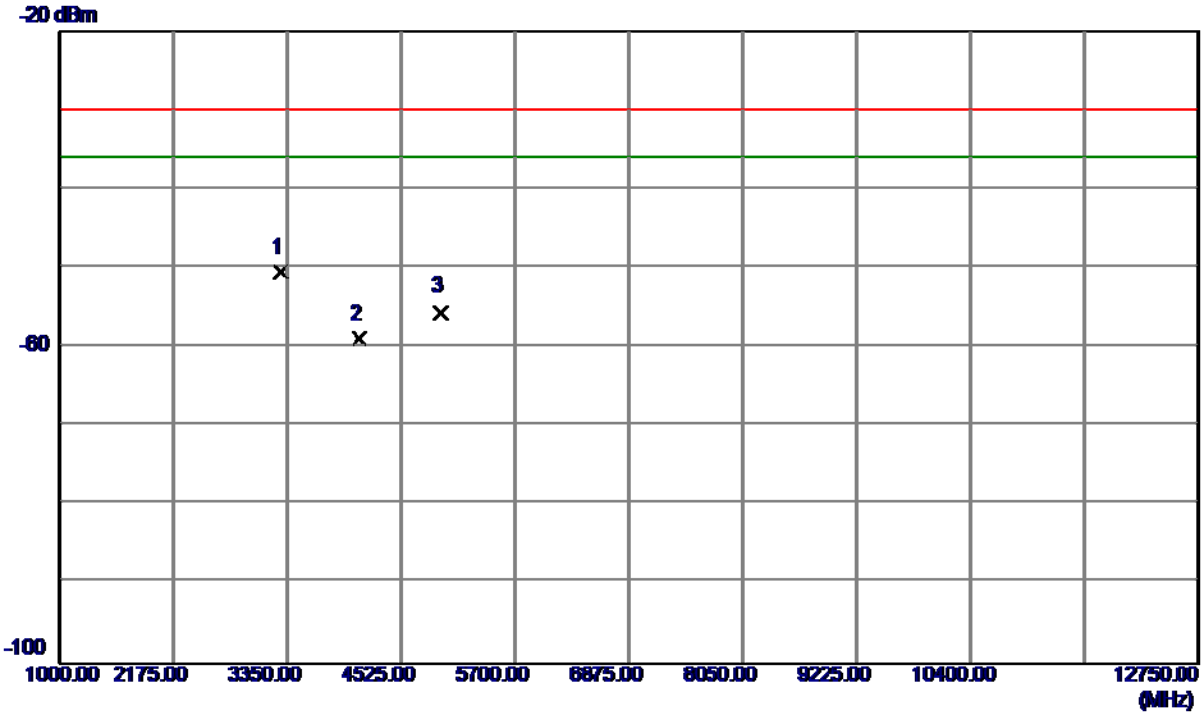
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3229.3670	-47.61	1.16	-46.45	-30.00	-16.45	RMS	
2	4844.2080	-63.80	7.95	-55.85	-30.00	-25.85	RMS	

Test Mode:	TX Mode 2462 MHz (11n 40M)

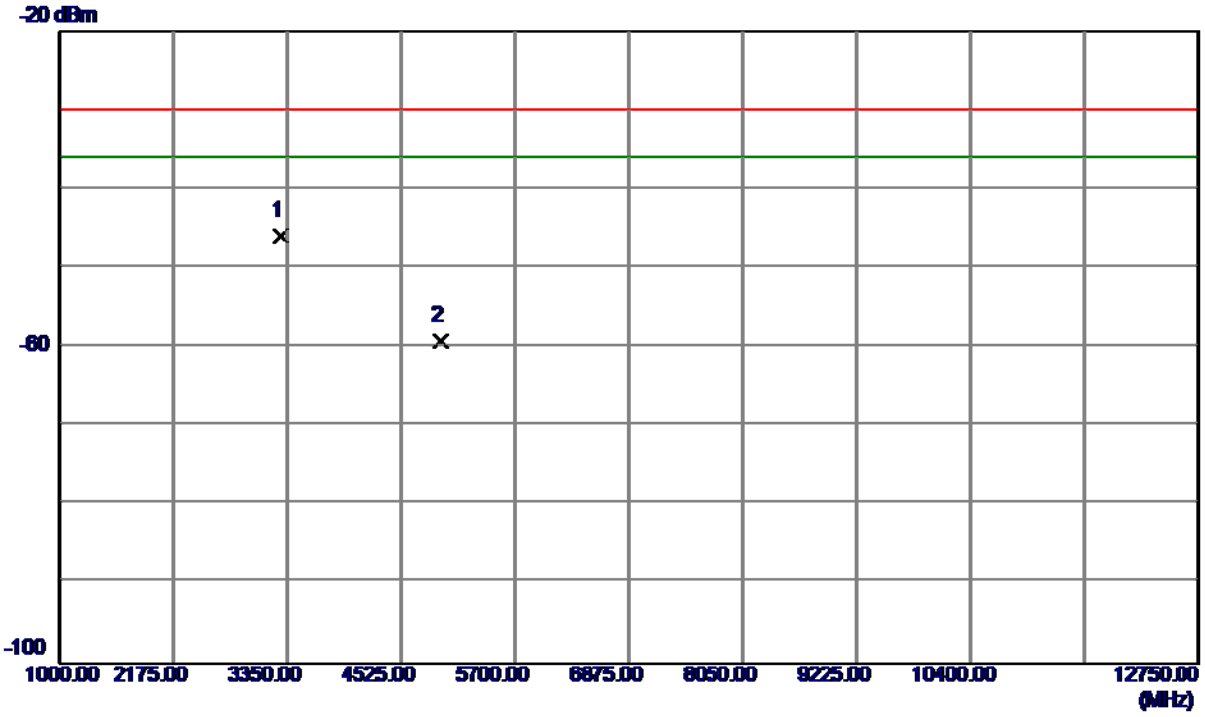
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3283.0250	-51.82	1.28	-50.54	-30.00	-20.54	RMS	
2	4088.2920	-65.59	6.63	-58.96	-30.00	-28.96	RMS	
3	4924.5000	-63.74	8.14	-55.60	-30.00	-25.60	RMS	

Test Mode:	TX Mode 2462 MHz (11n 40M)

Horizontal

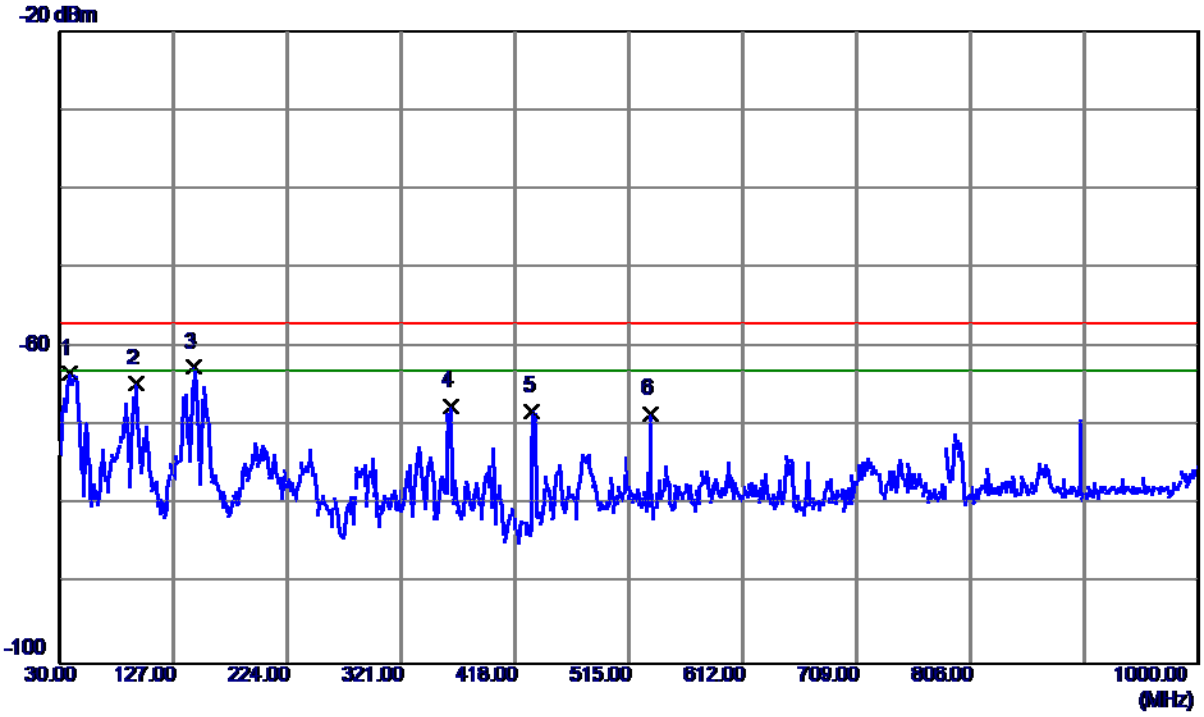


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3283.0250	-47.31	1.38	-45.93	-30.00	-15.93	RMS	
2	4924.1080	-67.33	8.17	-59.16	-30.00	-29.16	RMS	

APPENDIX I - RECEIVER SPURIOUS EMISSIONS

Test Mode:	RX Mode 2412 MHz (11b)

Vertical

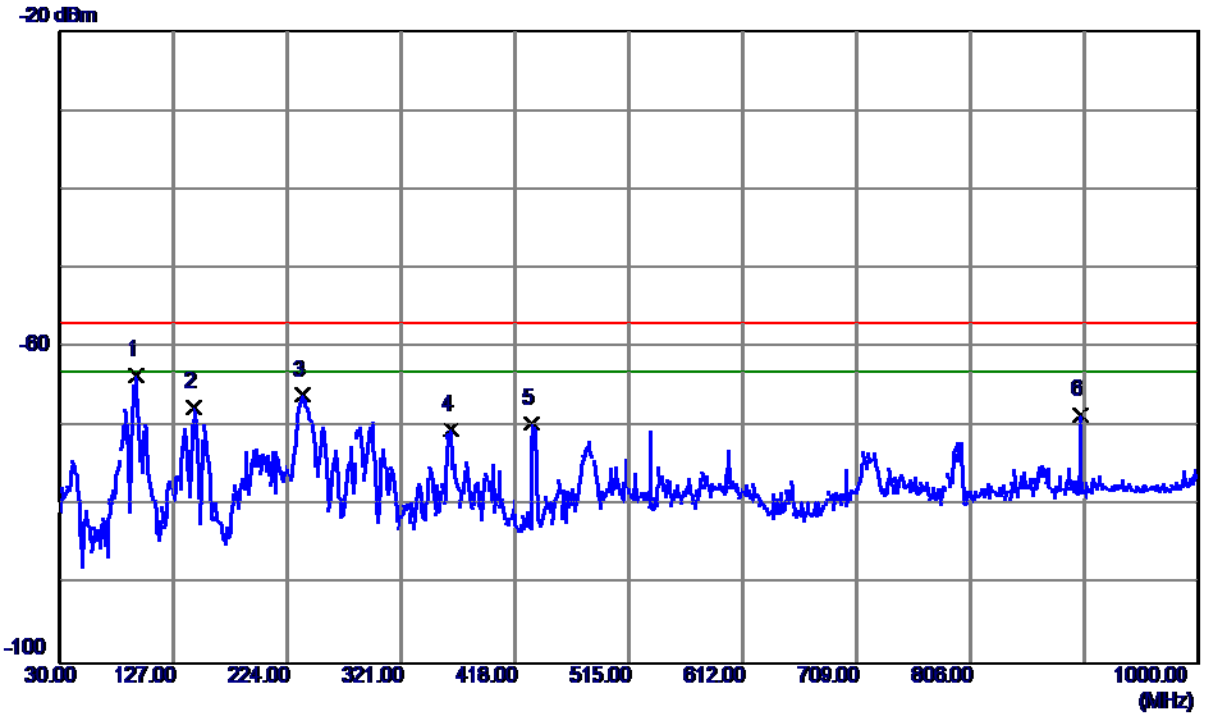


No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	38.3419	-58.98	-4.43	-63.41	-57.00	-6.41	RMS	
2	95.6690	-58.38	-6.23	-64.61	-57.00	-7.61	RMS	
3 *	144.6540	-61.99	-0.61	-62.60	-57.00	-5.60	RMS	
4	363.0010	-67.96	0.47	-67.49	-57.00	-10.49	RMS	
5	432.5500	-68.76	0.61	-68.15	-57.00	-11.15	RMS	
6	533.2360	-72.60	4.16	-68.44	-57.00	-11.44	RMS	

]

Test Mode:	RX Mode 2412 MHz (11b)

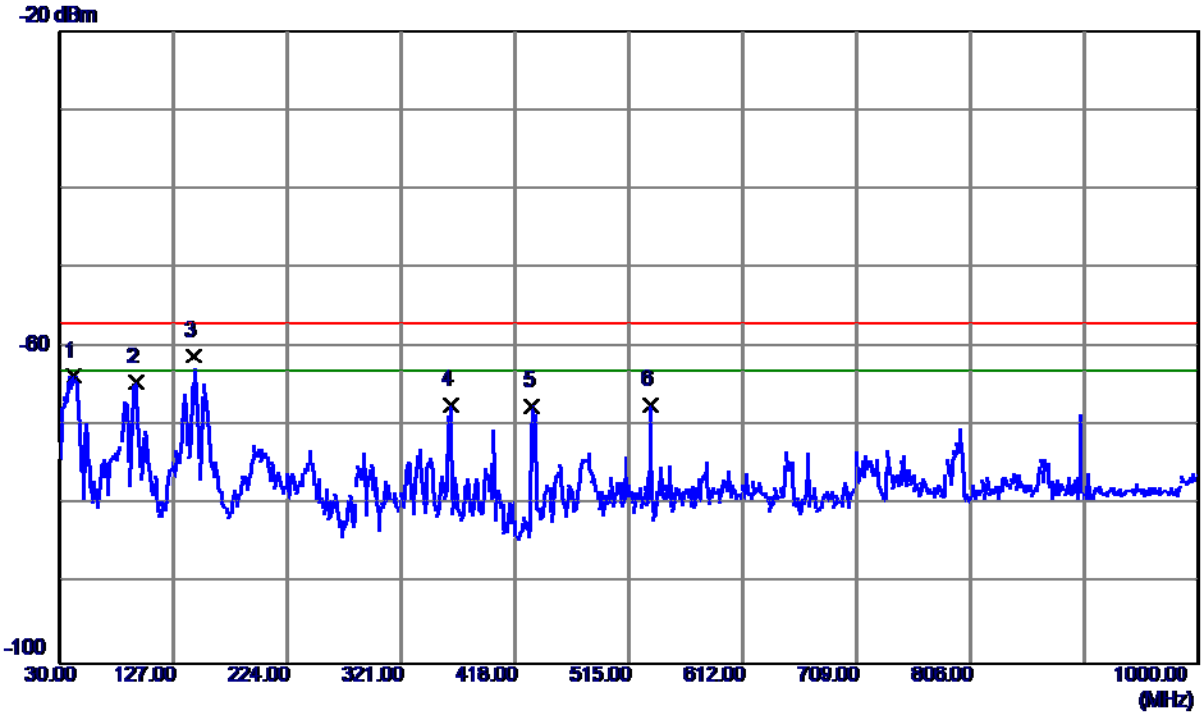
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	95.2810	-53.88	-9.71	-63.59	-57.00	-6.59	RMS	
2	144.6540	-66.88	-0.71	-67.59	-57.00	-10.59	RMS	
3	237.2890	-63.40	-2.60	-66.00	-57.00	-9.00	RMS	
4	363.0980	-71.08	0.69	-70.39	-57.00	-13.39	RMS	
5	432.1620	-70.34	0.68	-69.66	-57.00	-12.66	RMS	
6	899.9930	-78.26	9.84	-68.42	-57.00	-11.42	RMS	

Test Mode:	RX Mode 2472 MHz (11b)

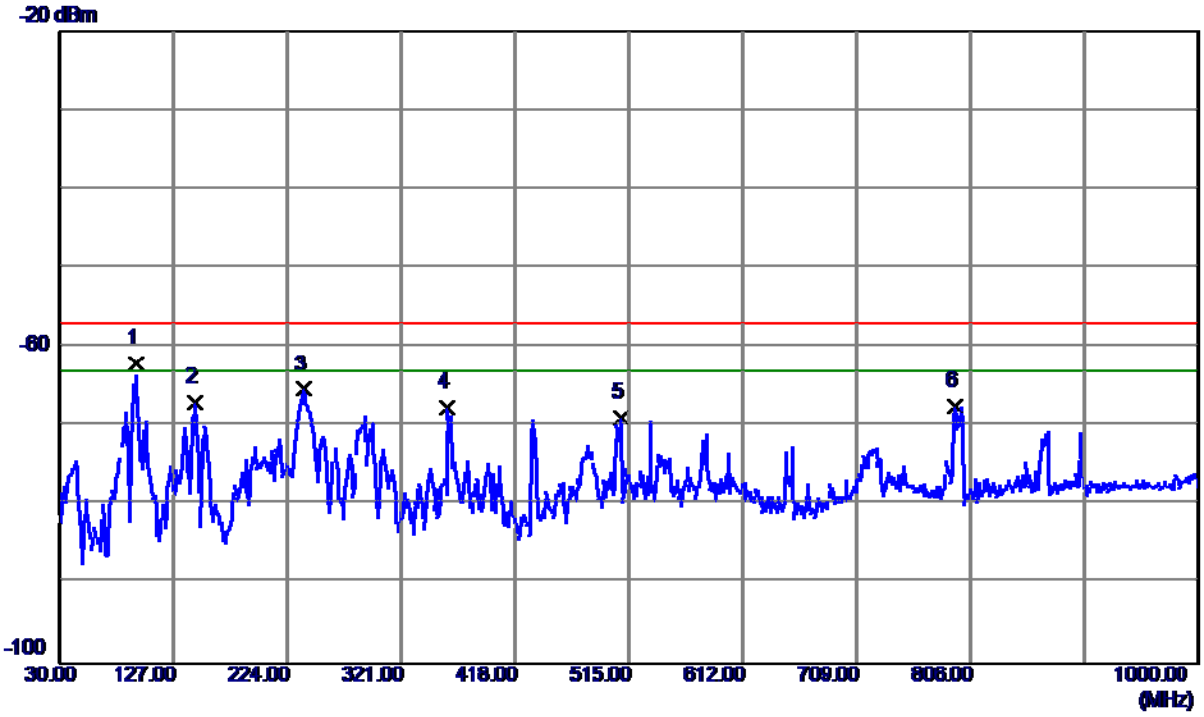
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	41.3490	-60.51	-3.22	-63.73	-57.00	-6.73	RMS	
2	95.2810	-58.11	-6.41	-64.52	-57.00	-7.52	RMS	
3 *	144.6760	-60.45	-0.61	-61.06	-57.00	-4.06	RMS	
4	363.0010	-67.83	0.47	-67.36	-57.00	-10.36	RMS	
5	432.5500	-68.15	0.61	-67.54	-57.00	-10.54	RMS	
6	533.2360	-71.50	4.16	-67.34	-57.00	-10.34	RMS	

Test Mode:	RX Mode 2472 MHz (11b)

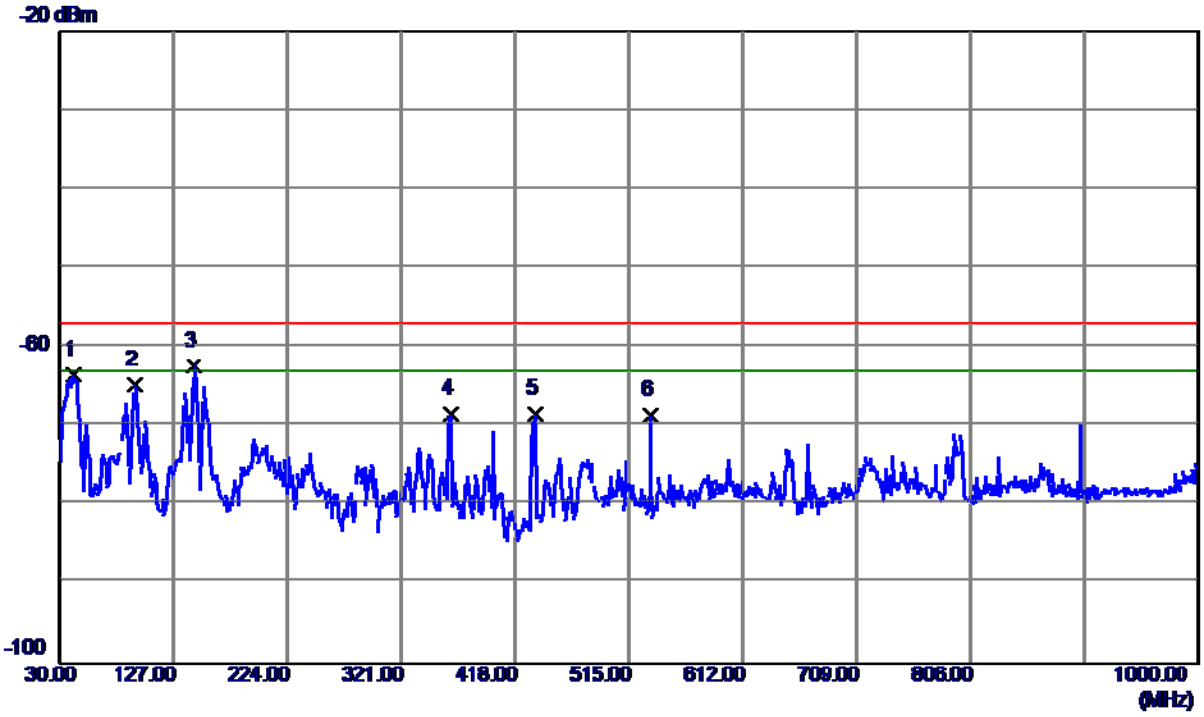
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	95.3140	-52.39	-9.70	-62.09	-57.00	-5.09	RMS	
2	145.4299	-66.35	-0.69	-67.04	-57.00	-10.04	RMS	
3	238.0650	-62.81	-2.55	-65.36	-57.00	-8.36	RMS	
4	360.1880	-68.22	0.59	-67.63	-57.00	-10.63	RMS	
5	508.4040	-73.10	4.16	-68.94	-57.00	-11.94	RMS	
6	793.0020	-75.80	8.28	-67.52	-57.00	-10.52	RMS	

Test Mode:	RX Mode 2422 MHz (11n 40M)

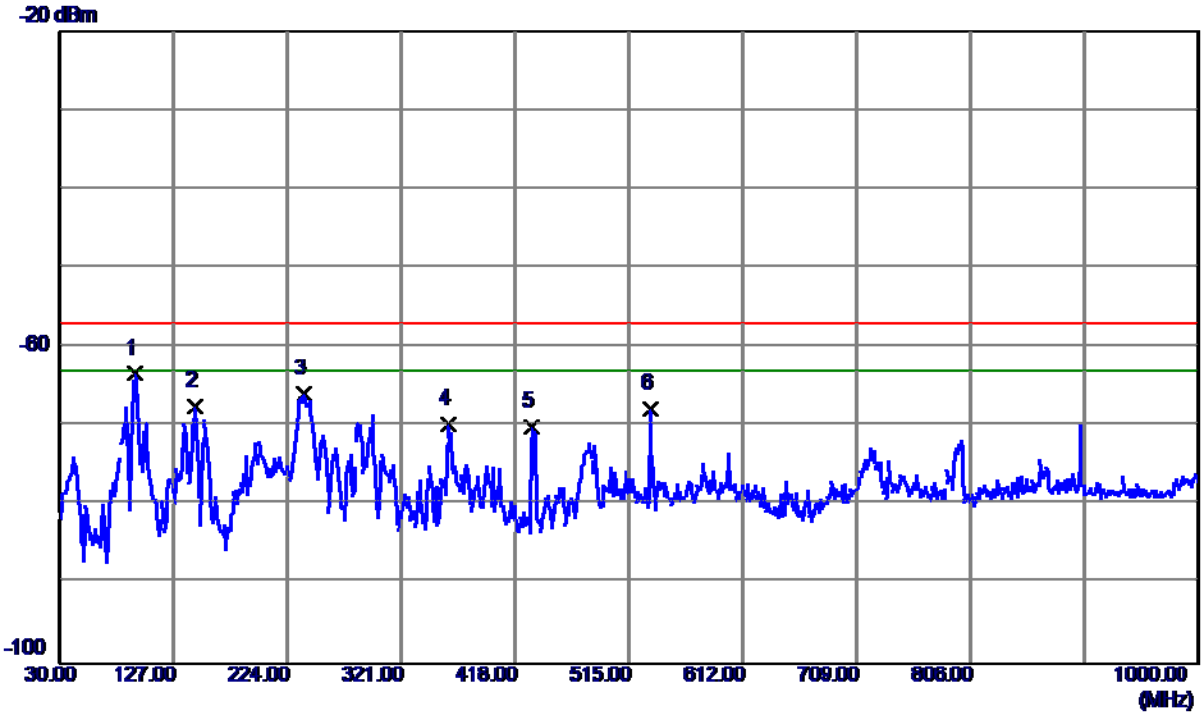
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	41.3490	-60.26	-3.22	-63.48	-57.00	-6.48	RMS	
2	94.8930	-58.20	-6.56	-64.76	-57.00	-7.76	RMS	
3 *	144.6540	-61.85	-0.61	-62.46	-57.00	-5.46	RMS	
4	362.7100	-68.96	0.46	-68.50	-57.00	-11.50	RMS	
5	435.7510	-69.46	1.02	-68.44	-57.00	-11.44	RMS	
6	533.3330	-72.73	4.16	-68.57	-57.00	-11.57	RMS	

Test Mode:	RX Mode 2422 MHz (11n 40M)

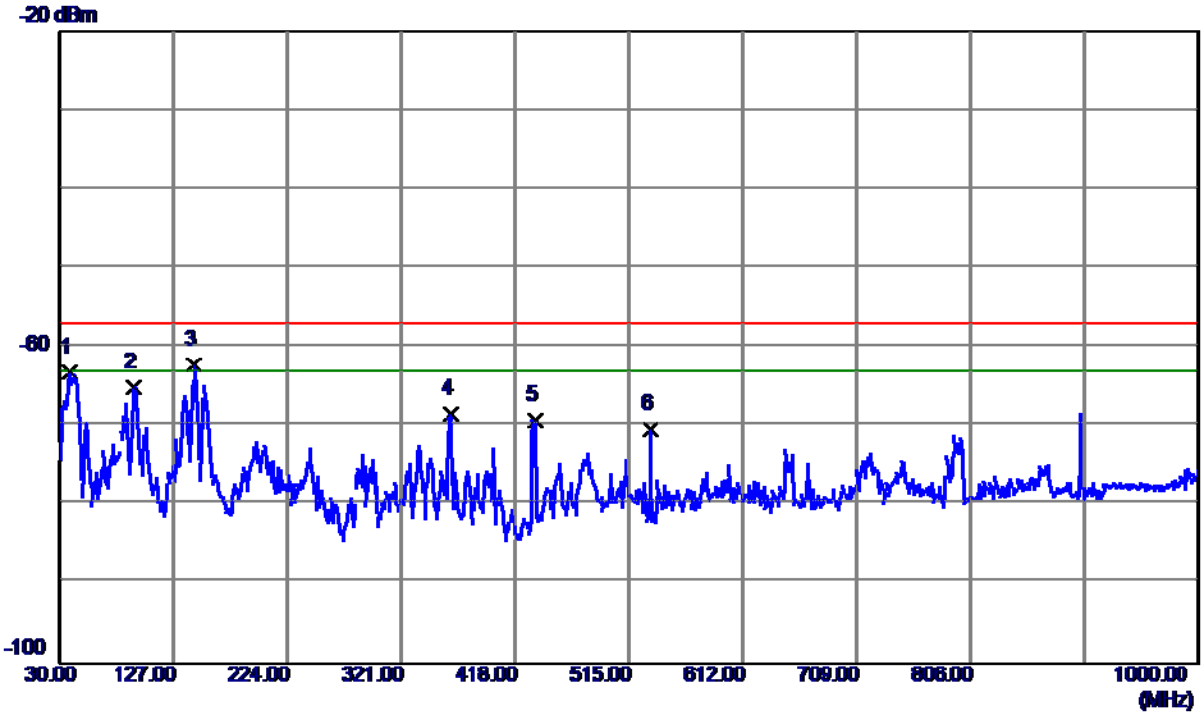
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	94.8930	-53.47	-9.82	-63.29	-57.00	-6.29	RMS	
2	145.4299	-66.83	-0.69	-67.52	-57.00	-10.52	RMS	
3	237.6770	-63.34	-2.57	-65.91	-57.00	-8.91	RMS	
4	360.4790	-70.32	0.60	-69.72	-57.00	-12.72	RMS	
5	432.1620	-70.74	0.68	-70.06	-57.00	-13.06	RMS	
6	533.2360	-72.26	4.35	-67.91	-57.00	-10.91	RMS	

Test Mode:	RX Mode 2462 MHz (11n 40M)

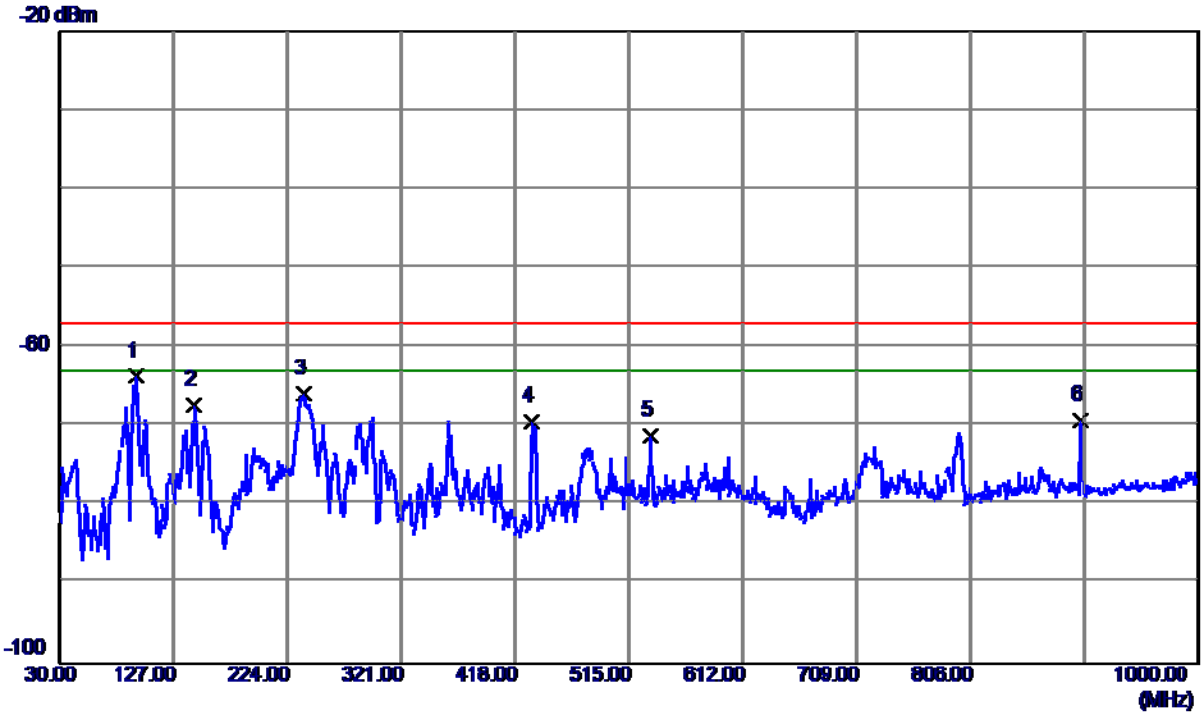
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	38.7300	-59.02	-4.14	-63.16	-57.00	-6.16	RMS	
2	94.1170	-58.47	-6.64	-65.11	-57.00	-8.11	RMS	
3 *	144.6540	-61.66	-0.61	-62.27	-57.00	-5.27	RMS	
4	363.0980	-68.89	0.47	-68.42	-57.00	-11.42	RMS	
5	435.6540	-70.33	1.01	-69.32	-57.00	-12.32	RMS	
6	533.3330	-74.60	4.16	-70.44	-57.00	-13.44	RMS	

Test Mode:	RX Mode 2462 MHz (11n 40M)

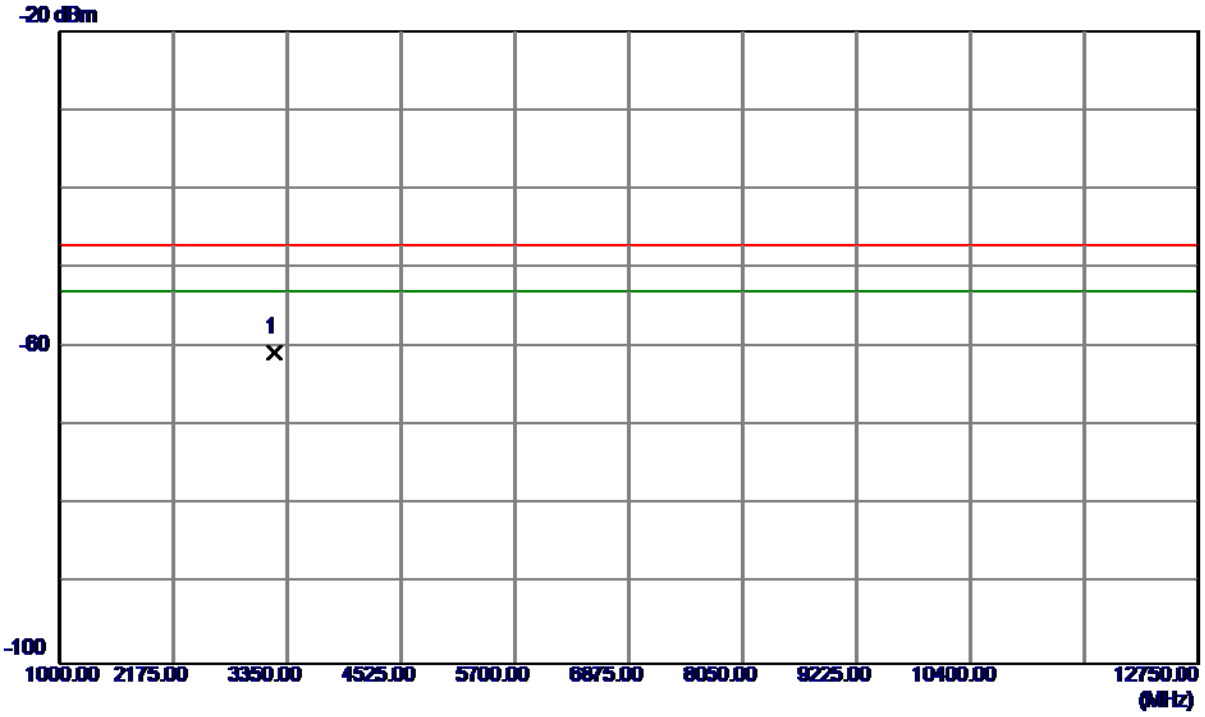
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	95.2810	-54.03	-9.71	-63.74	-57.00	-6.74	RMS	
2	144.6540	-66.61	-0.71	-67.32	-57.00	-10.32	RMS	
3	237.6770	-63.31	-2.57	-65.88	-57.00	-8.88	RMS	
4	432.1620	-70.05	0.68	-69.37	-57.00	-12.37	RMS	
5	533.3330	-75.50	4.35	-71.15	-57.00	-14.15	RMS	
6	899.9930	-79.17	9.84	-69.33	-57.00	-12.33	RMS	

Test Mode:	RX Mode 2412 MHz (11b)

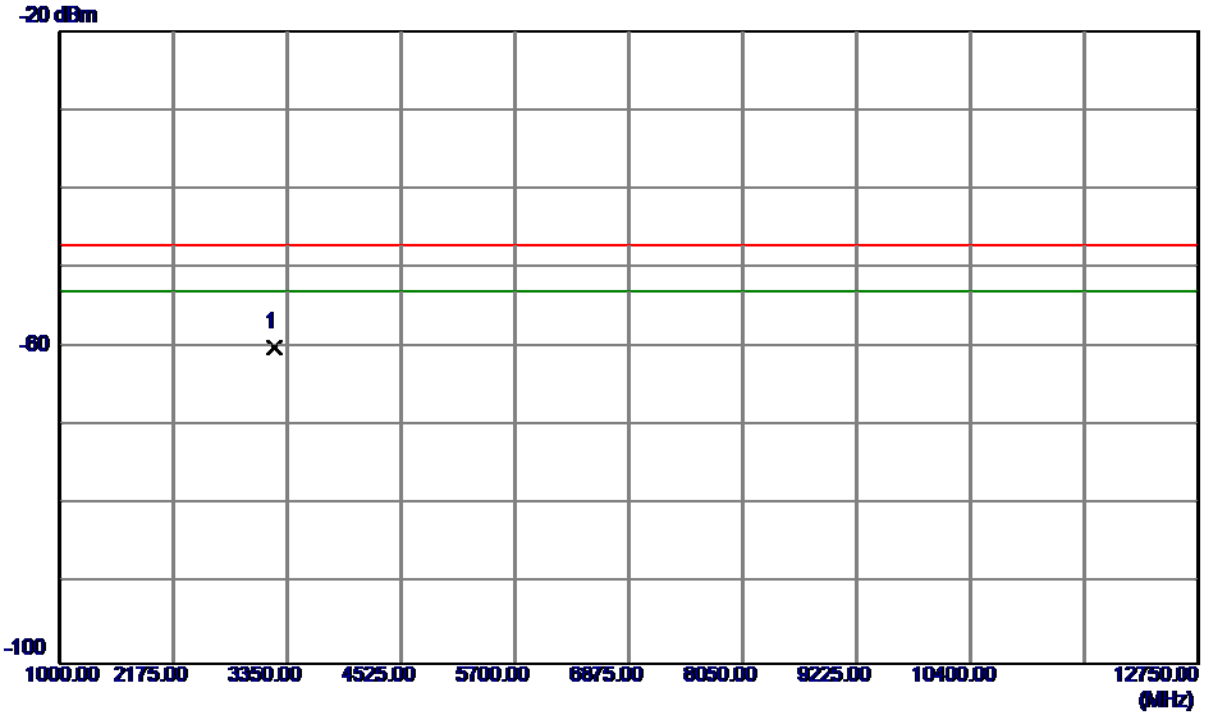
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3215.8890	-61.63	0.97	-60.66	-47.00	-13.66	RMS	

Test Mode:	RX Mode 2412 MHz (11b)

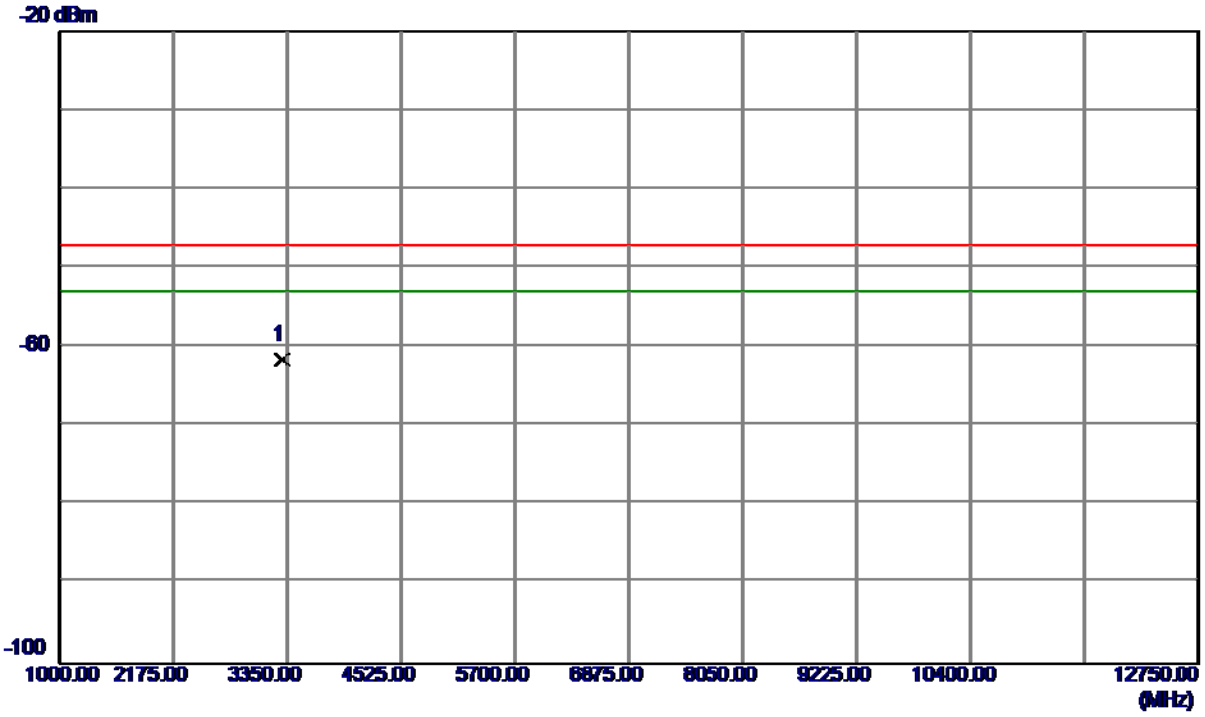
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3215.9700	-61.12	1.10	-60.02	-47.00	-13.02	RMS	

Test Mode:	RX Mode 2472 MHz (11b)

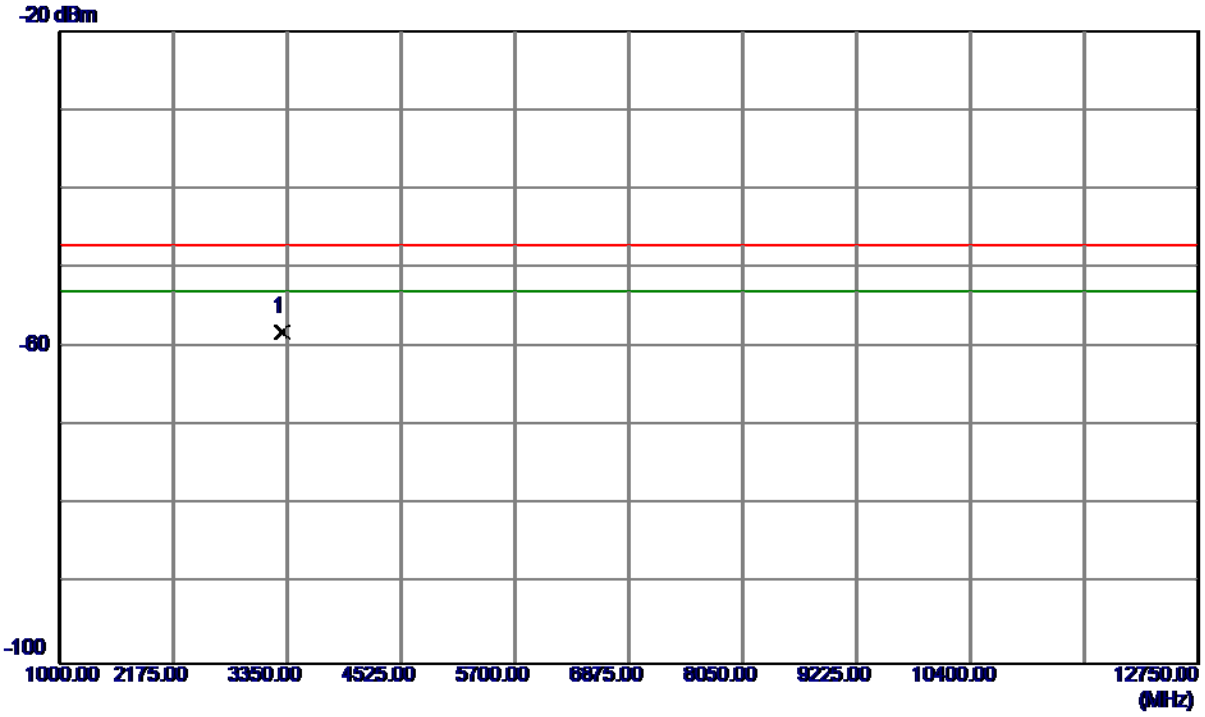
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3295.9550	-62.89	1.34	-61.55	-47.00	-14.55	RMS	

Test Mode:	RX Mode 2472 MHz (11b)

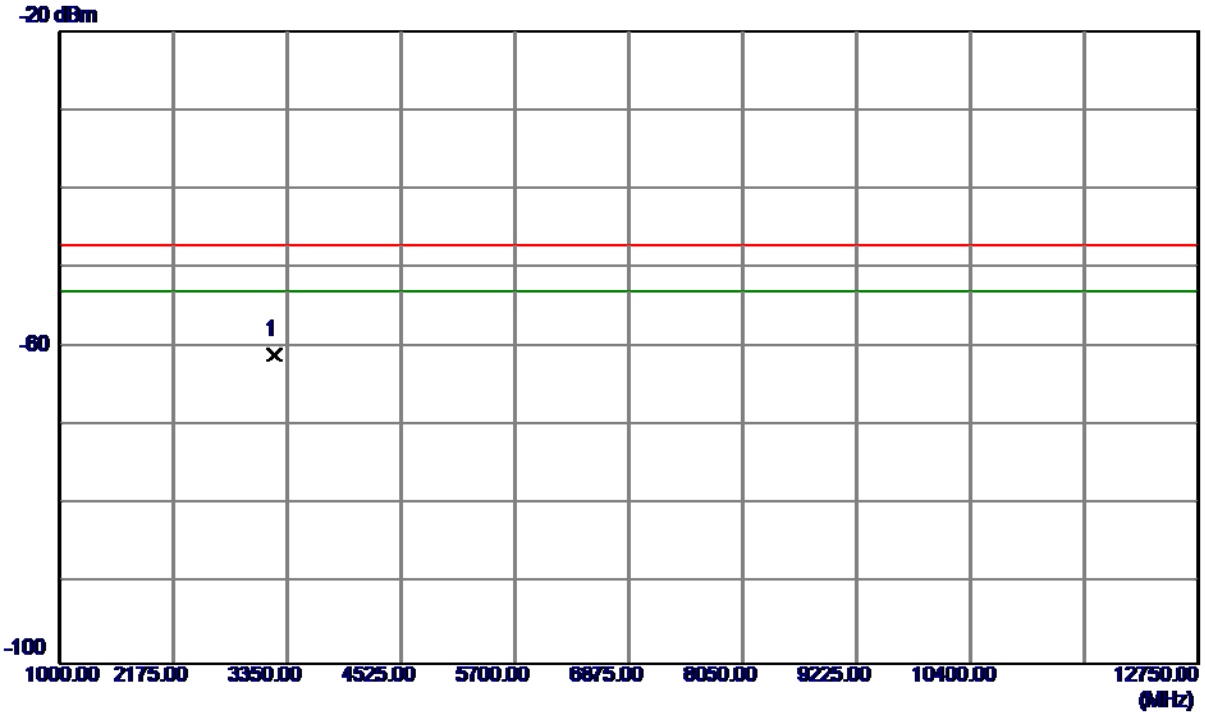
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3295.9670	-59.46	1.44	-58.02	-47.00	-11.02	RMS	

Test Mode:	RX Mode 2412 MHz (11g)

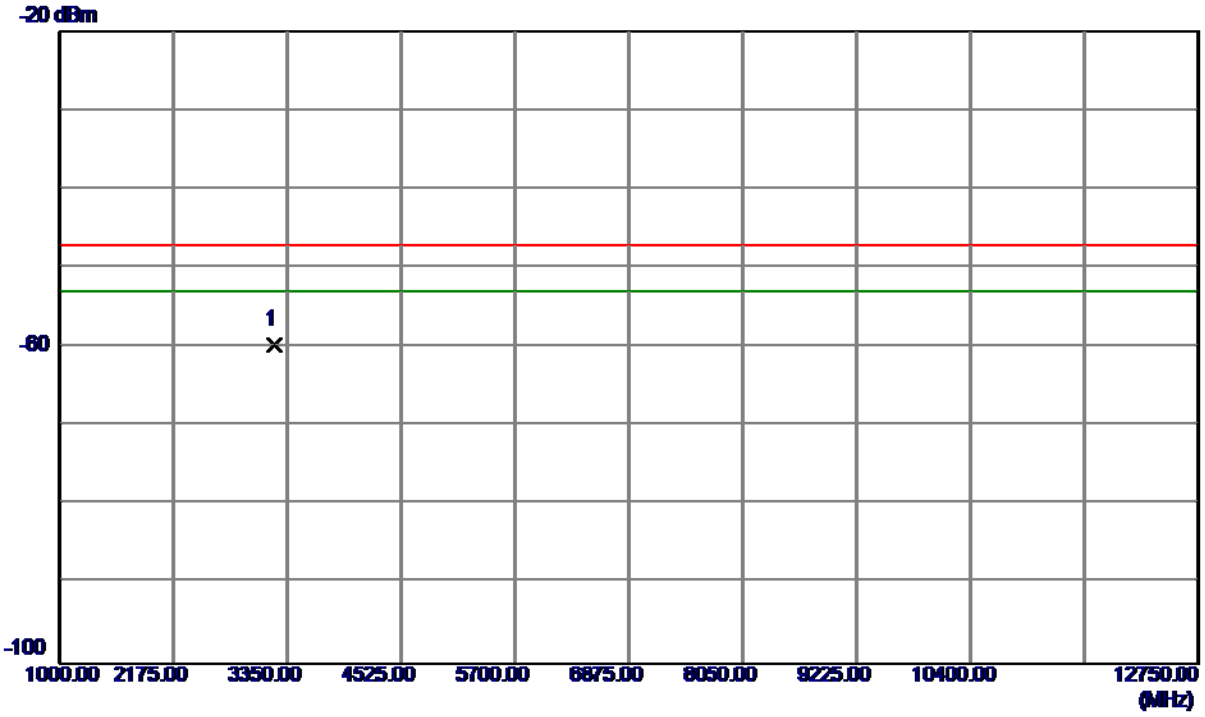
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3216.0060	-61.91	0.97	-60.94	-47.00	-13.94	RMS	

Test Mode:	RX Mode 2412 MHz (11g)

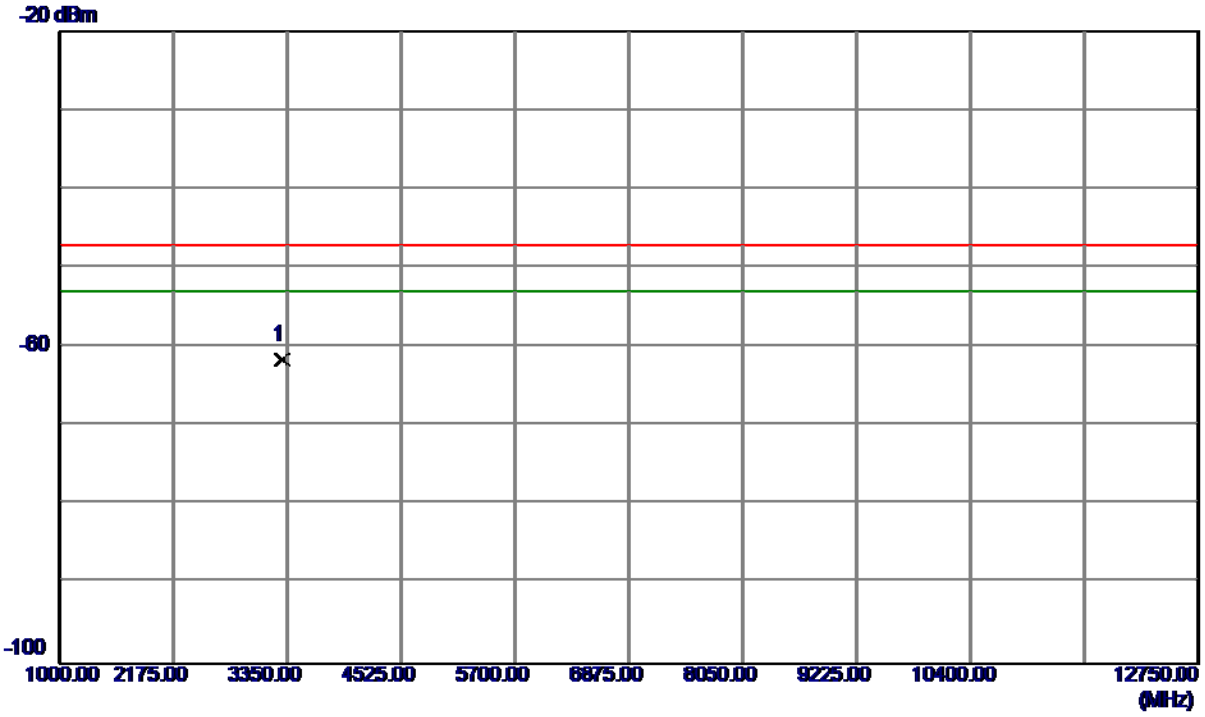
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3215.8180	-60.82	1.10	-59.72	-47.00	-12.72	RMS	

Test Mode:	RX Mode 2472 MHz (11g)

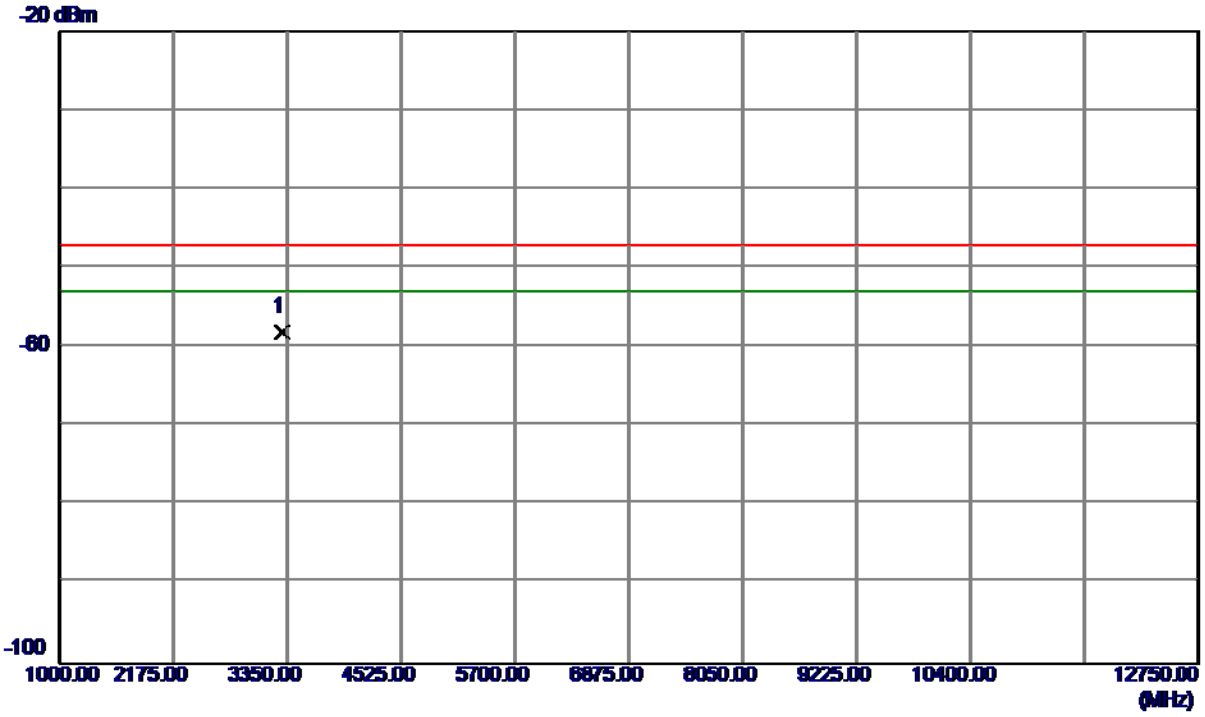
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3295.8810	-62.98	1.34	-61.64	-47.00	-14.64	RMS	

Test Mode:	RX Mode 2472 MHz (11g)

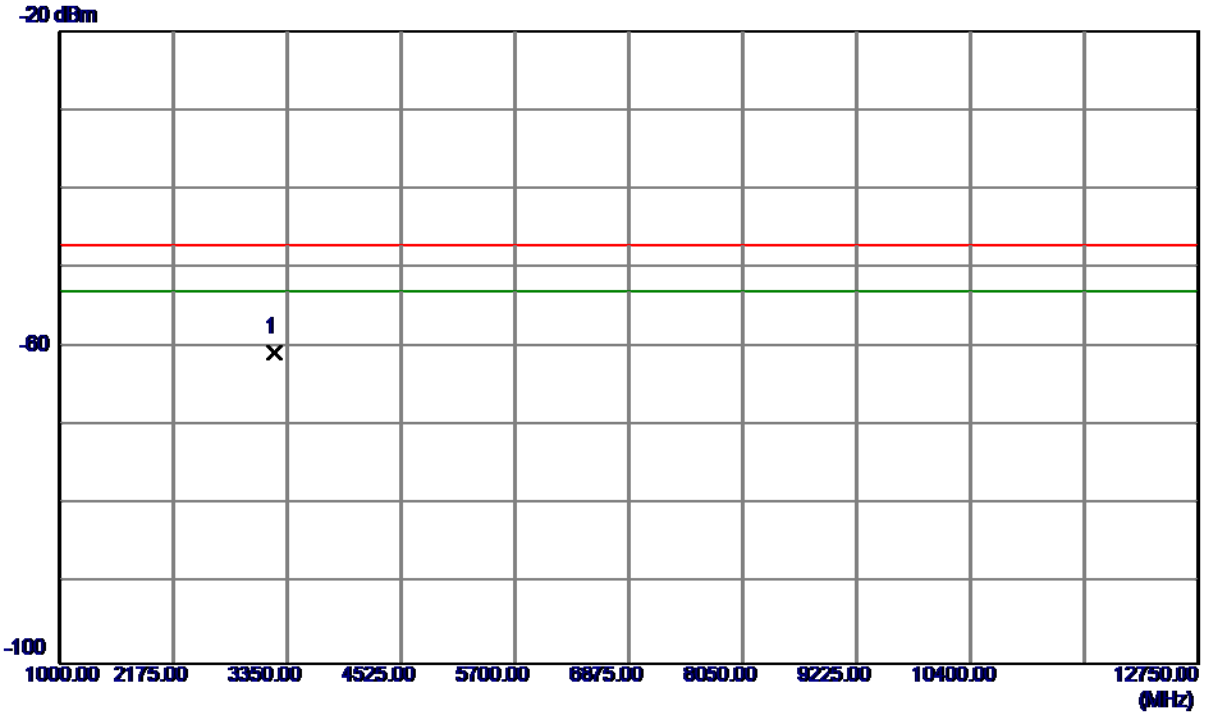
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3295.9830	-59.47	1.44	-58.03	-47.00	-11.03	RMS	

Test Mode:	RX Mode 2412 MHz (11n 20M)

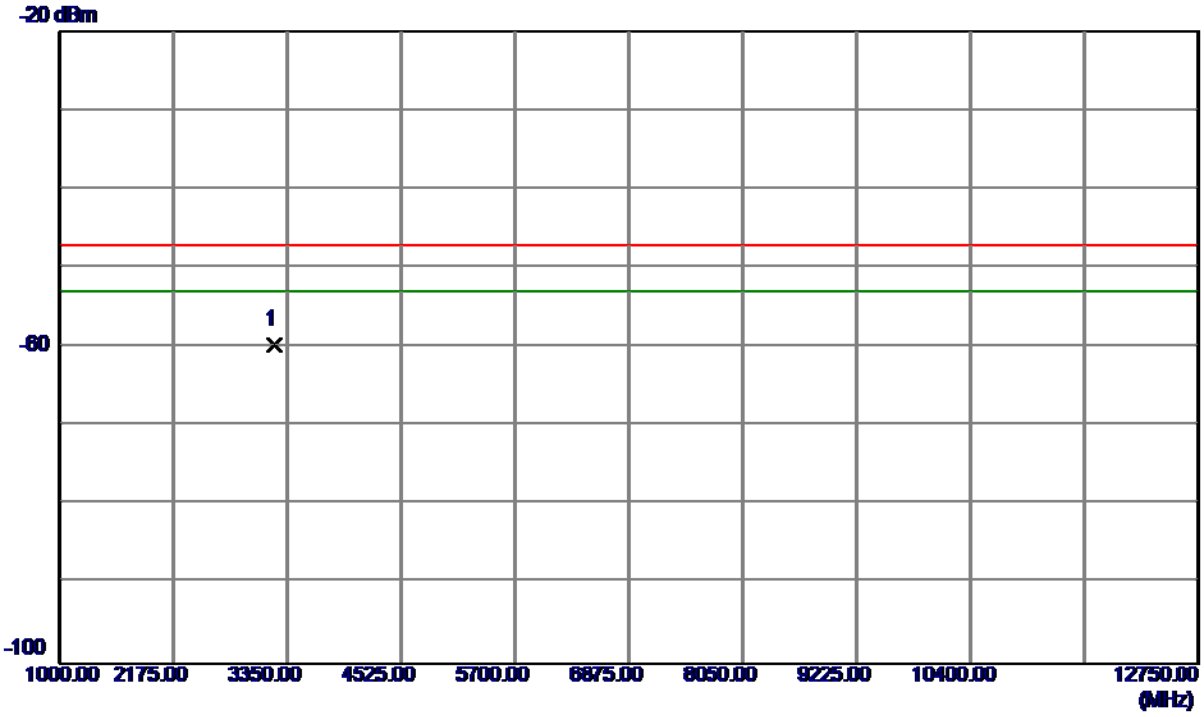
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3216.0049	-61.62	0.97	-60.65	-47.00	-13.65	RMS	

Test Mode:	RX Mode 2412 MHz (11n 20M)

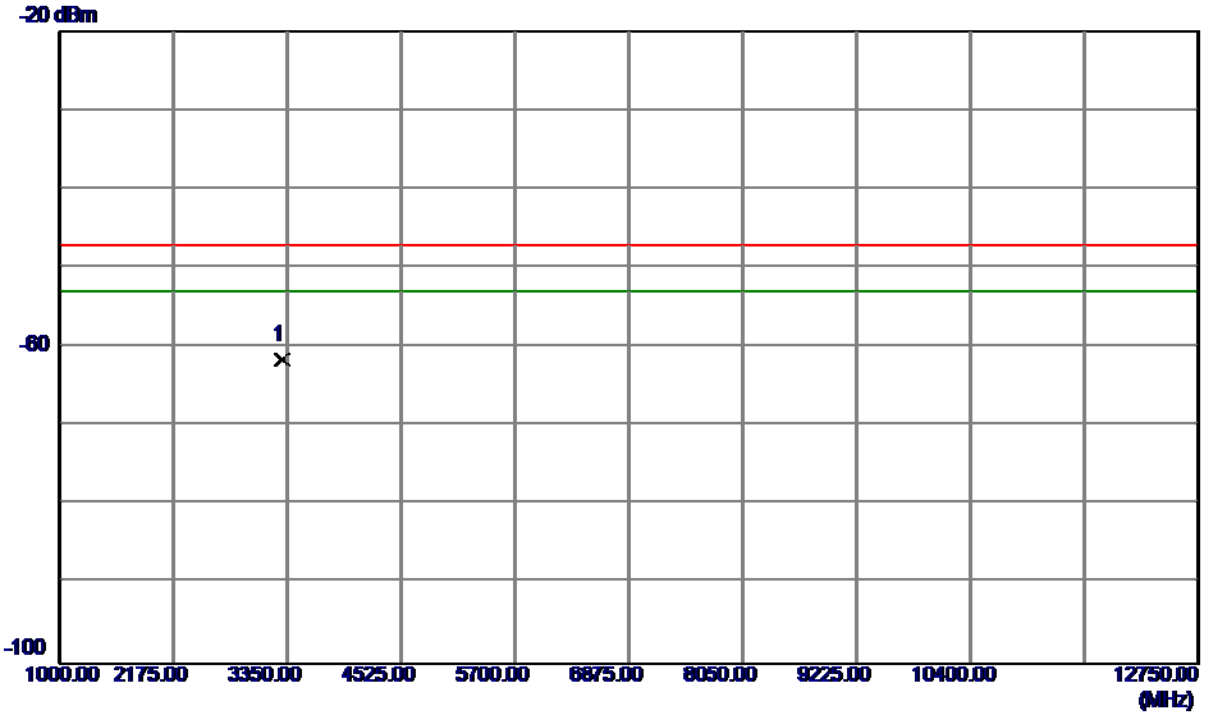
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3215.9830	-60.84	1.10	-59.74	-47.00	-12.74	RMS	

Test Mode:	RX Mode 2472 MHz (11n 20M)

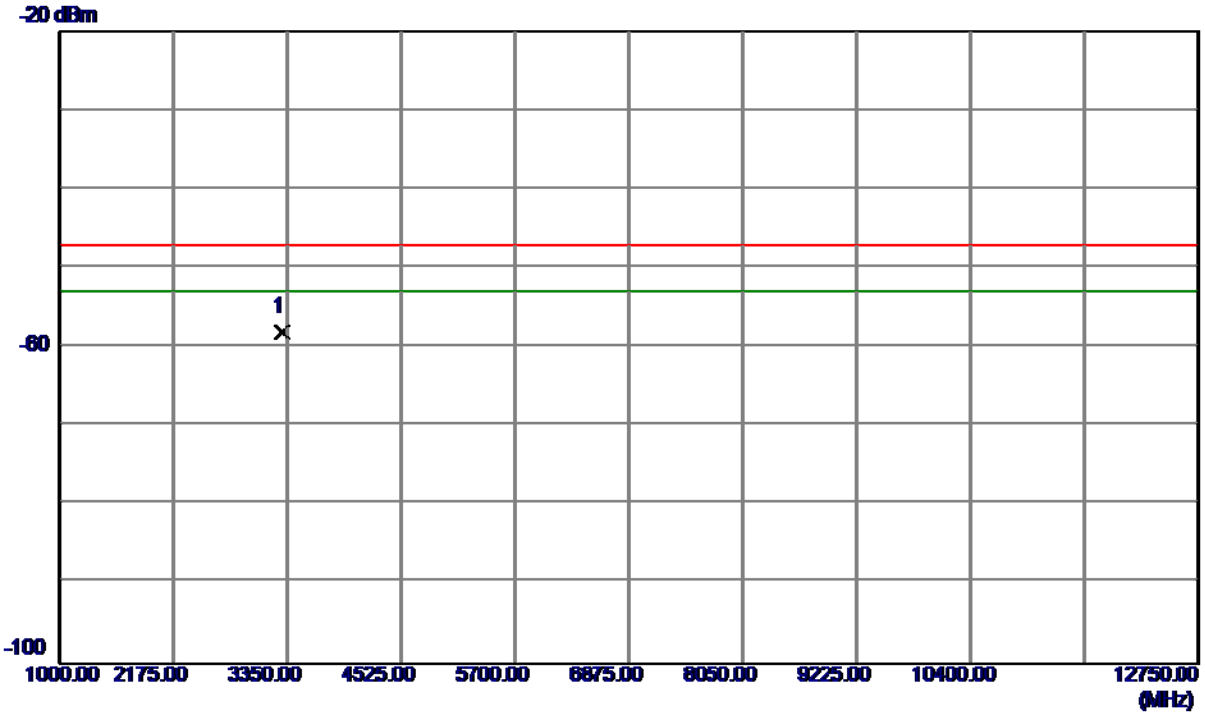
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3296.1020	-62.98	1.34	-61.64	-47.00	-14.64	RMS	

Test Mode:	RX Mode 2472 MHz (11n 20M)

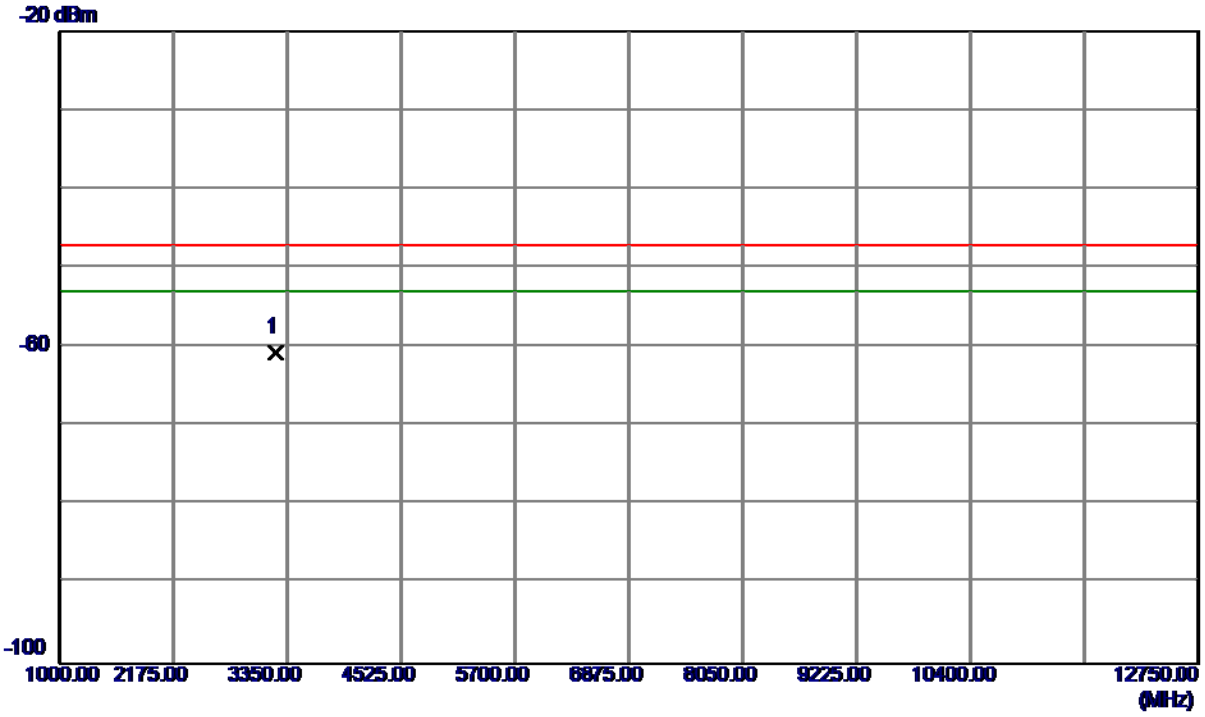
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3296.0040	-59.46	1.44	-58.02	-47.00	-11.02	RMS	

Test Mode:	RX Mode 2422 MHz (11n 40M)

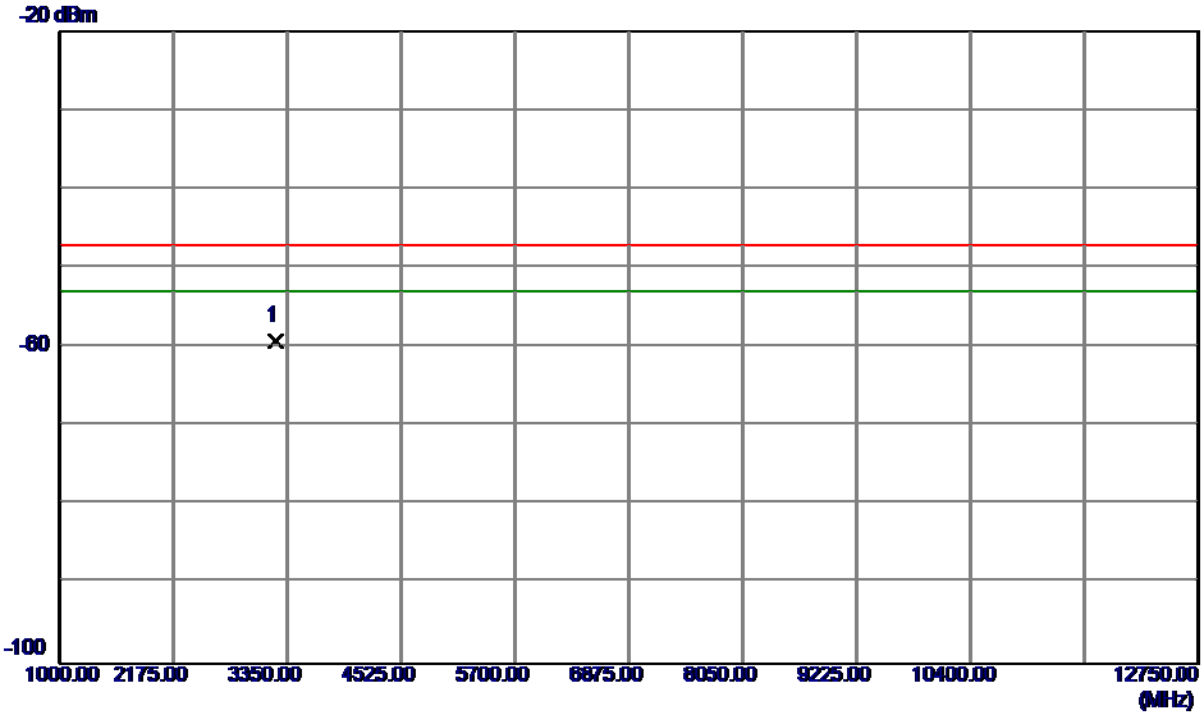
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3229.4000	-61.70	1.04	-60.66	-47.00	-13.66	RMS	

Test Mode:	RX Mode 2422 MHz (11n 40M)

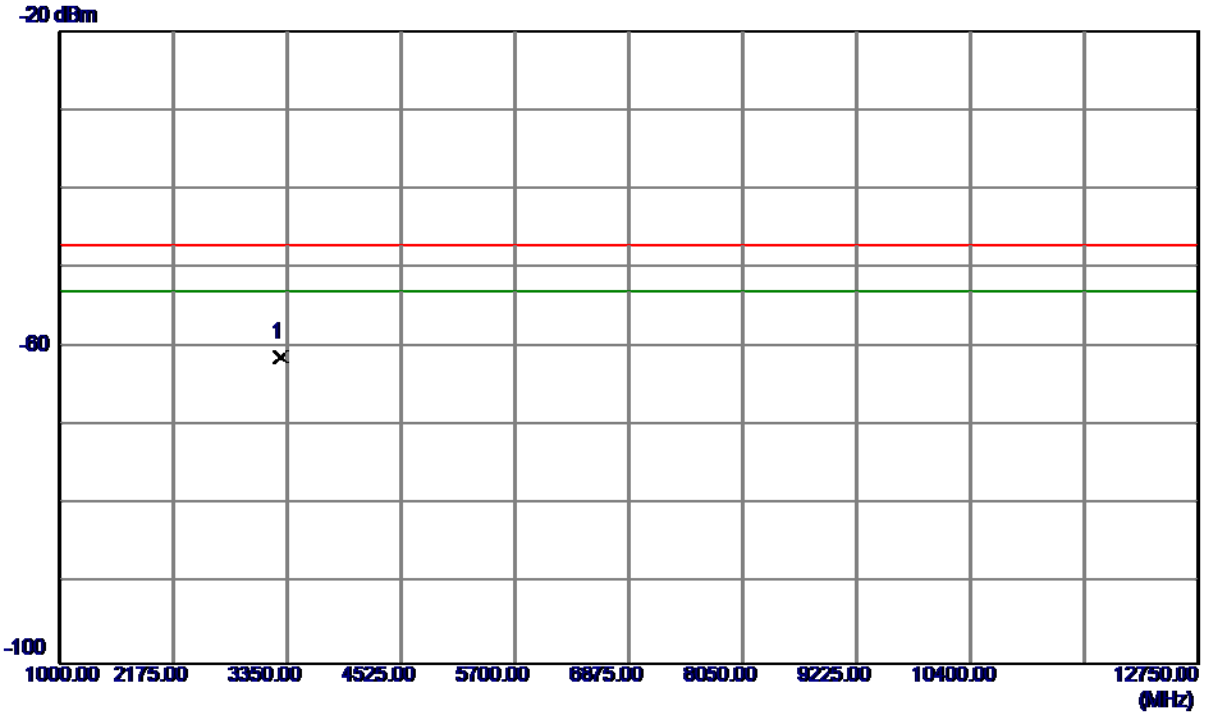
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3229.1820	-60.35	1.16	-59.19	-47.00	-12.19	RMS	

Test Mode:	RX Mode 2462 MHz (11n 40M)

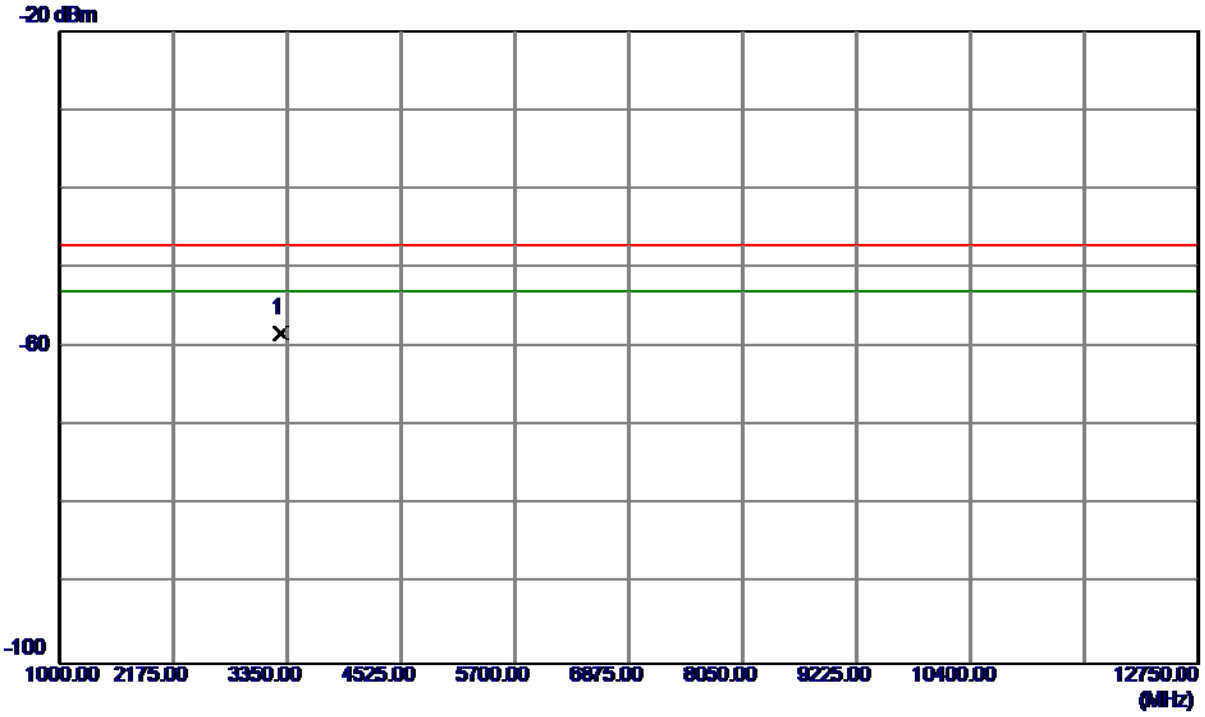
Vertical



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3282.4070	-62.56	1.28	-61.28	-47.00	-14.28	RMS	

Test Mode:	RX Mode 2462 MHz (11n 40M)

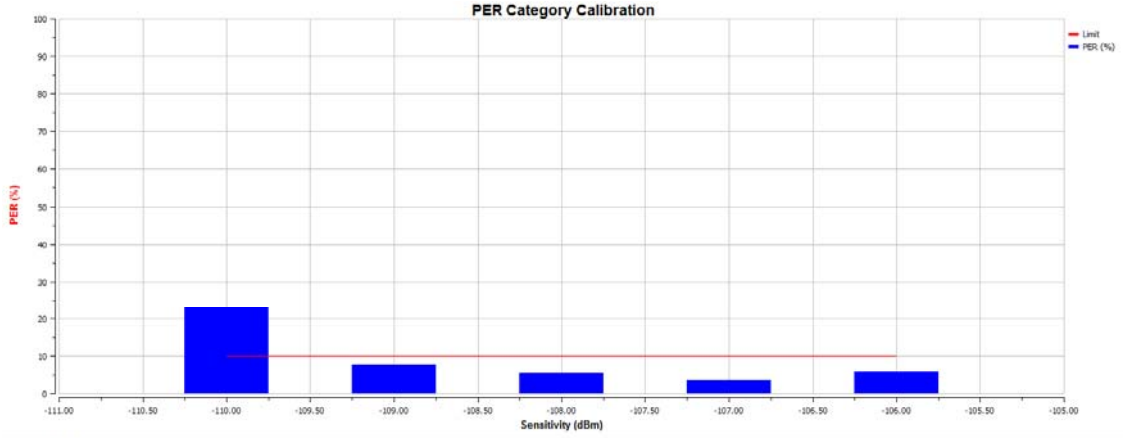
Horizontal



No.	Freq.	Reading Level	Correct Factor	Measure ment	Limit	Margin		
	MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1 *	3282.7549	-59.59	1.38	-58.21	-47.00	-11.21	RMS	

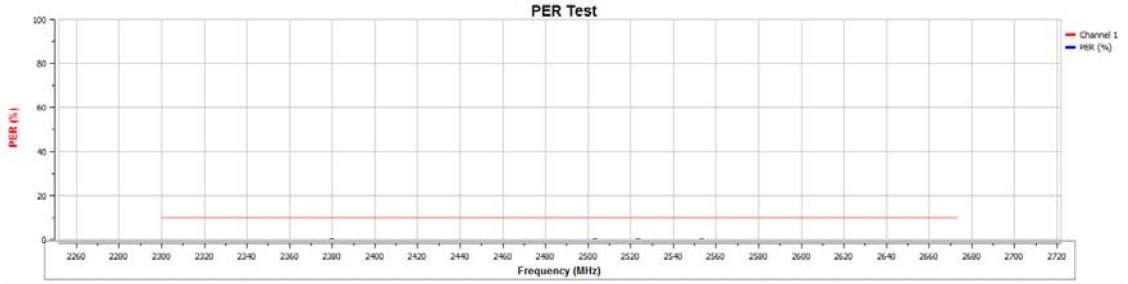
APPENDIX J - RECEIVER BLOCKING

802.11b Mode 2412 MHz



Receiver Blocking Test Data

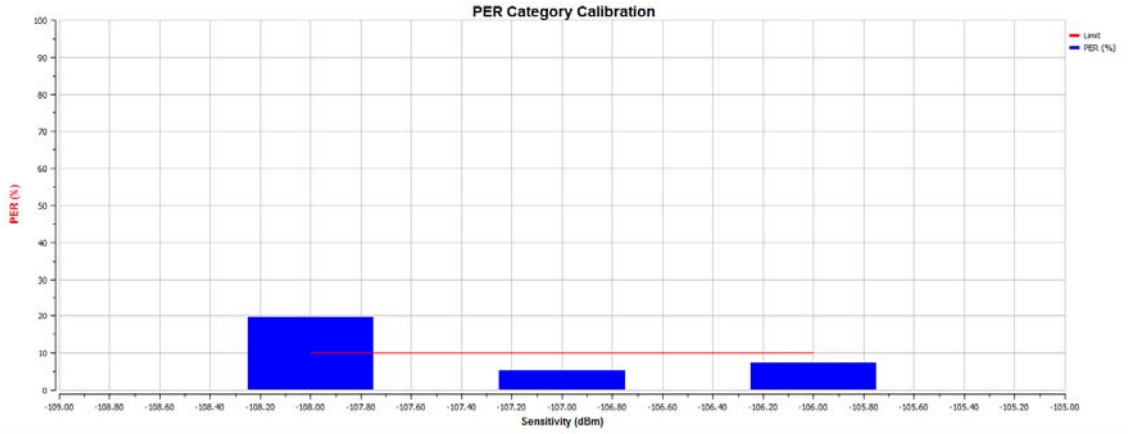
Sensitivity (dBm)	Attenuator (dB)	C Bin	U Bin	PER (%)
-106	106	518	488	5.791506
-107	107	519	501	3.468208
-108	108	522	494	5.363985
-109	109	510	471	7.647059
-110	110	520	401	22.88461



Receiver Category

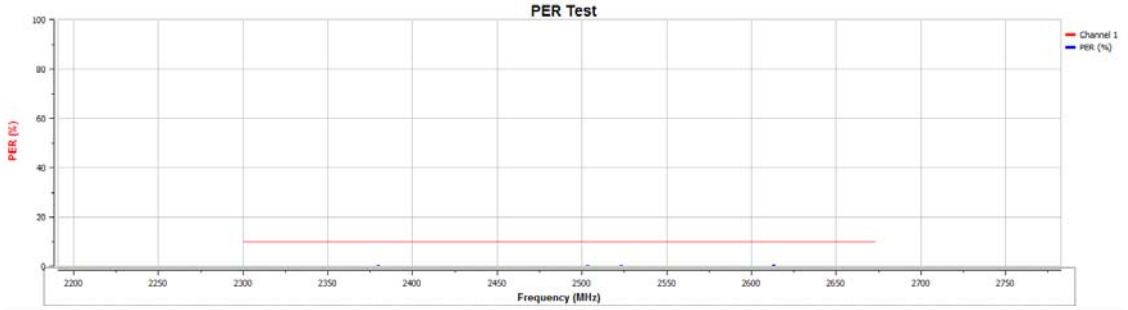
Blocking Signal Freq (MHz)	Blocking Level (dBm)	PER (%)	Limit (%)	Status
2300	-47	0	10	Pass
2380	-47	0	10	Pass
2360	-47	0	10	Pass
2380	-53	0.3853565	10	Pass
2503.5	-53	0.1972887	10	Pass
2523.5	-47	0.1976285	10	Pass
2553.5	-47	0.3809524	10	Pass
2583.5	-47	0	10	Pass
2613.5	-47	0	10	Pass
2643.5	-47	0	10	Pass
2673.5	-47	0	10	Pass

802.11b Mode 2472 MHz



Receiver Blocking Test Data

Sensitivity (dBm)	Attenuator (dB)	C Bin	U Bin	PER (%)
-106	106	519	481	7.321773
-107	107	501	475	5.189621
-108	108	501	402	19.76048



Receiver Category

Blocking Signal Freq (MHz)	Blocking Level (dBm)	PER (%)	Limit (%)	Status
2300	-47	0	10	Pass
2350	-47	0	10	Pass
2380	-47	0	10	Pass
2380	-53	0.1919386	10	Pass
2503.5	-53	0.3824092	10	Pass
2523.5	-47	0.3992016	10	Pass
2553.5	-47	0	10	Pass
2583.5	-47	0	10	Pass
2613.5	-47	0.7619048	10	Pass
2643.5	-47	0	10	Pass
2673.5	-47	0	10	Pass