

TEST REPORT

Applicant: Particle Industries, Inc.
EUT Description: M-SoM LTE-M/2G/Satellite + Wi-Fi for Global
Model: M635e
Brand: Particle
Standards: ETSI EN 301 893 V2.2.1
Date of Receipt: 2026/05/14
Date of Test: 2026/05/14 to 2026/06/11
Date of Issue: 2026/06/11

TOWE. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

the results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of the model are manufactured with identical electrical and mechanical components. All sample tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise. without written approval of TOWE, the test report shall not be reproduced except in full.



Jim Huang
Approved By:



Carey Chen
Reviewed By:

Revision History

Rev.	Issue Date	Description	Revised by
01	2026/06/11	Original	Carey Chen

Summary of Test Results

Test Item	Test Requirement	Test Method	Result
User Access Restrictions	Clause 4.2.10		Reference report RE2312WDG0148-3
Nominal Centre frequencies	Clause 4.2.1	Clause 5.4.2	Pass
Nominal Channel Bandwidth and Occupied Channel Bandwidth	Clause 4.2.2	Clause 5.4.3	Pass
RF output power, Transmit Power Control (TPC) and Power Density	Clause 4.2.3	Clause 5.4.4	Pass
Transmitter unwanted emissions outside the transmitter's operating bands	Clause 4.2.4.1	Clause 5.4.5	Pass
Transmitter unwanted emissions within the transmitter's operating bands	Clause 4.2.4.2	Clause 5.4.6	Pass
Adaptivity (Channel Access Mechanism)	Clause 4.2.7	Clause 5.4.9.3	Pass
Receiver Blocking	Clause 4.2.8	Clause 5.4.10	Pass
Adjacent channel selectivity	Clause 4.2.9	Clause 5.4.11	Pass
Receiver spurious emissions	Clause 4.2.5	Clause 5.4.7	Reference report RE2312WDG0148-3
Dynamic Frequency Selection (DFS)			
Channel Shutdown	Clause 4.2.6.2.5	Clause 5.4.8.2.1.6	Pass

Remark:

Review this report and original report, this report also updates the following standard:

Original report standard:	The newest report standard:
ETSI EN 301 893 V2.1.1	ETSI EN 301 893 V2.2.1

In this report tested the testing items for the upgrade of differences between the old and new versions, also the worst data of Transmitter unwanted emissions outside the transmitter's operating bands were spot checked and DFS was retested, and other items data please refer to the previous report with report number RE2312WDG0148-3 issued by Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch.

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1 General Description

1.1 Lab Information

1.1.1 Testing Location

These measurements tests were conducted at the Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. facility located at F401 and F101, Building E, Hongwei Industrial Zone, Liuxian 3rd Road, Bao'an District, Shenzhen, China.

Tel.: +86-755-27212361

Contact Email: info@towewireless.com

1.1.2 Test Facility / Accreditations

A2LA (Certificate Number: 7088.01)

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

FCC Designation No.: CN1353

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized as an accredited testing laboratory.

Test Firm Registration Number: 684095

Designation Number: CN1353.

ISED CAB identifier: CN0152

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0152

Company Number: 31000

1.2 Client Information

1.2.1 Applicant

Applicant:	Particle Industries, Inc.
Address:	548 Market St, PMB 34833, San Francisco, CA 94104, USA

1.2.2 Manufacturer

Manufacturer:	Particle Industries, Inc.
Address:	548 Market St, PMB 34833, San Francisco, CA 94104, USA

1.3 Product Information

EUT Description:	M-SoM LTE-M/2G/Satellite + Wi-Fi for Global			
Model:	M635e			
Brand:	Particle			
Hardware Version:	v0.2			
Software Version:	v6.4.1			
IMEI:	RF Conducted	862063070037473		
	RSE	862063070036368		
Modulation Type:	802.11a/n:	OFDM-BPSK, QPSK, 16QAM, 64QAM		
	802.11ac:	OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM		
Smart System:	☒ SISO	802.11a/n/ac		
EUT Function	☒ Client	☐ Outdoor AP	☐ Indoor AP	☐ Fixed P2P AP
TPC Function:	☒ With TPC		☐ Without TPC	
DFS Function:	☐ Master ☐ Slave with radar detection ☒ Slave without radar detection			
Frequency Range:	5150MHz to 5250MHz 5250MHz to 5350MHz 5470MHz to 5725MHz			
Channel Frequency:	20M Bandwidth Channel:	5180 ~ 5320MHz	8 Channels	
		5180 ~ 5240MHz	4 Channels	
		5500 ~ 5700MHz	11 Channels	
	40M Bandwidth Channel:	5190 ~ 5310MHz	4 Channels	
		5190 ~ 5230MHz	2 Channels	
		5510 ~ 5670MHz	5 Channels	
Antenna Type:	PCB Antenna			
Antenna Gain:	Frequency Range	Ant2 (dBi)		
	5150MHz to 5250MHz	6.8		
	5250MHz to 5350MHz	6.8		
	5470MHz to 5725MHz	6.8		
Remark: The above EUT's information was declared by applicant, please refer to the specifications or user's manual for more detailed description.				

2 Test Configuration

2.1 Standards Specification

Reference Standards	Standards Title
ETSI EN 301 893 V2.2.1	5 GHz WAS/RLAN; Harmonised Standard for access to radio spectrum

2.2 Test Channel

Unless otherwise stated in the test procedures for essential radio test suites, the channels (and nominal channel bandwidths) on which the essential radio test suites contained in the present document shall be performed are given in table 10. The channel identifiers have the format $C_{sb}f$ in which context C denotes 'channel', sb denotes the sub-band that the test channel is applicable to (where 'gen' denotes that the test channel is not sub-band dependent), and f is an index.

When testing devices that support simultaneous transmissions in adjacent or non-adjacent channels, DFS testing does not need to be performed simultaneously in these different channels.

Table 10: Test channels for sub-band 1, sub-band 2 and sub-band 3

Test	Clause	Test Channels		
		Sub-band 1	Sub-band 2	Sub-band 3
Nominal centre frequency (see note 1)	5.4.2	C ₁₁	C ₂₁	C ₃₁
Occupied bandwidth	5.4.3	C ₁₁	C ₂₁	C ₃₁
RF output power, Power Spectral Density(PSD)	5.4.4	C ₁₂ , C ₁₃	C ₂₂ , C ₂₃	C ₃₂ , C ₃₃
Transmit Power Control (TPC) (see note 1)	5.4.4	n, a	C ₂₂ , C ₂₃	C ₃₂ , C ₃₃
Transmitter unwanted emissions outside the transmitter's operating bands (see note 1)	5.4.5	C ₁₁	C ₂₁	C ₃₁
Transmitter unwanted emissions within the transmitter's operating bands (for single-channel operation)	5.4.6	C ₁₂ , C ₁₃	C ₂₂ , C ₂₃	C ₃₂ , C ₃₃
Transmitter unwanted emissions within the transmitter's operating bands (for multichannel operation in adjacent channels) (see note 3 for multi-channel operation in nonadjacent channels)	5.4.6	C _{gen1} , C _{gen2} (see note 4 for channels in the group of adjacent channels not used for transmission)		
Receiver spurious emissions (see note 1)	5.4.7	C ₁₁	C ₂₁	C ₃₁
Dynamic Frequency Selection (DFS)	5.4.8	n, a	C ₂₄	C ₃₄ (see note 2)
Adaptivity (channel access mechanism)	5.4.9	C _{gen3}		
Receiver blocking	5.4.10	C ₁₁	C ₂₁	C ₃₁
Adjacent channel selectivity	5.4.11	C ₁₁	C ₂₁	C ₃₁
Test channel definitions:				
C ₁₁ , C ₂₁ , C ₃₁ :	One channel from the channel plan for the sub-band. For occupied bandwidth, testing shall be repeated for every nominal channel bandwidth within the sub-band. For receiver blocking and adjacent channel selectivity, it is sufficient to only perform this test using the lowest nominal channel bandwidth.			
C ₁₂ , C ₂₂ , C ₃₂ :	The lowest channel for every channel plan within this sub-band. For PSD testing, it is			

	sufficient to only perform this test using the lowest nominal channel bandwidth. For unwanted emissions testing, it is sufficient to only perform this test using a nominal channel bandwidth of 20 MHz.
C ₁₃ , C ₂₃ , C ₃₃ :	The highest channel for every channel plan within this sub-band. For PSD testing, it is sufficient to only perform this test using the lowest nominal channel bandwidth. For unwanted emissions testing, it is sufficient to only perform this test using a nominal channel bandwidth of 20 MHz.
C ₁₄ , C ₂₄ , C ₃₄ :	One channel from the channel plan for this sub-band. If more than one nominal channel bandwidth is specified for this sub-band, testing shall be performed using the lowest and highest nominal channel bandwidth.
C _{gen1} :	The lowest channel in the group of adjacent channels for all supported total bandwidths (N).
C _{gen2} :	The highest channel in the group of adjacent channels for all supported total bandwidths (N).
C _{gen3} :	One channel (in case of single-channel testing) or a group of adjacent channels (in case of multi-channel testing) from the channel plan.
NOTE 1:	In case of more than one channel plan, testing of these specific requirements needs only to be performed using one of the channel plans.
NOTE 2:	Where the channel plan includes channels whose nominal channel bandwidth falls completely or partly within the 5600 MHz to 5650 MHz band, the tests for the Channel Availability Check (CAC) (and, where implemented, for the off-channel CAC) shall be performed on one of these channels in addition to a channel within the band 5470 MHz to 5600 MHz or within the band 5650 MHz to 5725 MHz.
NOTE 3:	For multi-channel operation in non-adjacent channels, each group of adjacent channels shall be tested individually with the specified test channels.
NOTE 4:	If one or more of the channels in the group of adjacent channels might not be used for transmission, channel configurations suitable to verify each of the supported channel edge masks as shown in figure 2, figure 3 and figure 4 shall be tested in addition.

2.3 Test Mode

Modulation Type	SISO - Data Rate
802.11a	6 Mbps
802.11n20	MCS0 (6.5 Mbps)
802.11n40	MCS0 (13.5 Mbps)
802.11ac20	MCS0 (6.5 Mbps)
802.11ac40	MCS0 (13.5 Mbps)
Transmitting mode:	Keep the EUT was programmed to be in continuously transmitting mode.
Normal Link:	Keep the EUT operation to normal function.

2.4 Test Environment

Relative Humidity	45-56 % RH Ambient	
Condition	Temperature(°C)	Voltage(V)
NTNV	25	3.8
LTNV	-35	3.8
HTNV	75	3.8
Remark:		
NTNV Normal Temperature Normal Voltage		
LTNV Low Temperature Normal Voltage		
HTNV High Temperature Normal Voltage		

2.5 Support Unit used in test

Description	Manufacturer	Model	Serial Number
Router	MSI	GRAXE66 (FCC ID: I4L-GRAXE66)	3028ZD00UU00010231000818
Laptop	Lenovo	Thinkbook 14 G4+IAP	YX05AZ13

2.6 Test RF Cable

For all conducted test items: The offset level is set spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

2.7 Modifications

No modifications were made during testing.

3 Equipment and Measurement Uncertainty

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, whichever is less, and where applicable is traceable to recognized national standards.

3.1 Test Equipment List

RF Conducted					
Description	Manufacturer	Model	S.N.	Last Due	Cal Due
Signal Analyzer	Keysight	N9020A	US46470429	2026/03/05	2027/03/04
Signal Generator	R&S	SMR20	101027	2026/03/05	2027/03/04
Wideband Radio Communication Tester	R&S	CMW500	150615	2026/03/06	2027/03/05
Wireless Communication Tester	R&S	CMW270	102840	2025/05/29	2026/05/28
				2026/05/29	2027/05/28
UP/Down-Converter	R&S	CMW-Z800A	100572	2025/05/29	2026/05/28
				2026/05/29	2027/05/28
Hygrometer	BingYu	HTC-1	N/A	2025/05/29	2027/05/28
Vector Signal Generator	R&S	SMM100A	549353	2025/05/29	2026/05/28
				2026/05/29	2027/05/28
RF Control Unit	Tonscend	JS0806-2	23C80620671	2025/05/29	2026/05/28
				2026/05/29	2027/05/28
Measurement Software	Tonscend	TS1120-3 V3.5.39	10776	N/A	N/A

Radiated Emission					
Description	Manufacturer	Model	S.N.	Last Due	Cal Due
Biconic Logarithmic Periodic Antennas	Schwarzbeck	VULB9163	1461	2023/06/25	2026/06/24
Double-Ridged Horn Antennas	Schwarzbeck	BBHA 9120D	2814	2023/06/25	2026/06/24
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	1291	2023/06/25	2026/06/24
Signal Analyzer	Keysight	N9020A	US46470366	2026/03/06	2027/03/05
Low Noise Amplifier	Tonscend	TAP9K3G40	AP23A8060274	2025/03/11	2027/03/10
Low Noise Amplifier	Tonscend	TAP01018050	AP23A8060268	2025/03/11	2027/03/10
Low Noise Amplifier	Tonscend	TAP18040048	AP22G806249	2025/03/11	2027/03/10
Hygrometer	BINGYU	HTC-1	N/A	2025/07/25	2026/07/24
Band Reject Filter Group	Tonscend	JS0806-F	23A806F0654	N/A	N/A
Test Software	Tonscend	TS+	Version: 5.0.0	N/A	N/A

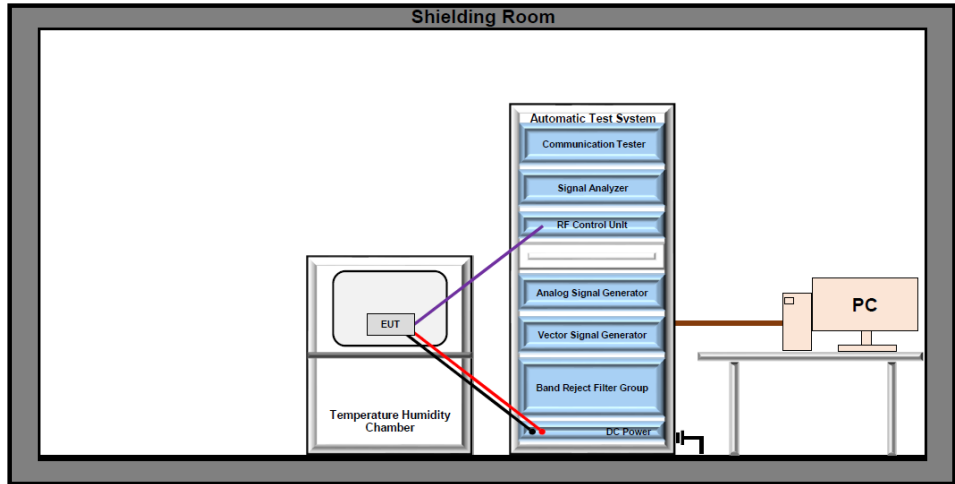
3.2 Measurement Uncertainty

Parameter	Ulab
Frequency error	679.96Hz
Output power	0.76dB
Conducted spurious emissions	2.22dB
Radiation 30MHz~1GHz(FAR)	4.48dB
Radiation 1GHz~18GHz(FAR)	5.30dB
Radiation 18GHz~40GHz(FAR)	5.26dB

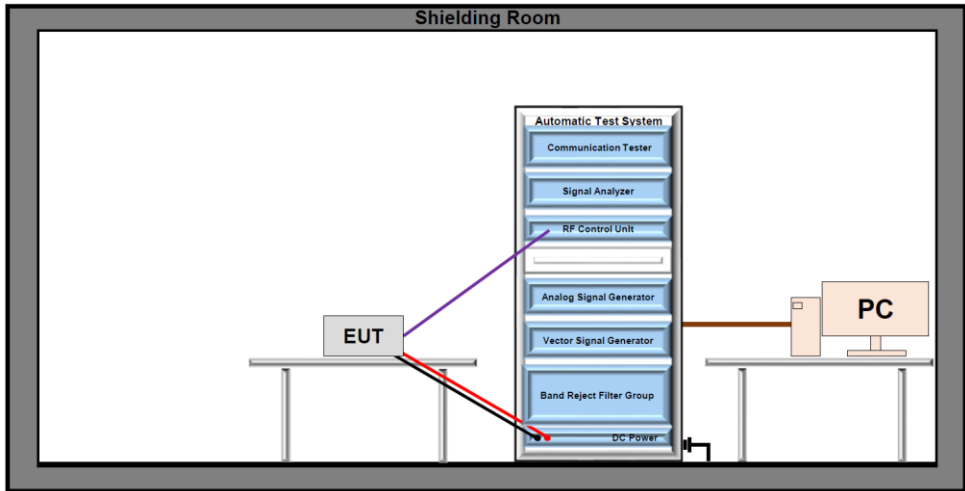
Uncertainty figures are valid to a confidence level of 95%

4 Test results

4.1 Nominal Centre frequencies

Test Requirement:	ETSI EN 301 893 Clause 4.2.1
Test Method:	ETSI EN 301 893 Clause 5.4.2
Limit:	The nominal centre frequencies (f_c) for channels whose nominal channel bandwidth falls partly or completely within sub-band 1, sub-band 2 or sub-band 3 shall be defined by equation (1). $f_c = 5\,160\text{ MHz} + (g \times 20\text{ MHz}) \pm f_{c_offset}, \text{ with } g \text{ integer and } 0 \leq g \leq 9 \text{ or } 16 \leq g \leq 28 \quad (1)$ Operation on the channel with $g = 28$ is only permitted where operation in sub-band 4 by RLAN devices is allowed by national frequency usage conditions. An offset (f_{c_offset}) is permitted for each nominal centre frequency. The offset may be different for each nominal centre frequency, but it shall not be greater than 200 kHz. Where an offset is applied, the nominal centre frequencies used by the equipment shall be noted in the test report (see clause 5.4.1, item a)). The nominal centre frequency for any given channel shall be maintained within the range of $f_c \pm 0,002\%$. Equipment may have simultaneous transmissions on more than one channel
Test Environment:	Refer to section 2.4.
Test Setup:	
Measuring Instruments:	Refer to section 3.1
Test Result:	Appendix

4.2 Nominal Channel Bandwidth and Occupied Channel Bandwidth

Test Requirement:	ETSI EN 301 893 Clause 4.2.2
Test Method:	ETSI EN 301 893 Clause 5.4.3
Limit:	The nominal channel bandwidth for a single channel shall be 20 MHz. Alternatively, equipment may implement a lower nominal channel bandwidth with a minimum of 5 MHz, providing it still conforms to the limits defined for nominal centre frequencies (20 MHz raster). For channels whose nominal channel bandwidth falls partly or completely within sub-band 2 or sub-band 3, the occupied bandwidth shall not be less than 80 % of the nominal channel bandwidth. During a Channel Occupancy Time (COT), equipment may operate temporarily with an occupied bandwidth of less than 80 % of its nominal channel bandwidth. The occupied bandwidth shall not be less than 2 MHz. For channels whose nominal channel bandwidth falls completely outside sub-band 2 and sub-band 3, the occupied bandwidth shall be equal or less than the nominal channel bandwidth. In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet the requirements specified in this clause. The occupied bandwidth might change with time/payload.
Test Environment:	Refer to section 2.4.
Test Setup:	
Measuring Instruments:	Refer to section 3.1
Test Result:	Appendix

4.3 RF output power, Transmit Power Control (TPC) and Power Density

Test Requirement:	ETSI EN 301 893 Clause 4.2.3
Test Method:	ETSI EN 301 893 Clause 5.4.4

Limit:

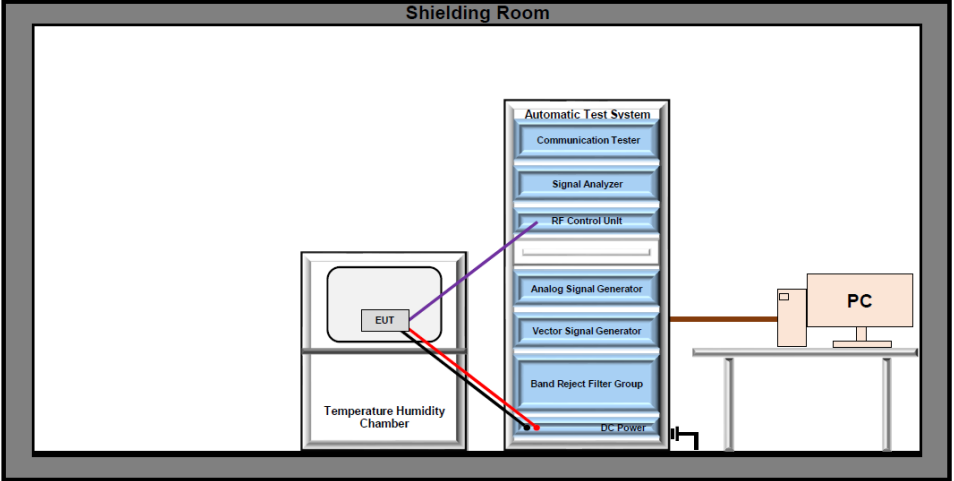
Limits for RF output power and PSD

The maximum RF output power $P_{H, sb}$ and the PSD in sub-band sb shall not exceed the limits given in table 2 for that sub-band. If the device uses TPC, $P_{H, sb}$ is the RF output power in sub-band sb at the highest power level of the TPC range in sub-band sb. In case of multiple (adjacent or non-adjacent) channels, the limits for the maximum RF output power and the PSD apply per sub-band.

Table 2: RF output power and PSD limits

Sub-band	RF output power limit (dBm)		PSD limit (dBm/MHz)	
	with TPC (see note3)	without TPC	with TPC	without TPC
Sub-band 1	23	23	10	10
Sub-band 2	23	20	10	7
Sub-band 3 (see note2)	30 (see note1)	27 (see note1)	17 (see note1)	14 (see note1)
Note 1:	Secondary devices without radar detection operating in sub-band 3 shall conform to the limits for sub-band 2.			
Note 2:	National frequency usage conditions may allow devices to operate in sub-band 3 on a channel with a nominal channel bandwidth that extends into sub-band 4.			
Note 3:	If TPC is used, the RF output power in sub-band sb at the lowest power level of the TPC range in sub-band sb ($P_{L, sb}$) shall be at least 6 dB less than the applicable RF output power limit with TPC.			

Test Environment:	Refer to section 2.4.
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Test Setup:	
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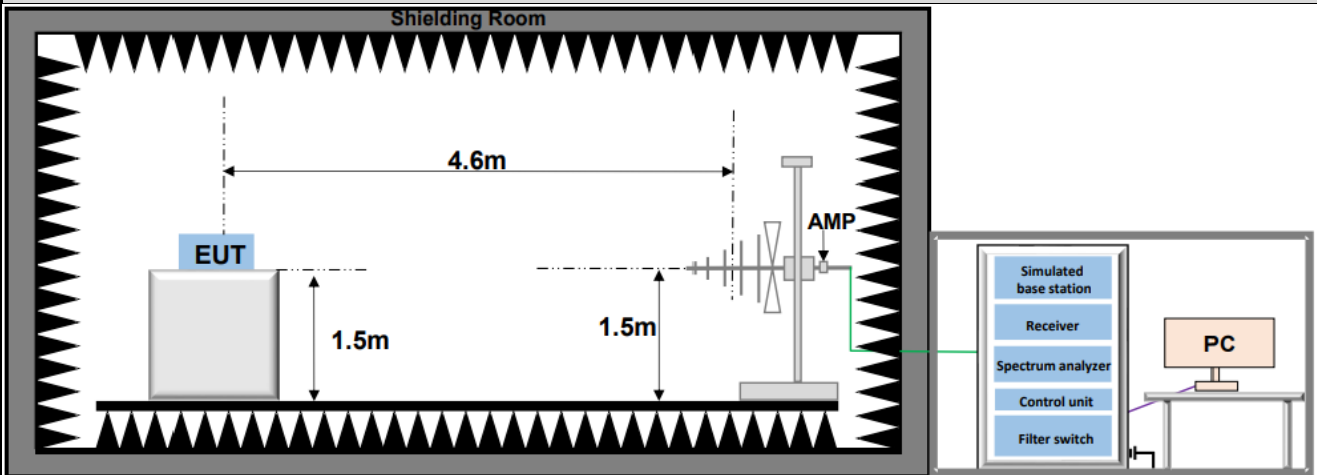
Measuring Instruments:	Refer to section 3.1
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Test Result:	Appendix
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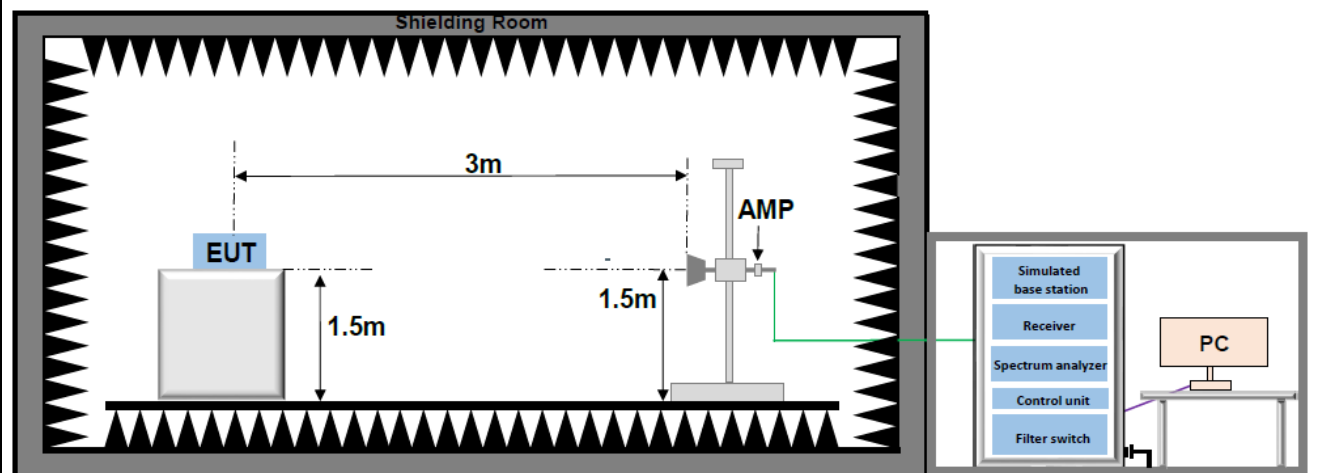
4.4 Transmitter unwanted emissions outside the transmitter's operating bands

Test Requirement:	ETSI EN 301 893 Clause 4.2.4.1	
Test Method:	ETSI EN 301 893 Clause 5.4.5	
Limit:		
The level of transmitter unwanted emissions outside the transmitter's operating bands shall not exceed the limits given in table 3.		
In case of equipment with antenna connectors, these limits apply to emissions at the antenna port (conducted). For emissions radiated by the cabinet or emissions radiated by integral antenna equipment (without antenna connectors), these limits are ERP for emissions up to 1 GHz and EIRP for emissions above 1 GHz.		
Table 3: Transmitter unwanted emission limits outside the transmitter's operating bands		
Frequency range	Maximum power	Bandwidth
30 MHz to 87.5 MHz	-36dBm	100 kHz
87,5 MHz to 118 MHz	-54dBm	100 kHz
118 MHz to 174 MHz	-36dBm	100 kHz
174 MHz to 230 MHz	-54dBm	100 kHz
230 MHz to 470 MHz	-36dBm	100 kHz
470 MHz to 694 MHz	-54dBm	100 kHz
964 MHz to 1 GHz	-36dBm	100 kHz
1 GHz to 26 GHz	-30dBm	1MHz
Test Environment:	Refer to section 2.4.	
Measuring Instruments:	Refer to section 3.1	
Test Procedure:	1. The test distance between the receiving antenna and the EUT is 4.6m below 1GHz frequency range, and 3m which is in far field test condition for measured frequency above 1GHz, while the receiving (test) antenna scanning 1.5m height. 2. The EUT was placed on a turntable with 1.5m height (FAR). 3. Set EUT in continuous transmitting with maximum output power. 4. The table was rotated from 0 to 360 degree to search the highest radiated emission. 5. Repeat above step for each polarization and channel to find the worst emission level. 6. The results obtained are compared to the limits in order to prove compliance with the requirement.	

Test Setup:



Below 1GHz



Above 1GHz

Test Result:	Appendix
Remark ¹ :	Radiated spurious emissions were measured from 30MHz to 26GHz. The disturbance between 18GHz to 26GHz was very low. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be recorded.
Remark ² :	Transmitter unwanted emissions outside the 5 GHz RLAN bands were performed with the EUT set to transmit at the worst-case mode/channel based on power and PSD.

4.5 Transmitter unwanted emissions within the transmitter's operating bands

Test Requirement:	ETSI EN 301 893 Clause 4.2.4.2
Test Method:	ETSI EN 301 893 Clause 5.4.6

Limit:

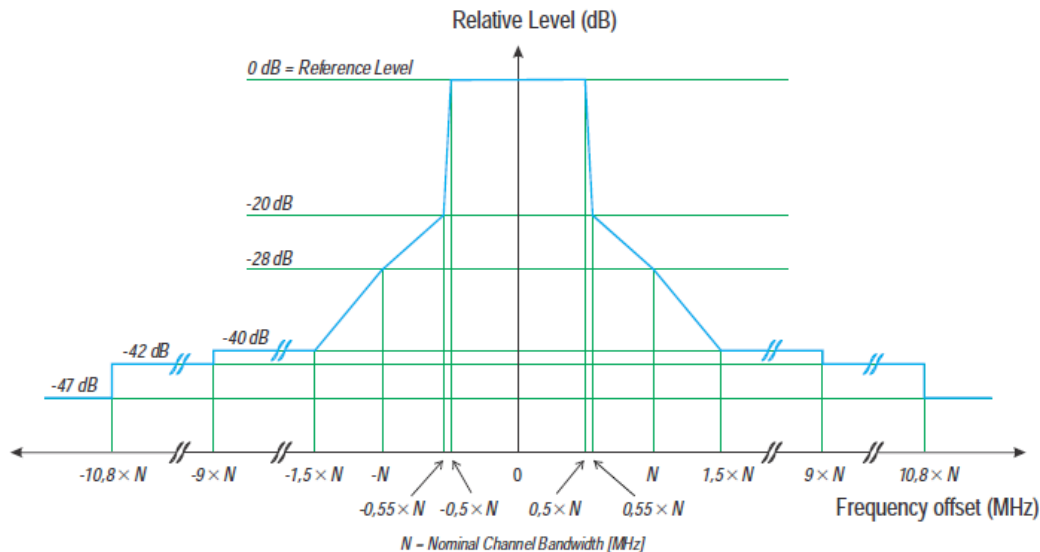


Figure 1: Transmit spectral power mask

The mean PSD of the transmitter unwanted emissions within the transmitter's operating bands shall not exceed the limits of the mask provided in figure 1 or an absolute level of -30 dBm/MHz, whichever is greater. The limits in figure 1 are relative to the maximum PSD transmitted by the RLAN device when measured with a reference bandwidth of 1 MHz.

The mask is only applicable within the band(s) of operation. Beyond the band edges, the requirements for transmitter unwanted emissions outside the transmitter's operating bands (see clause 4.2.4.1) apply.

In case of smart antenna systems (devices with multiple transmit chains) each of the transmit chains shall meet the limits for transmitter unwanted emissions within the transmitter's operating bands.

In case of multi-channel operation in adjacent or non-adjacent channels, clause 4.2.4.2.2.2 and clause 4.2.4.2.2.3 describe how the overall transmit spectral power mask to be applied shall be constructed. The transmitter unwanted emissions within the transmitter's operating bands shall not exceed the limits of this overall transmit spectral power mask or an absolute level of -30 dBm/MHz based on ERC Recommendation 74-01 [i.13], whichever is greater.

The channel edge masks for multi-channel operation in adjacent and/or non-adjacent channels which are supported by the equipment shall be noted in the test report (see clause 5.4.1).

Channel edge mask for multi-channel operation in adjacent channels

- When the lowest channel(s) and/or the highest channel(s) of a group of adjacent channels is/are not used for transmission, an additional channel edge mask as in figure 2 shall be applied at the lower edge of the lowest channel used for transmission and at the higher edge of the highest channel used for transmission. M is the separation in MHz between these edges.

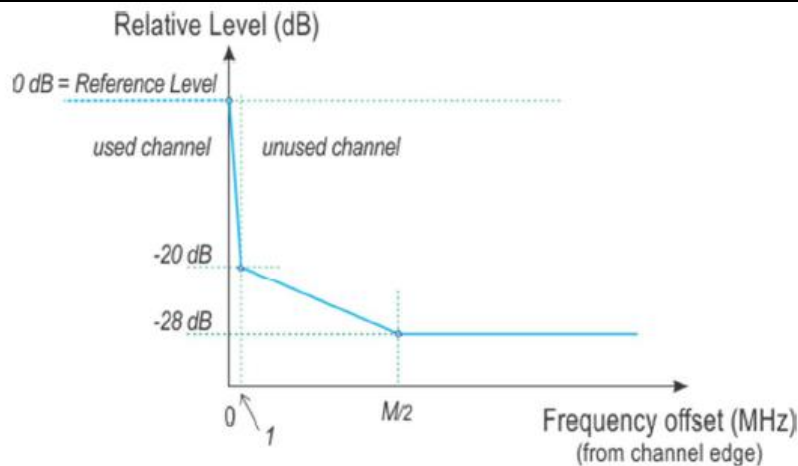


Figure 2: Channel edge mask - case 1

- When there are two or more channels not used for transmission in between channels used for transmission (all belonging to the same group of adjacent channels configured for multi-channel operation) and these channels not used for transmission are adjacent to each other, an additional channel edge mask as in figure 3 shall be applied at the higher edge of the channel adjacent to the lowest channel of the group of adjacent channels not used for transmission and at the lower edge of the channel adjacent to the highest channel of the group of adjacent channels not used for transmission. U is the total bandwidth of channels used for transmission adjacent to the channels not used for transmission.

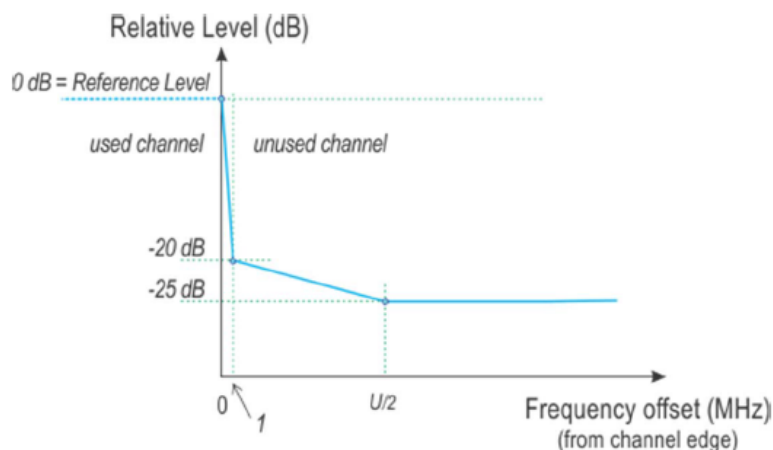


Figure 3: Channel edge mask - case 2

- When there is only one channel not used for transmission in between channels used for transmission (all belonging to the group of adjacent channels configured for multi-channel operation), an additional channel edge mask as in figure 4 shall be applied at the higher edge of the channel below the channel not used for transmission and at the lower edge of the channel above the channel not used for transmission

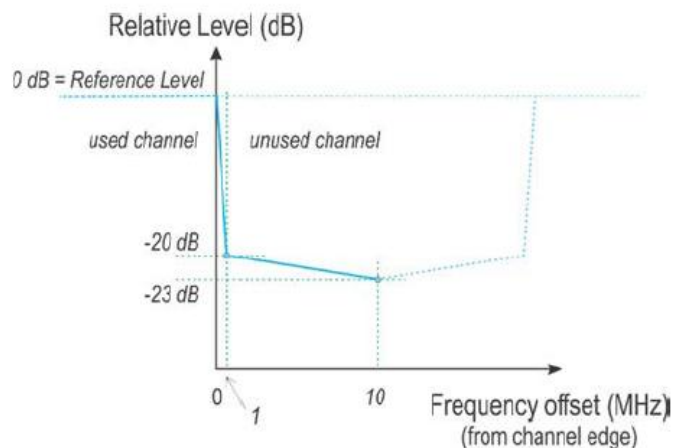


Figure 4: Channel edge mask - case 3

Any Local Oscillator (LO) power in a 2 MHz band may exceed the limits provided by the overall transmit spectral power mask (constructed from the masks in figure 1 to figure 4) but shall be less than -28 dBc (relative to the RF output power), or less than -20 dBm/MHz, whichever is greater. A 2 MHz band per LO can be located anywhere within the group of adjacent channels configured for multi-channel operation. The LO exceedance shall occur not more than once per 20 MHz of the total bandwidth (N) of the group of adjacent channels. For the specific case of a 40 MHz band configured for multi-channel operation and only one channel is being used for transmission, the LO exceedance shall be not more than 0 dBc if occurring.

Annex I contains a number of examples of how the overall transmit spectral power mask is constructed.

Equipment configured for multi-channel operation in groups of four adjacent channels

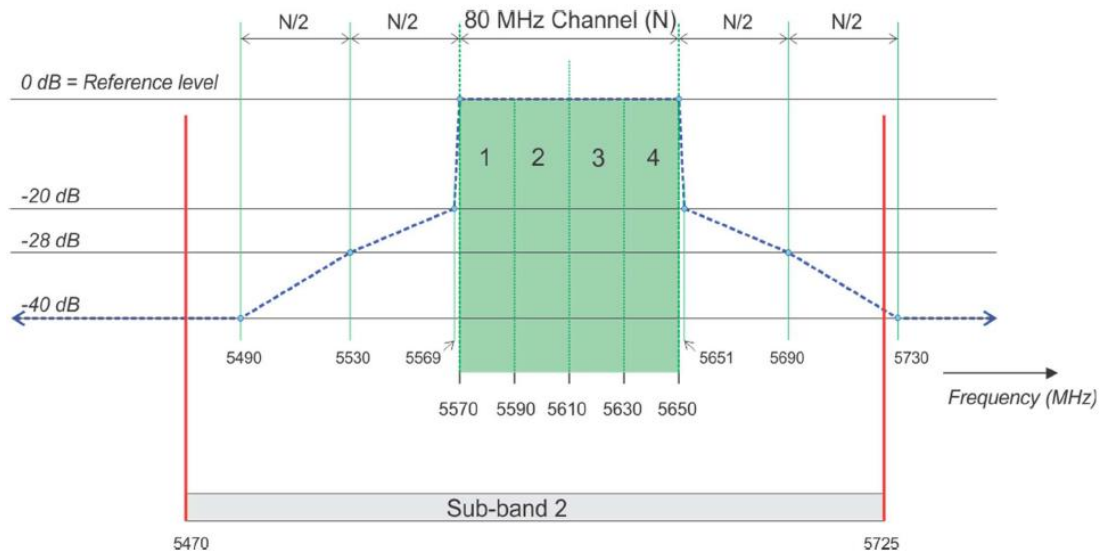


Figure I.1: Example 1

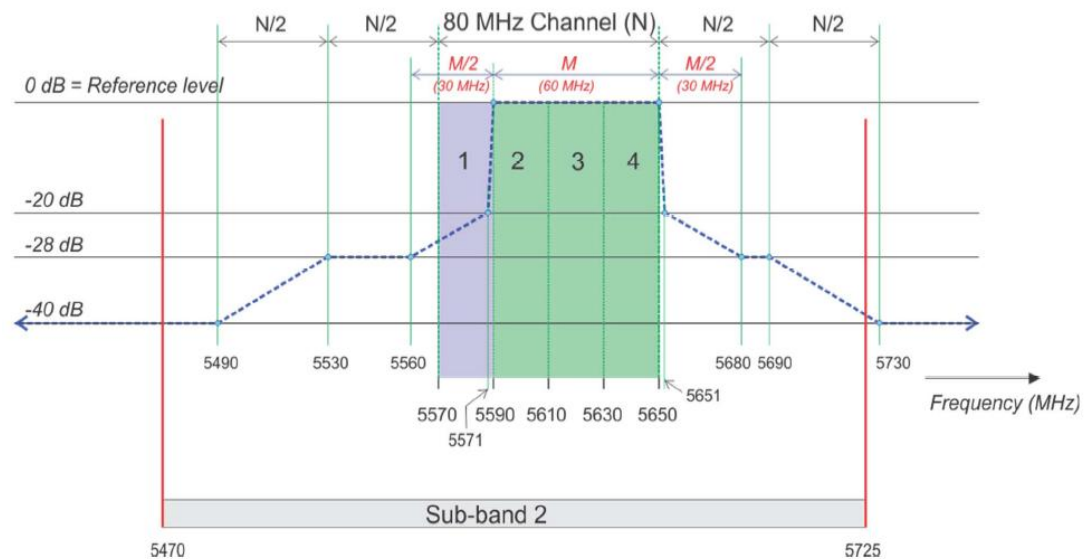


Figure I.2: Example 2

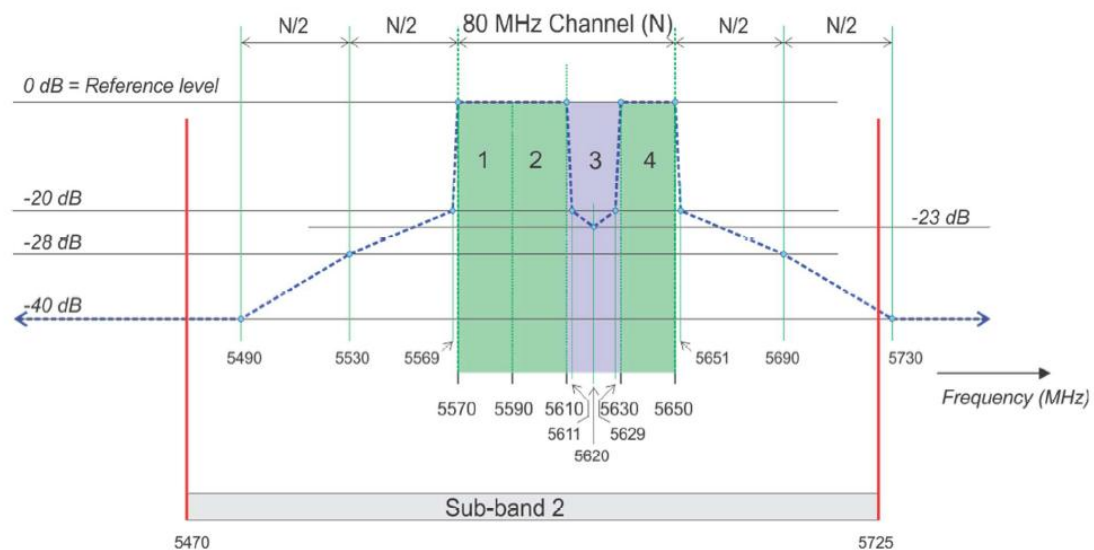


Figure I.3: Example 3

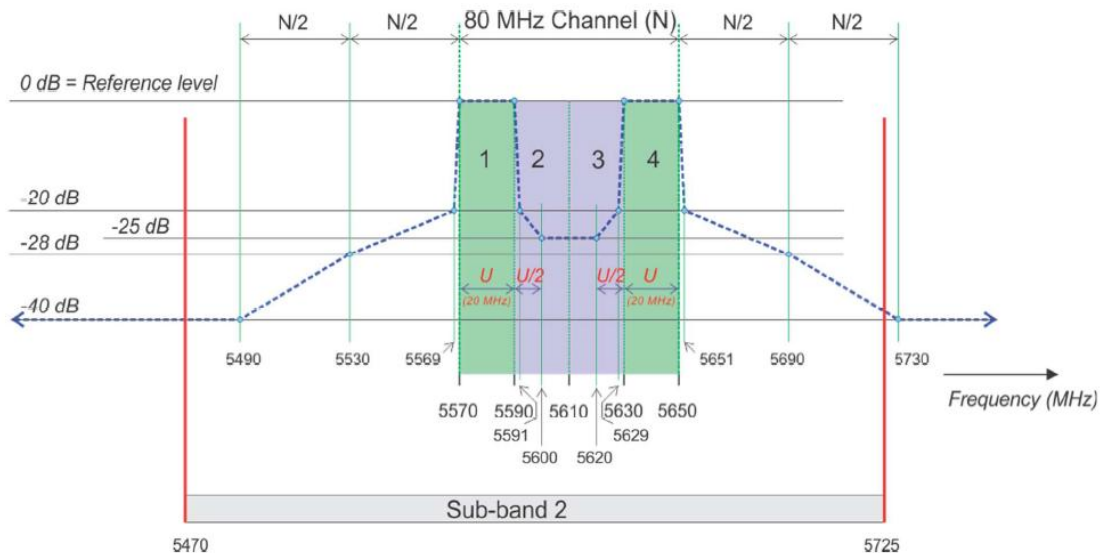


Figure I.4: Example 4

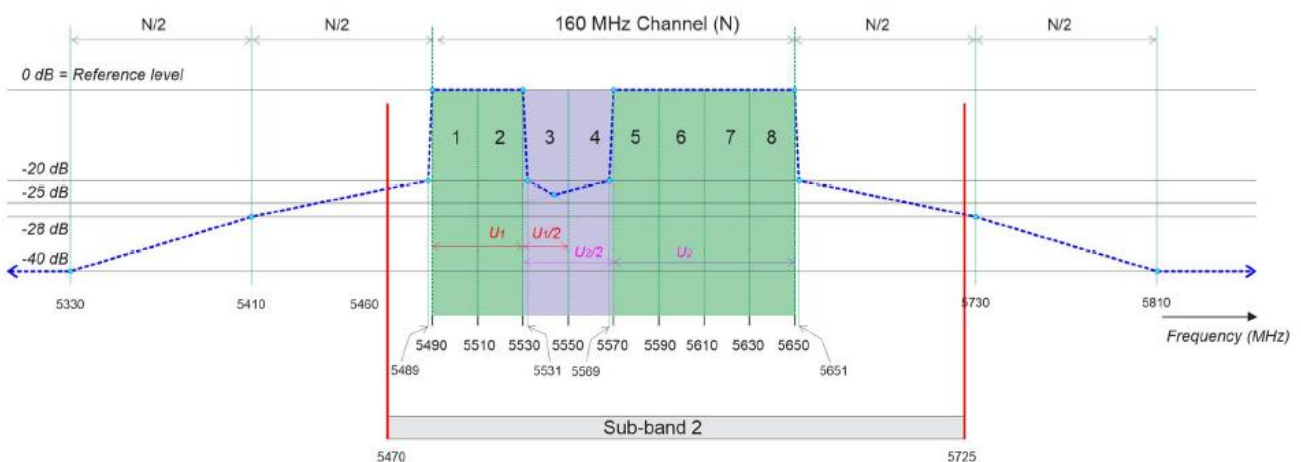


Figure I.5: Example 5

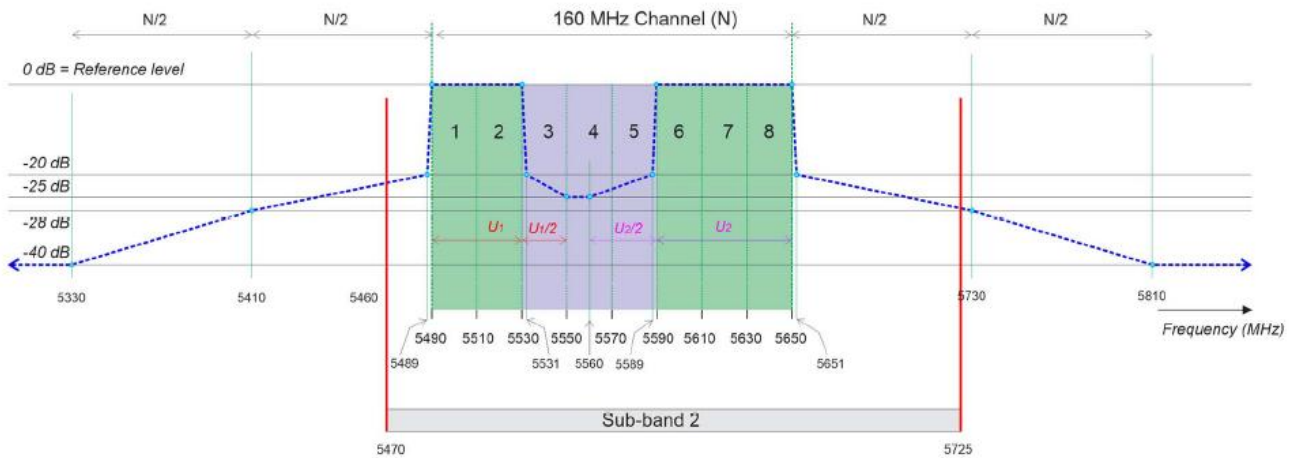


Figure I.6: Example 6

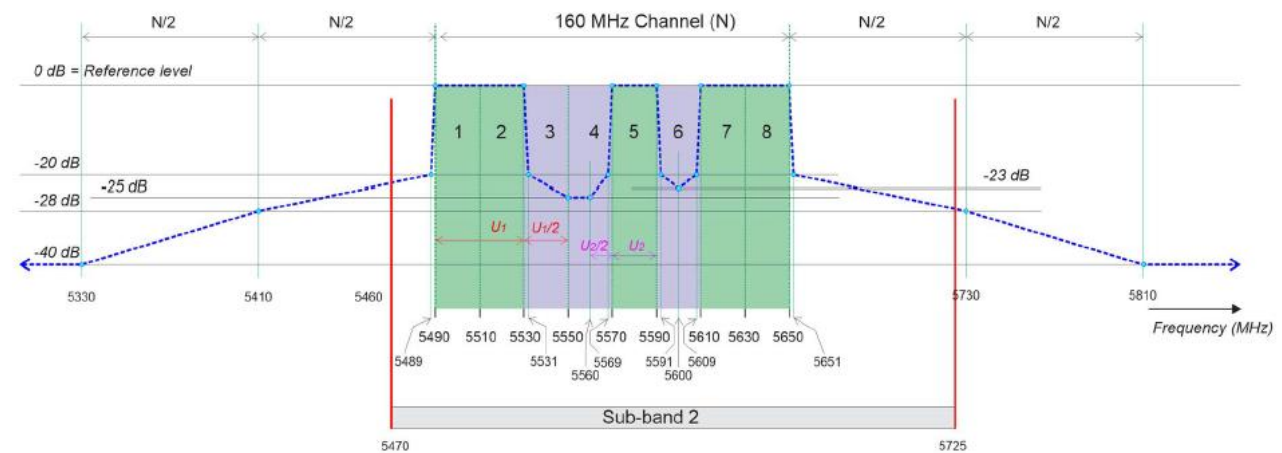


Figure I.7: Example 7

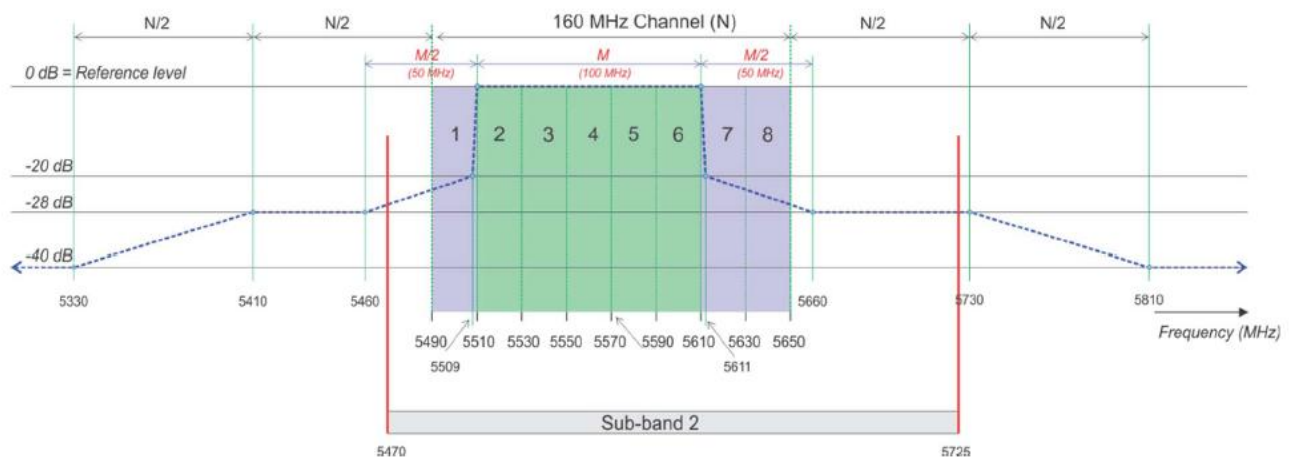


Figure I.8: Example 8

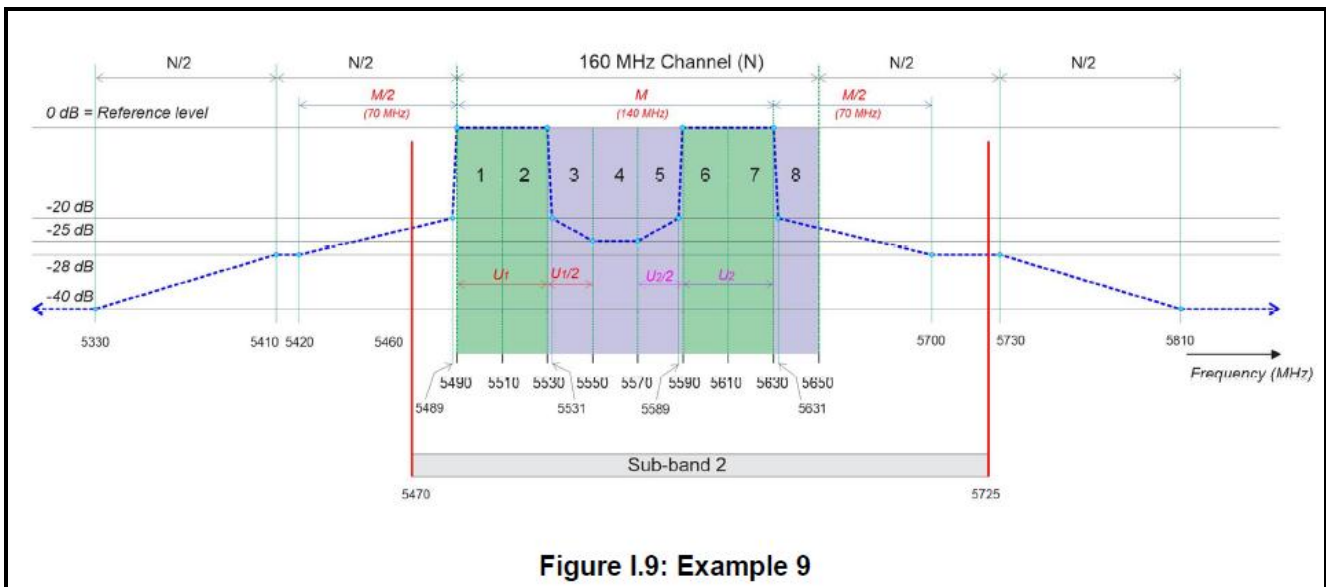


Figure I.9: Example 9

Test Environment:	Refer to section 2.4.
Test Setup:	The diagram shows a test setup inside a shielding room. An Equipment Under Test (EUT) is connected to an Automatic Test System. The system includes a Communication Tester, Signal Analyzer, RF Control Unit, Analog Signal Generator, Vector Signal Generator, Band Reject Filter Group, and DC Power. The system is connected to a PC.
Measuring Instruments:	Refer to section 3.1
Test Result:	Appendix

4.6 Receiver Blocking

Test Requirement:	ETSI EN 301 893 Clause 4.2.8
Test Method:	ETSI EN 301 893 Clause 5.4.10

Limit:

For equipment that supports a PER or FER test to be performed, the minimum performance criterion shall be a PER or FER less than or equal to 10 %.

For equipment that does not support a PER or a FER test to be performed, the minimum performance criterion shall be no loss of the wireless transmission function needed for the intended use of the equipment.

While maintaining the minimum performance criteria as defined in clause 4.2.8.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined in table 8.

Table 8: Receiver Blocking parameters

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)		Type of blocking signal
		Master or Slave with radar detection (see table D.2, note 2)	Slave without radar detection (see table D.2, note 2)	
$P_{min} + 6\text{dB}$	5100	-53	-59	Continuous Wave
$P_{min} + 6\text{dB}$	4900 5000 5975	-47	-53	Continuous Wave

Note P_{min} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.8.3 in the absence of any blocking signal.

Test Environment:	Refer to section 2.4.
Measuring Instruments:	Refer to section 3.1
Test Setup:	

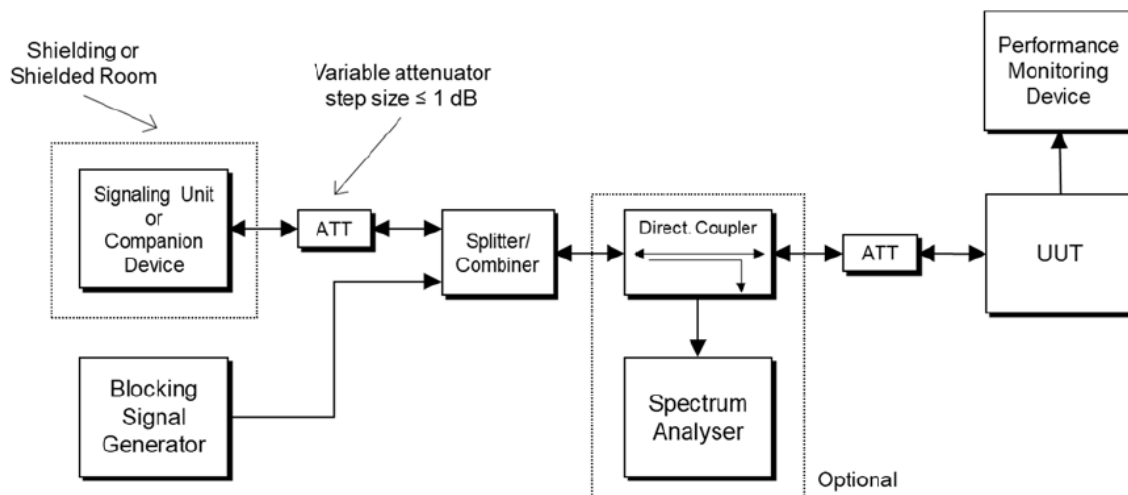


Figure 21: Test setup for receiver blocking

Test Result:	Appendix
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4.7 Adjacent channel selectivity

Test Requirement:	ETSI EN 301 893 Clause 4.2.9
Test Method:	ETSI EN 301 893 Clause 5.4.11

Limit:

For equipment that supports a PER or FER test to be performed, the minimum performance criterion shall be a PER or FER less than or equal to 10 %.

For equipment that does not support a PER or a FER test to be performed, the minimum performance criterion shall be no loss of the wireless transmission function needed for the intended use of the equipment

The limits defined in this clause apply when the equipment receives the wanted signal on a single channel and the occupied bandwidth of the interfering signal falls completely within a channel adjacent to this channel. Both channels have a nominal channel bandwidth as defined in clause 4.2.2.

While maintaining the minimum performance criteria as defined in clause 4.2.9.3. the adjacent channel interferer level shall be equal to or greater than the limit given in table 9 corresponding to a frequency offset within the range specified in table 9.

Table 9: Adjacent channel selectivity parameters

Wanted signal mean power from companion device (dBm)	Interferer signal frequency offset range (MHz)	Interferer signal Power (dBm) (see note 2)	Type of blocking signal
$P_{\min} + 10\text{dB}$	20 ± 0.2	$P_{\min} + 26\text{dB}$	Same as the wanted signal with an equivalent occupied bandwidth
Note 1: $P_{\min}$ is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined clause 4.2.9.3 in the absence of any interfering signal.			
Note 2: The level specified for the interferer signal applies at the lowest data rate.			

Test Environment:	Refer to section 2.4.
Measuring Instruments:	Refer to section 3.1
Test Setup:	

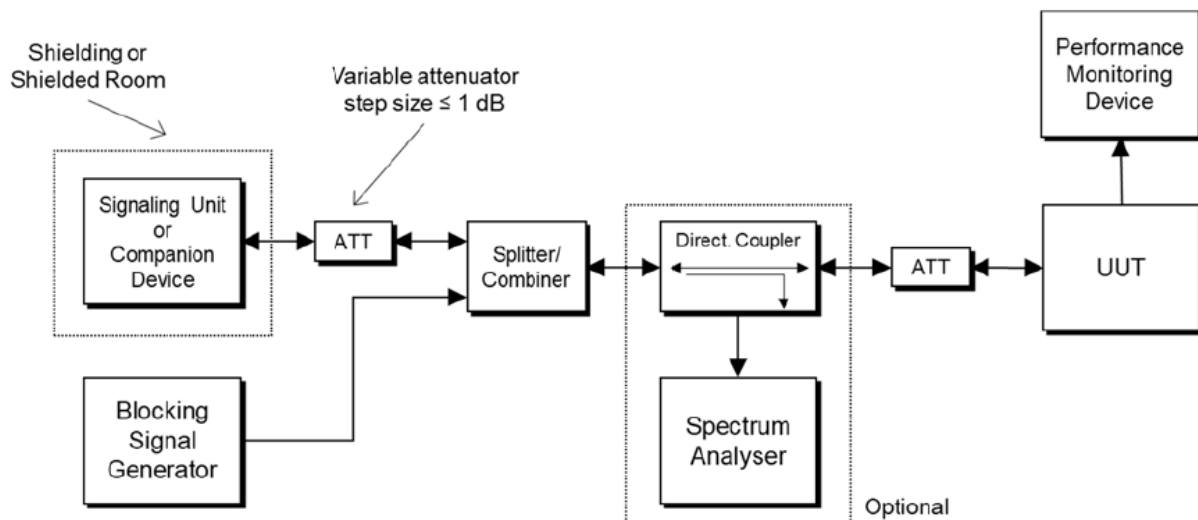


Figure 22: Test setup for receiver adjacent channel selectivity

Test Result:	Appendix
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4.8 Adaptivity

Test Requirement:	ETSI EN 301 893 Clause 4.2.7
Test Method:	ETSI EN 301 893 Clause 5.4.9.3

Limit:

The Initiating Device may have data to be transmitted in different Priority Classes and therefore the Channel Access Mechanism is allowed to operate different Channel Access Engines as described in clause 4.2.7.3.2.6 simultaneously (one for each implemented Priority Class).

Table 6: Priority Class dependent Channel Access parameters for Supervising Devices

Class #	p0	CW _{min}	CW _{max}	Maximum Channel Occupancy Time (COT)
4	1	3	7	2ms
3	1	7	15	4ms
2	3	15	63	6ms (see note 1 and note 2)
1	7	15	1023	6ms (see note 1)
Note 1:	The maximum COT of 6 ms may be increased to 8 ms by inserting one or more pauses. The minimum duration of a pause shall be 100 μs. The maximum duration (channel occupancy) before including any such pause shall be 6 ms. Pause duration is not included in the COT.			
Note 2:	The maximum COT of 6 ms may be increased to 10 ms by extending CW to $CW \times 2 + 1$ when selecting the random number q for any backoff(s) that precede the channel occupancy that may exceed 6 ms or which follow the channel occupancy that exceeded 6 ms. The choice between preceding or following a channel occupancy shall remain unchanged during the operation time of the device.			
Note 3:	The values for p0, CW _{min} , CW _{max} are minimum values. Greater values are allowed.			

Table 7: Priority Class dependent Channel Access parameters for Supervised Devices

Class #	p0	CW _{min}	CW _{max}	Maximum Channel Occupancy Time (COT)
4	2	3	7	2ms
3	2	7	15	4ms
2	3	15	1023	6ms (see note 1)
1	7	15	1023	6ms (see note 1)
Note 1:	The maximum COT of 6 ms may be increased to 8 ms by inserting one or more pauses. The minimum duration of a pause shall be 100 μs. The maximum duration (channel occupancy) before including any such pause shall be 6 ms. Pause duration is not included in the COT.			
Note 2:	The values for p0, CW _{min} , CW _{max} are minimum values. Greater values are allowed.			

An Idle Period is defined as any period that has a duration greater than 27 μs.

The use of Short Control Signalling Transmissions is constrained as follows:

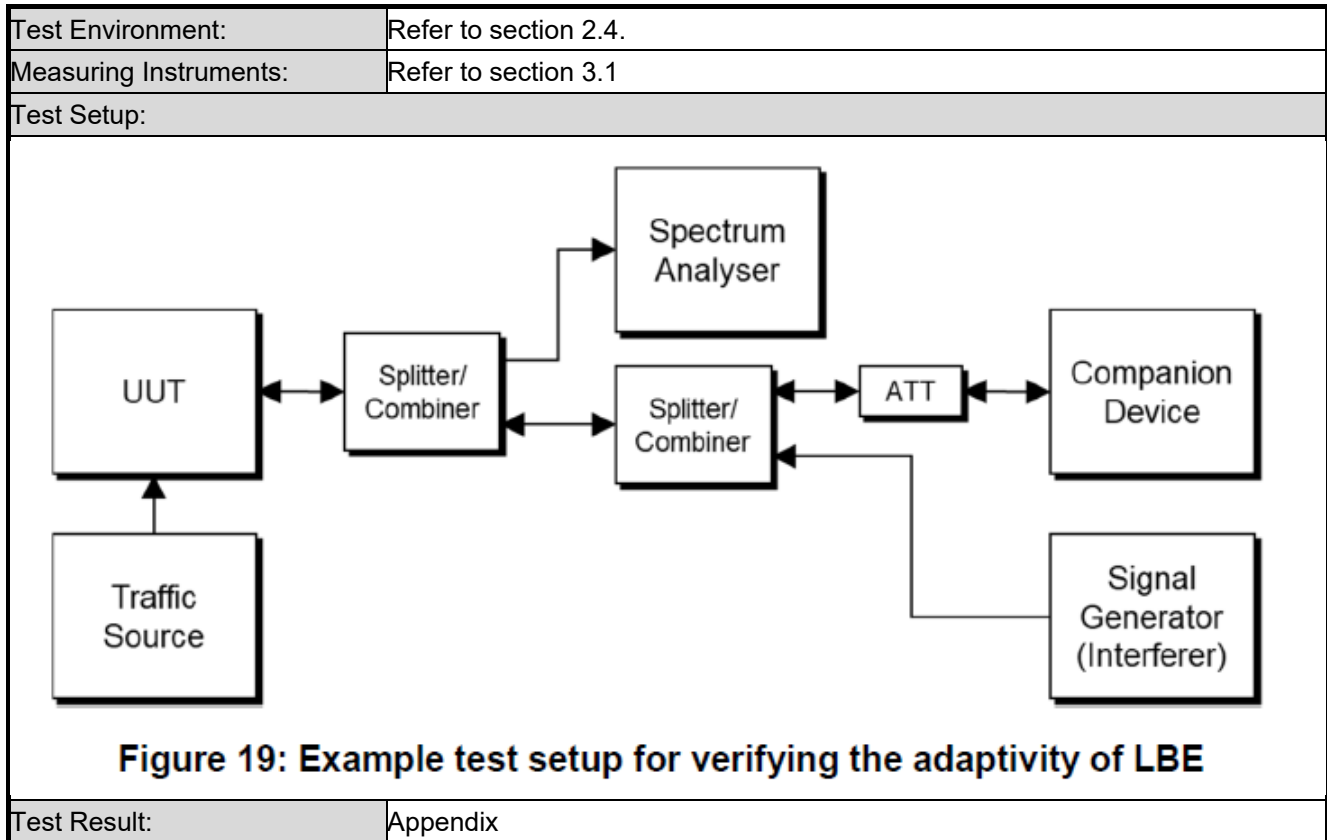
within an observation period of 50 ms, the number of Short Control Signalling Transmissions by the equipment shall be equal to or less than 50; and the total duration of the equipment's Short Control Signalling Transmissions shall be less than 2 500 μs within said observation period.

Energy Detection Threshold (EDT) (LBE)

An operating channel is an occupied channel as long as transmissions in that channel are present at a power level greater than the Energy Detection Threshold (EDT). The power level is determined by integrating the received power over the channel and then normalized to per MHz power. The received power shall be determined at the interface between the equipment and the antenna assembly. If no transmissions are present at a power level greater than the EDT, the operating channel is an unoccupied channel. Equipment may consist of one or more devices.

The EDT is proportional to the equipment's maximum configured RF output power and shall be:

$$EDT = \begin{cases} -75 \text{ dBm/MHz} & \text{for } P_{\max} \leq 18 \text{ dBm} \\ -80 \text{ dBm/MHz} + (23 \text{ dBm} - P_{\max}) & \text{for } 18 \text{ dBm} < P_{\max} < 23 \text{ dBm} \\ -80 \text{ dBm/MHz} & \text{for } P_{\max} \geq 23 \text{ dBm} \end{cases}$$



4.9 Dynamic Frequency Selection (DFS)

Test Requirement:	ETSI EN 301 893 Clause 4.2.6
Test Method:	ETSI EN 301 893 Clause 5.4.8

Table 5: Applicability of DFS requirements

Requirement	DFS operational mode		
	Primary device	Secondary device without radar detection (see table D.2, note 2)	Secondary device with radar detection (see table D.2, note 2)
CAC	Required	Not required	Required (see note 2)
Off-channel CAC (see note 1)	Required	Not required	Required (see note 2)
In-service monitoring	Required	Not required	Required
Channel shutdown	Required	Required	Required
Non-occupancy period	Required	Not required	Required
Uniform spreading	Required	Not required	Not required
NOTE 1: If implemented.			
NOTE 2: A secondary device with radar detection is not required to perform a CAC or off-channel CAC at initial use of a channel but only before returning to the use of a channel where it has detected a radar signal by in-service monitoring. Where the secondary device with radar detection is under the control of its primary device and does not start transmissions on the channel until connected to that primary device, then the secondary device with radar detection does not have to perform a CAC or off-channel CAC and may rely on the CAC performed by the primary device to enable in-service monitoring.			

Limit:

Table D.1 to table D.5 contain the values and limits for the DFS specific parameters referred to in clause 4.2.6 and clause 5.4.8.

Figure D.1 shows a single burst for a radar test signal using a constant PRF which is representative for the radar test signal 1 to signal 3 from table D.4. Figure D.2 shows multiple bursts of these same test signals. Figure D.2 shows the general structure of a single burst radar test signal using a constant PRF. This structure is representative for the radar test signal 1 to signal 3 from table D.4.

Figure D.3 shows a single burst of a pulse based staggered PRF radar test signal. Figure D.4 shows a single burst of a packet based staggered PRF radar test signal which is representative for the radar test signal 5 and signal 6 from table D.4. Figure D.5 shows multiple bursts of these same test signals.

Table D.1: DFS requirement values

Parameter	Value
Channel Availability Check Time	60 s (see note 1)
Minimum Off-Channel CAC Time	6 minutes (see note 2)
Maximum Off-Channel CAC Time	4 hours (see note 2)
Channel Move Time	10s
Channel Closing Transmission Time	1s
Non-Occupancy Period	30 minutes
Note 1: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the Channel Availability Check Time shall be 10 minutes.	
Note 2: For channels whose nominal bandwidth falls completely or partly within the band 5 600 MHz to 5 650 MHz, the Off-Channel CAC Time shall be within the range 1 hour to 24 hours.	

Table D.2: Radar Detection Threshold Levels

e.i.r.p. Spectral Density (dBm/MHz)	Value (see note 1 and note 2)
10	-62 dBm
Note 1: This is the level at the input of the receiver of an RLAN device with a maximum e.i.r.p. density of 10 dBm/MHz and assuming a 0 dBi receive antenna. For devices employing different e.i.r.p. spectral density and/or a different receive antenna gain G (dBi) the Radar Detection Threshold Level at the receiver input follows the following relationship: DFS Detection Threshold (dBm) = -62 + 10 - e.i.r.p. Spectral Density (dBm/MHz) + G (dBi); however the Radar Detection Threshold Level shall not be less than -64 dBm assuming a 0 dBi receive antenna gain. Note 2: Slave devices with a maximum e.i.r.p. of less than 23 dBm do not have to implement radar detection unless these devices are used in fixed outdoor point to point or fixed outdoor point to multipoint applications (see clause 4.2.6.1.3).	

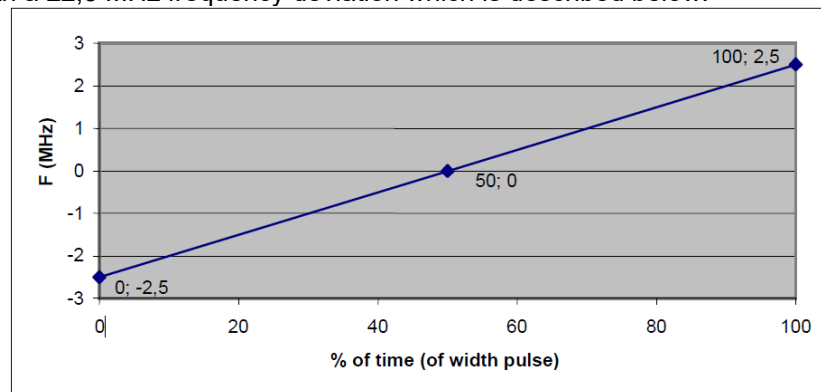
Table D.3: Parameters of the reference DFS test signal

Pulse width W (μs)	Pulse repetition frequency PRF (PPS)	Pulses per burst (PPB)
1	700	18

Table D.4: Parameters of radar test signals

Radar test signal # (see note 1 to note 3)	Pulse width W (μs)		Pulse repetition frequency PRF (PPS)		Number of different PRFs	Pulses per burst for each PRF (PPB) (see note 5)
	Min	Max	Min	Max		
1	0.5	5	200	1000	1	10 (see note 6)
2	0.5	15	200	1600	1	15 (see note 6)
3	0.5	15	2300	4000	1	25
4	20	30	2000	4000	1	20
5	0.5	2	300	400	2/3	10 (see note 6)
6	0.5	2	400	1200	2/3	15 (see note 6)

- Note 1: Radar test signal 1 to signal 4 are signals with constant PRF (see figure D.1). These radar test signals are intended to simulate also radars using a packet-based staggered PRF (see figure D.2).
- Note 2: Radar test signal #4 is a modulated radar test signal. The modulation to be used is a chirp modulation with a ±2,5 MHz frequency deviation which is described below:



- Note 3: Radar test signal 5 and radar test signal 6 are signals with single pulse-based staggered PRF using 2 or 3 different PRF values. For radar test signal 5, the difference between the PRF values chosen shall be between 20 PPS and 50 PPS. For radar test signal 6, the difference between the PRF values chosen shall be between 80 PPS and 400 PPS (see figure D.3).
- Note 4: Apart from off-channel CAC testing, the radar test signals shall only contain a single burst of pulses (see figure D.1, figure D.3 and figure D.4).
For off-channel CAC testing, repetitive bursts shall be used for the total duration of the test (see figure D.2 and figure D.5 (see also clause 4.2.6.2.3, clause 5.4.8.2.1.4.2 and clause 5.4.8.2.1.4.3)).
- Note 5: The total number of pulses in a burst is equal to the number of pulses for a single PRF multiplied by the number of different PRFs used.
- Note 6: For the CAC and Off-Channel CAC requirements, the minimum number of pulses (for each PRF) for any of the radar test signals to be detected in the band 5 600 MHz to 5 650 MHz shall be 18.

Table D.5: Detection probability

Parameter	Detection Probability (P_d)	
	Channels whose nominal bandwidth falls partly or completely within the 5 600 MHz to 5 650 MHz band	Other channels
CAC, Off-Channel CAC	99.99%	60%
In-Service Monitoring	60%	60%

Note: P_d gives the probability of detection per simulated radar burst and represents a minimum level of detection performance under defined conditions.

Test Environment:

Refer to section 2.4.

Test Setup:

Setup A is a set-up whereby the UUT is an RLAN device operating in master mode. Radar test signals are injected into the UUT. This set-up also contains an RLAN device operating in slave mode which is associated with the UUT.

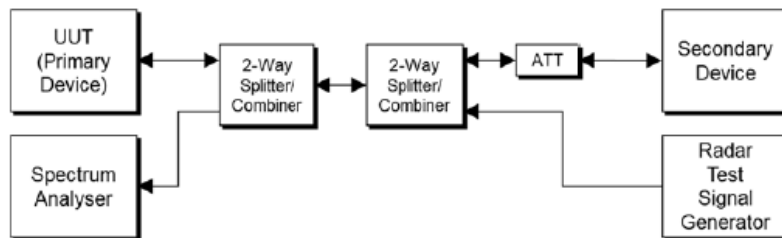


Figure 8: Setup A

Setup B is a set-up whereby the UUT is an RLAN device operating in slave mode, with or without Radar Interference Detection function. This set-up also contains an RLAN device operating in master mode. The radar test signals are injected into the master device. The UUT (slave device) is associated with the master device.

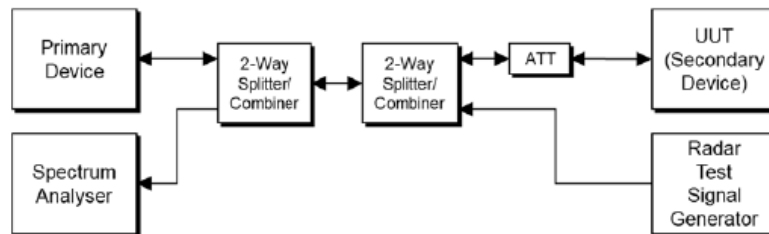


Figure 9: Setup B

The UUT is an RLAN device operating in slave mode with Radar Interference Detection function. Radar test signals are injected into the slave device. This set-up also contains an RLAN device operating in master mode. The UUT (slave device) is associated with the master device.

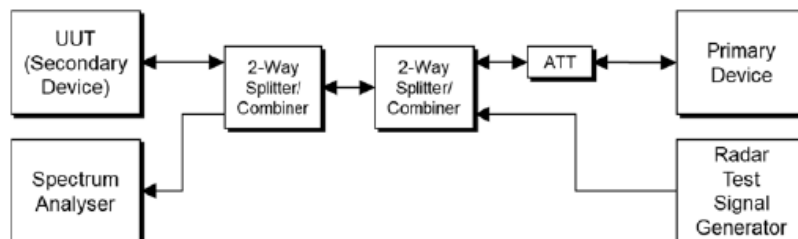


Figure 10: Setup C

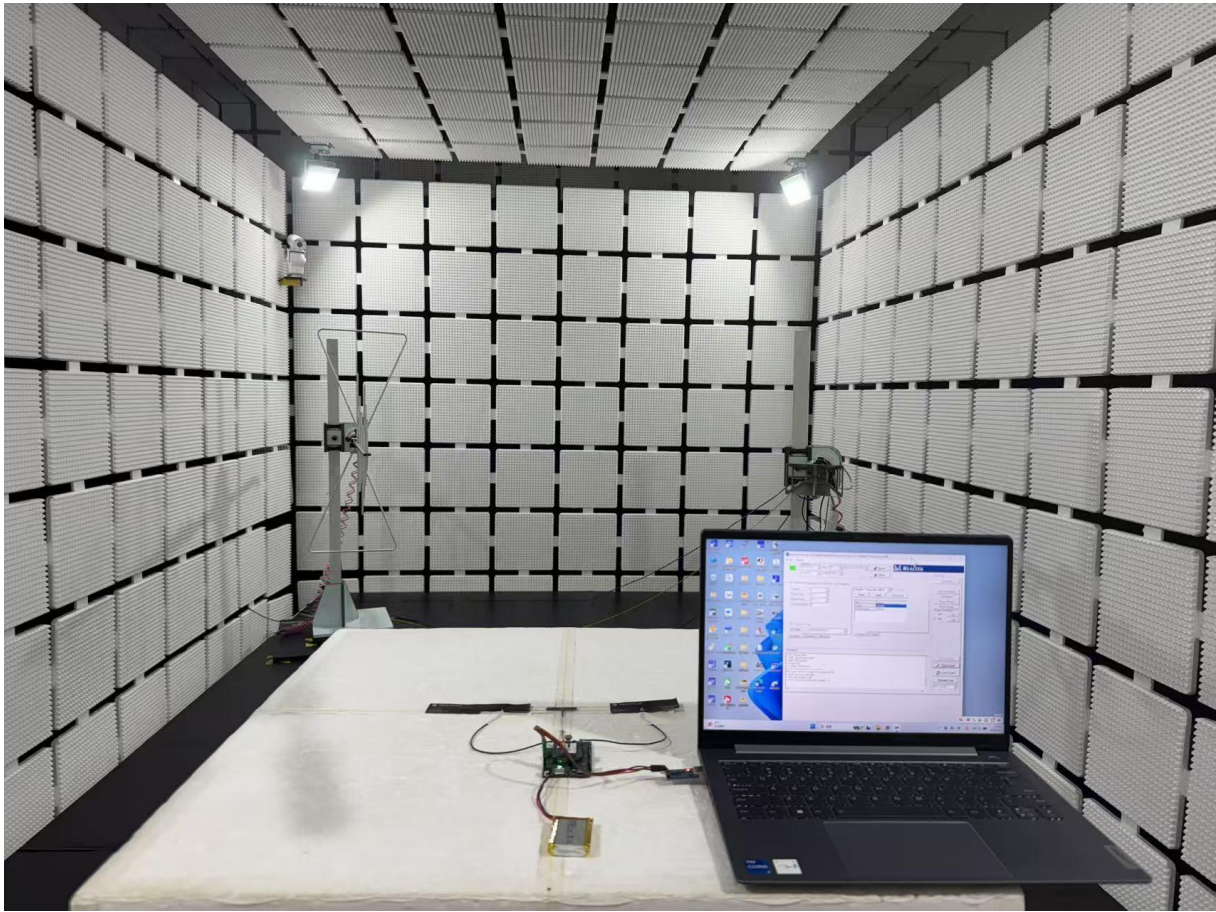
Measuring Instruments:

The measuring equipment is listed in the section 3.1 of this test report.

Test result:

The detailed test data see: **Appendix**.

5 Test Setup Photos



Appendix

Carrier frequencies

Test Result

Test Condition	TestMode	Antenna	Frequency[MHz]	Result[ppm]	Limit[ppm]	Verdict
LTNV	11ac20SISO	Ant2	5180	8.49421	±20	PASS
LTNV	11ac20SISO	Ant2	5260	8.36502	±20	PASS
LTNV	11ac20SISO	Ant2	5500	7.63636	±20	PASS
NTNV	11ac20SISO	Ant2	5180	8.49421	±20	PASS
NTNV	11ac20SISO	Ant2	5260	9.12548	±20	PASS
NTNV	11ac20SISO	Ant2	5500	7.63636	±20	PASS
HTNV	11ac20SISO	Ant2	5180	8.10811	±20	PASS
HTNV	11ac20SISO	Ant2	5260	8.36502	±20	PASS
HTNV	11ac20SISO	Ant2	5500	7.63636	±20	PASS
LTNV	11ac40SISO	Ant2	5190	8.09249	±20	PASS
LTNV	11ac40SISO	Ant2	5270	7.96964	±20	PASS
LTNV	11ac40SISO	Ant2	5510	7.62251	±20	PASS
NTNV	11ac40SISO	Ant2	5190	8.47784	±20	PASS
NTNV	11ac40SISO	Ant2	5270	7.96964	±20	PASS
NTNV	11ac40SISO	Ant2	5510	7.98548	±20	PASS
HTNV	11ac40SISO	Ant2	5190	7.70713	±20	PASS
HTNV	11ac40SISO	Ant2	5270	7.96964	±20	PASS
HTNV	11ac40SISO	Ant2	5510	7.98548	±20	PASS

RF Output Power

Test Result

Test Condition	Test Mode	Antenna	Frequency[MHz]	TPC	Conducted power [dBm]	Gain [dBi]	EIRP [dBm]	EIRP Limit [dBm]	Verdict
LTNV	11a	Ant2	5180	NA	11.65	6.80	18.45	23	PASS
LTNV	11a	Ant2	5240	NA	11.59	6.80	18.39	23	PASS
LTNV	11a	Ant2	5260	NA	11.53	6.80	18.33	20	PASS
LTNV	11a	Ant2	5320	NA	11.37	6.80	18.17	20	PASS
LTNV	11a	Ant2	5500	NA	11.80	6.80	18.60	20	PASS
LTNV	11a	Ant2	5700	NA	11.68	6.80	18.48	20	PASS
NTNV	11a	Ant2	5180	NA	11.66	6.80	18.46	23	PASS
NTNV	11a	Ant2	5240	NA	11.61	6.80	18.41	23	PASS
NTNV	11a	Ant2	5260	NA	11.55	6.80	18.35	20	PASS
NTNV	11a	Ant2	5320	NA	11.38	6.80	18.18	20	PASS
NTNV	11a	Ant2	5500	NA	11.81	6.80	18.61	20	PASS
NTNV	11a	Ant2	5700	NA	11.70	6.80	18.50	20	PASS
HTNV	11a	Ant2	5180	NA	11.65	6.80	18.45	23	PASS
HTNV	11a	Ant2	5240	NA	11.60	6.80	18.40	23	PASS
HTNV	11a	Ant2	5260	NA	11.52	6.80	18.32	20	PASS
HTNV	11a	Ant2	5320	NA	11.37	6.80	18.17	20	PASS
HTNV	11a	Ant2	5500	NA	11.79	6.80	18.59	20	PASS
HTNV	11a	Ant2	5700	NA	11.67	6.80	18.47	20	PASS
LTNV	11n20SISO	Ant2	5180	NA	11.96	6.80	18.76	23	PASS
LTNV	11n20SISO	Ant2	5240	NA	11.66	6.80	18.46	23	PASS
LTNV	11n20SISO	Ant2	5260	NA	11.61	6.80	18.41	20	PASS
LTNV	11n20SISO	Ant2	5320	NA	11.46	6.80	18.26	20	PASS
LTNV	11n20SISO	Ant2	5500	NA	11.84	6.80	18.64	20	PASS
LTNV	11n20SISO	Ant2	5700	NA	11.84	6.80	18.64	20	PASS
NTNV	11n20SISO	Ant2	5180	NA	12.01	6.80	18.81	23	PASS
NTNV	11n20SISO	Ant2	5240	NA	11.69	6.80	18.49	23	PASS
NTNV	11n20SISO	Ant2	5260	NA	11.65	6.80	18.45	20	PASS
NTNV	11n20SISO	Ant2	5320	NA	11.50	6.80	18.30	20	PASS
NTNV	11n20SISO	Ant2	5500	NA	11.88	6.80	18.68	20	PASS
NTNV	11n20SISO	Ant2	5700	NA	11.91	6.80	18.71	20	PASS
HTNV	11n20SISO	Ant2	5180	NA	11.92	6.80	18.72	23	PASS
HTNV	11n20SISO	Ant2	5240	NA	11.63	6.80	18.43	23	PASS
HTNV	11n20SISO	Ant2	5260	NA	11.59	6.80	18.39	20	PASS
HTNV	11n20SISO	Ant2	5320	NA	11.44	6.80	18.24	20	PASS
HTNV	11n20SISO	Ant2	5500	NA	11.83	6.80	18.63	20	PASS
HTNV	11n20SISO	Ant2	5700	NA	11.81	6.80	18.61	20	PASS
LTNV	11n40SISO	Ant2	5190	NA	11.39	6.80	18.19	23	PASS
LTNV	11n40SISO	Ant2	5230	NA	11.44	6.80	18.24	23	PASS
LTNV	11n40SISO	Ant2	5270	NA	11.28	6.80	18.08	20	PASS
LTNV	11n40SISO	Ant2	5310	NA	11.63	6.80	18.43	20	PASS
LTNV	11n40SISO	Ant2	5510	NA	11.83	6.80	18.63	20	PASS
LTNV	11n40SISO	Ant2	5670	NA	11.59	6.80	18.39	20	PASS
NTNV	11n40SISO	Ant2	5190	NA	11.38	6.80	18.18	23	PASS
NTNV	11n40SISO	Ant2	5230	NA	11.59	6.80	18.39	23	PASS
NTNV	11n40SISO	Ant2	5270	NA	11.25	6.80	18.05	20	PASS
NTNV	11n40SISO	Ant2	5310	NA	11.68	6.80	18.48	20	PASS
NTNV	11n40SISO	Ant2	5510	NA	11.98	6.80	18.78	20	PASS
NTNV	11n40SISO	Ant2	5670	NA	11.60	6.80	18.40	20	PASS
HTNV	11n40SISO	Ant2	5190	NA	11.49	6.80	18.29	23	PASS
HTNV	11n40SISO	Ant2	5230	NA	11.45	6.80	18.25	23	PASS
HTNV	11n40SISO	Ant2	5270	NA	11.26	6.80	18.06	20	PASS
HTNV	11n40SISO	Ant2	5310	NA	11.58	6.80	18.38	20	PASS
HTNV	11n40SISO	Ant2	5510	NA	11.94	6.80	18.74	20	PASS
HTNV	11n40SISO	Ant2	5670	NA	11.70	6.80	18.50	20	PASS
LTNV	11ac20SISO	Ant2	5180	NA	11.78	6.80	18.58	23	PASS
LTNV	11ac20SISO	Ant2	5240	NA	11.42	6.80	18.22	23	PASS
LTNV	11ac20SISO	Ant2	5260	NA	11.29	6.80	18.09	20	PASS
LTNV	11ac20SISO	Ant2	5320	NA	11.27	6.80	18.07	20	PASS
LTNV	11ac20SISO	Ant2	5500	NA	11.71	6.80	18.51	20	PASS
LTNV	11ac20SISO	Ant2	5700	NA	11.47	6.80	18.27	20	PASS

NTNV	11ac20SISO	Ant2	5180	NA	11.82	6.80	18.62	23	PASS
NTNV	11ac20SISO	Ant2	5240	NA	11.42	6.80	18.22	23	PASS
NTNV	11ac20SISO	Ant2	5260	NA	11.33	6.80	18.13	20	PASS
NTNV	11ac20SISO	Ant2	5320	NA	11.32	6.80	18.12	20	PASS
NTNV	11ac20SISO	Ant2	5500	NA	11.73	6.80	18.53	20	PASS
NTNV	11ac20SISO	Ant2	5700	NA	11.50	6.80	18.30	20	PASS
HTNV	11ac20SISO	Ant2	5180	NA	11.76	6.80	18.56	23	PASS
HTNV	11ac20SISO	Ant2	5240	NA	11.39	6.80	18.19	23	PASS
HTNV	11ac20SISO	Ant2	5260	NA	11.29	6.80	18.09	20	PASS
HTNV	11ac20SISO	Ant2	5320	NA	11.23	6.80	18.03	20	PASS
HTNV	11ac20SISO	Ant2	5500	NA	11.68	6.80	18.48	20	PASS
HTNV	11ac20SISO	Ant2	5700	NA	11.48	6.80	18.28	20	PASS
LTVN	11ac40SISO	Ant2	5190	NA	11.42	6.80	18.22	23	PASS
LTVN	11ac40SISO	Ant2	5230	NA	11.58	6.80	18.38	23	PASS
LTVN	11ac40SISO	Ant2	5270	NA	11.48	6.80	18.28	20	PASS
LTVN	11ac40SISO	Ant2	5310	NA	11.93	6.80	18.73	20	PASS
LTVN	11ac40SISO	Ant2	5510	NA	11.87	6.80	18.67	20	PASS
LTVN	11ac40SISO	Ant2	5670	NA	11.44	6.80	18.24	20	PASS
NTNV	11ac40SISO	Ant2	5190	NA	11.45	6.80	18.25	23	PASS
NTNV	11ac40SISO	Ant2	5230	NA	11.53	6.80	18.33	23	PASS
NTNV	11ac40SISO	Ant2	5270	NA	11.48	6.80	18.28	20	PASS
NTNV	11ac40SISO	Ant2	5310	NA	11.98	6.80	18.78	20	PASS
NTNV	11ac40SISO	Ant2	5510	NA	11.88	6.80	18.68	20	PASS
NTNV	11ac40SISO	Ant2	5670	NA	11.58	6.80	18.38	20	PASS
HTNV	11ac40SISO	Ant2	5190	NA	11.42	6.80	18.22	23	PASS
HTNV	11ac40SISO	Ant2	5230	NA	11.44	6.80	18.24	23	PASS
HTNV	11ac40SISO	Ant2	5270	NA	11.47	6.80	18.27	20	PASS
HTNV	11ac40SISO	Ant2	5310	NA	11.93	6.80	18.73	20	PASS
HTNV	11ac40SISO	Ant2	5510	NA	11.86	6.80	18.66	20	PASS
HTNV	11ac40SISO	Ant2	5670	NA	11.46	6.80	18.26	20	PASS

Power Spectral Density

Test Result

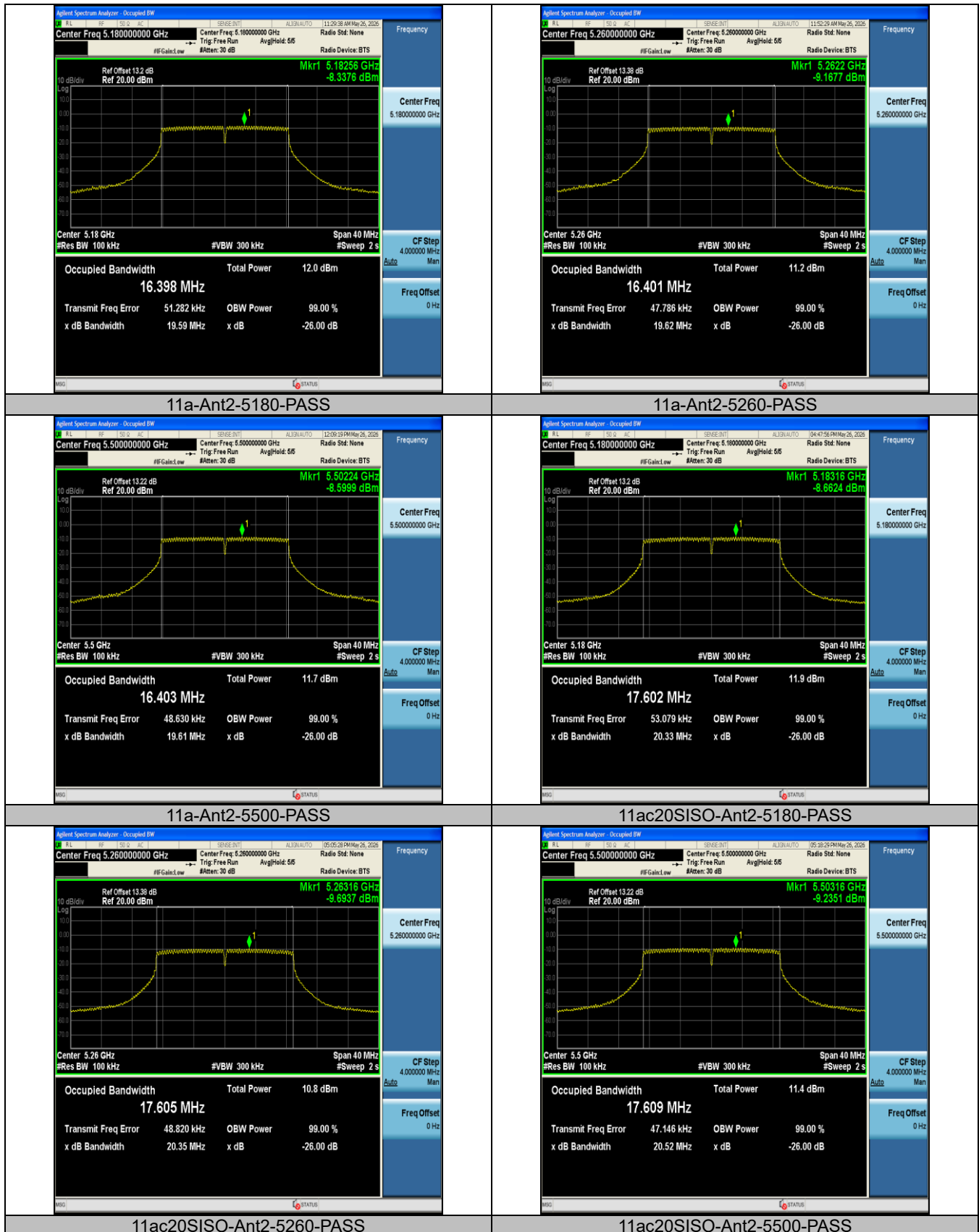
TestMode	Antenna	Channel	EIRP PSD [dBm/MHz]	Limit [dBm]	Verdict
11a	Ant2	5180	6.81	10	PASS
11a	Ant2	5240	6.73	10	PASS
11a	Ant2	5260	6.63	7	PASS
11a	Ant2	5320	6.51	7	PASS
11a	Ant2	5500	6.87	7	PASS
11a	Ant2	5700	6.80	7	PASS
11ac20SISO	Ant2	5180	6.78	10	PASS
11ac20SISO	Ant2	5240	6.35	10	PASS
11ac20SISO	Ant2	5260	6.21	7	PASS
11ac20SISO	Ant2	5320	6.25	7	PASS
11ac20SISO	Ant2	5500	6.56	7	PASS
11ac20SISO	Ant2	5700	6.36	7	PASS

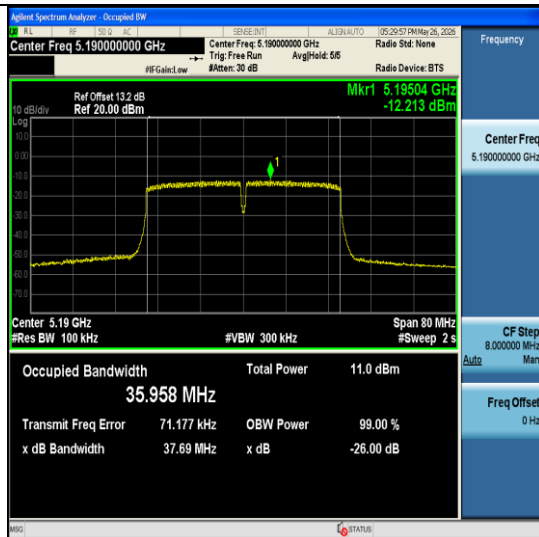
Occupied Channel Bandwidth

Test Result

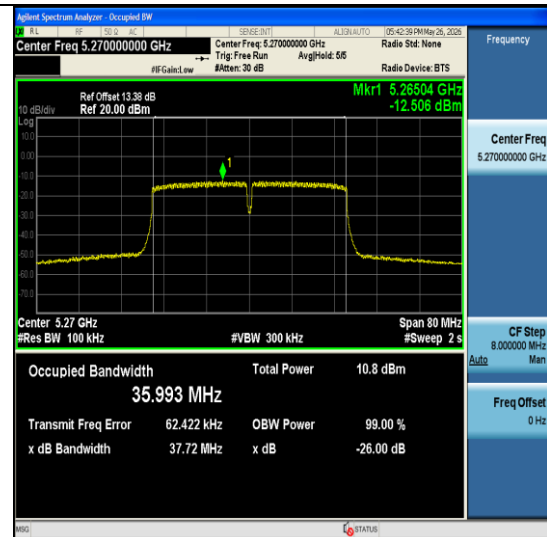
TestMode	Antenna	Frequency[MHz]	OCB[MHz]	Limit[MHz]	Verdict
11a	Ant2	5180	16.398	20	PASS
11a	Ant2	5260	16.401	16 to 20	PASS
11a	Ant2	5500	16.403	16 to 20	PASS
11ac20SISO	Ant2	5180	17.602	20	PASS
11ac20SISO	Ant2	5260	17.605	16 to 20	PASS
11ac20SISO	Ant2	5500	17.609	16 to 20	PASS
11ac40SISO	Ant2	5190	35.958	40	PASS
11ac40SISO	Ant2	5270	35.993	32 to 40	PASS
11ac40SISO	Ant2	5510	35.980	32 to 40	PASS

Test Graphs

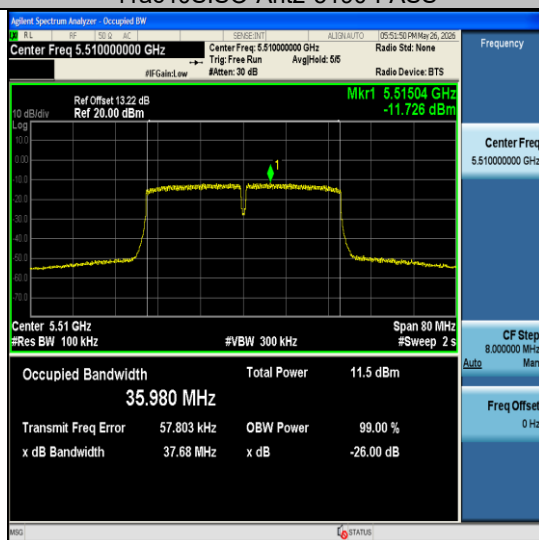




11ac40SISO-Ant2-5190-PASS



11ac40SISO-Ant2-5270-PASS

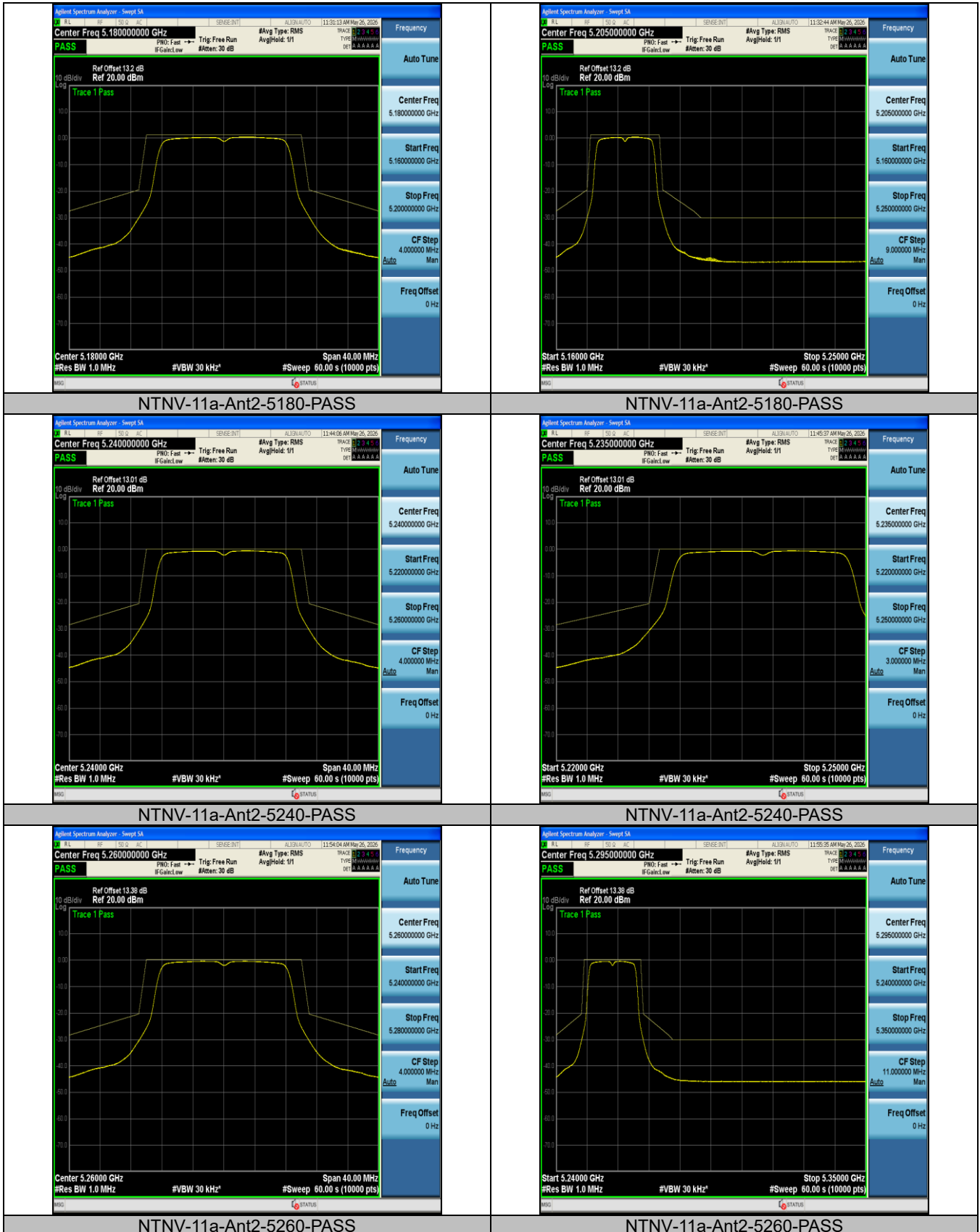


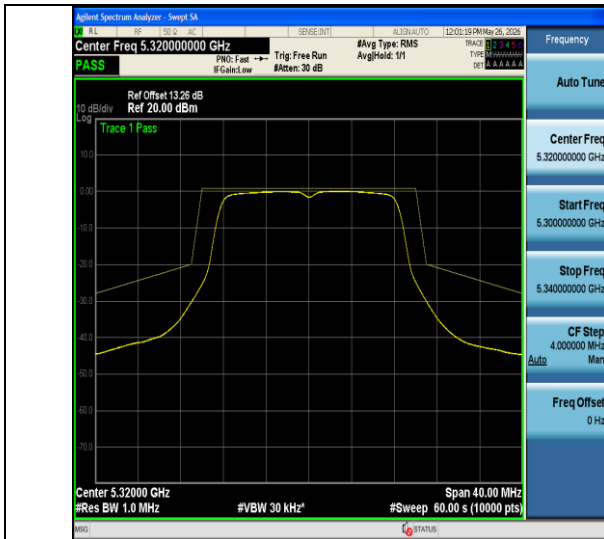
11ac40SISO-Ant2-5510-PASS

Transmitter unwanted emissions within the 5 GHz RLAN bands**Test Result**

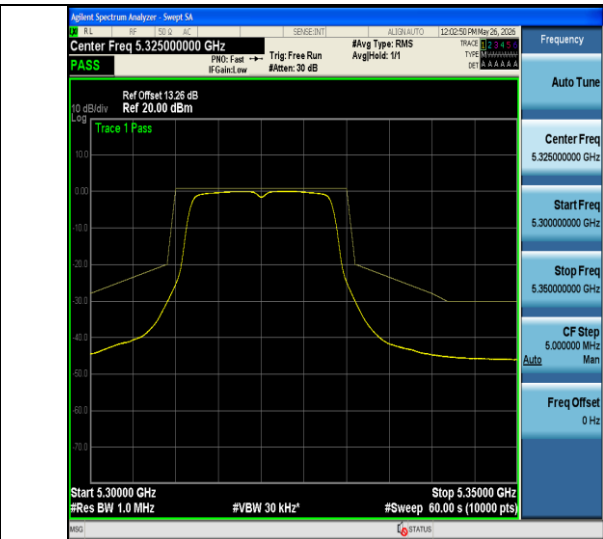
TestMode	Antenna	Frequency[MHz]	Result [dBm]	Limit[dBm]	Verdict
11a	Ant2	5180	See test graph	See test graph	PASS
11a	Ant2	5240	See test graph	See test graph	PASS
11a	Ant2	5260	See test graph	See test graph	PASS
11a	Ant2	5320	See test graph	See test graph	PASS
11a	Ant2	5500	See test graph	See test graph	PASS
11a	Ant2	5700	See test graph	See test graph	PASS
11ac20SISO	Ant2	5180	See test graph	See test graph	PASS
11ac20SISO	Ant2	5240	See test graph	See test graph	PASS
11ac20SISO	Ant2	5260	See test graph	See test graph	PASS
11ac20SISO	Ant2	5320	See test graph	See test graph	PASS
11ac20SISO	Ant2	5500	See test graph	See test graph	PASS
11ac20SISO	Ant2	5700	See test graph	See test graph	PASS
11ac40SISO	Ant2	5190	See test graph	See test graph	PASS
11ac40SISO	Ant2	5230	See test graph	See test graph	PASS
11ac40SISO	Ant2	5270	See test graph	See test graph	PASS
11ac40SISO	Ant2	5310	See test graph	See test graph	PASS
11ac40SISO	Ant2	5510	See test graph	See test graph	PASS
11ac40SISO	Ant2	5670	See test graph	See test graph	PASS

Test Graphs

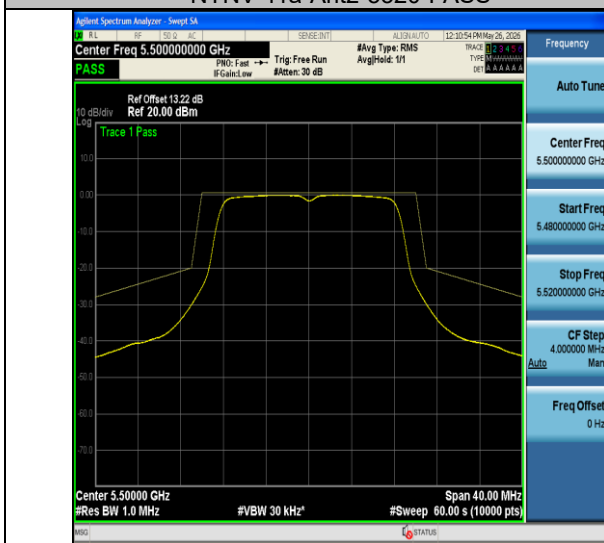




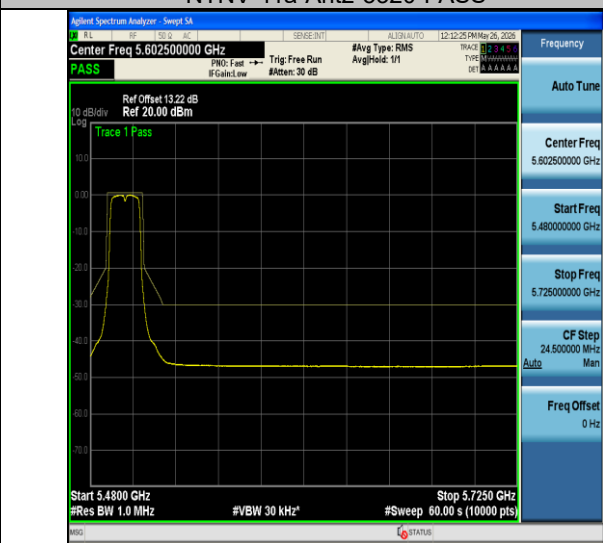
NTVN-11a-Ant2-5320-PASS



NTVN-11a-Ant2-5320-PASS



NTVN-11a-Ant2-5500-PASS



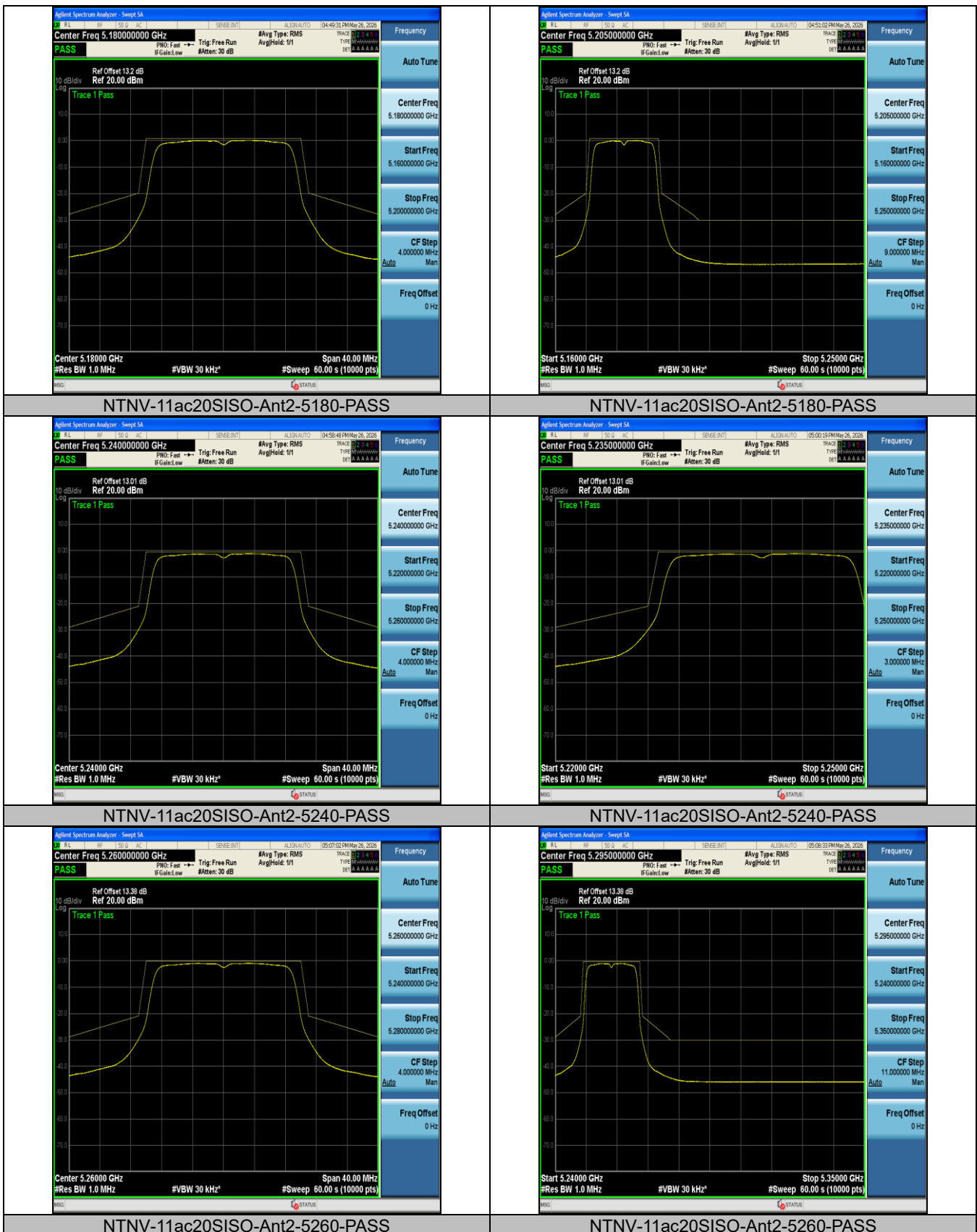
NTVN-11a-Ant2-5500-PASS

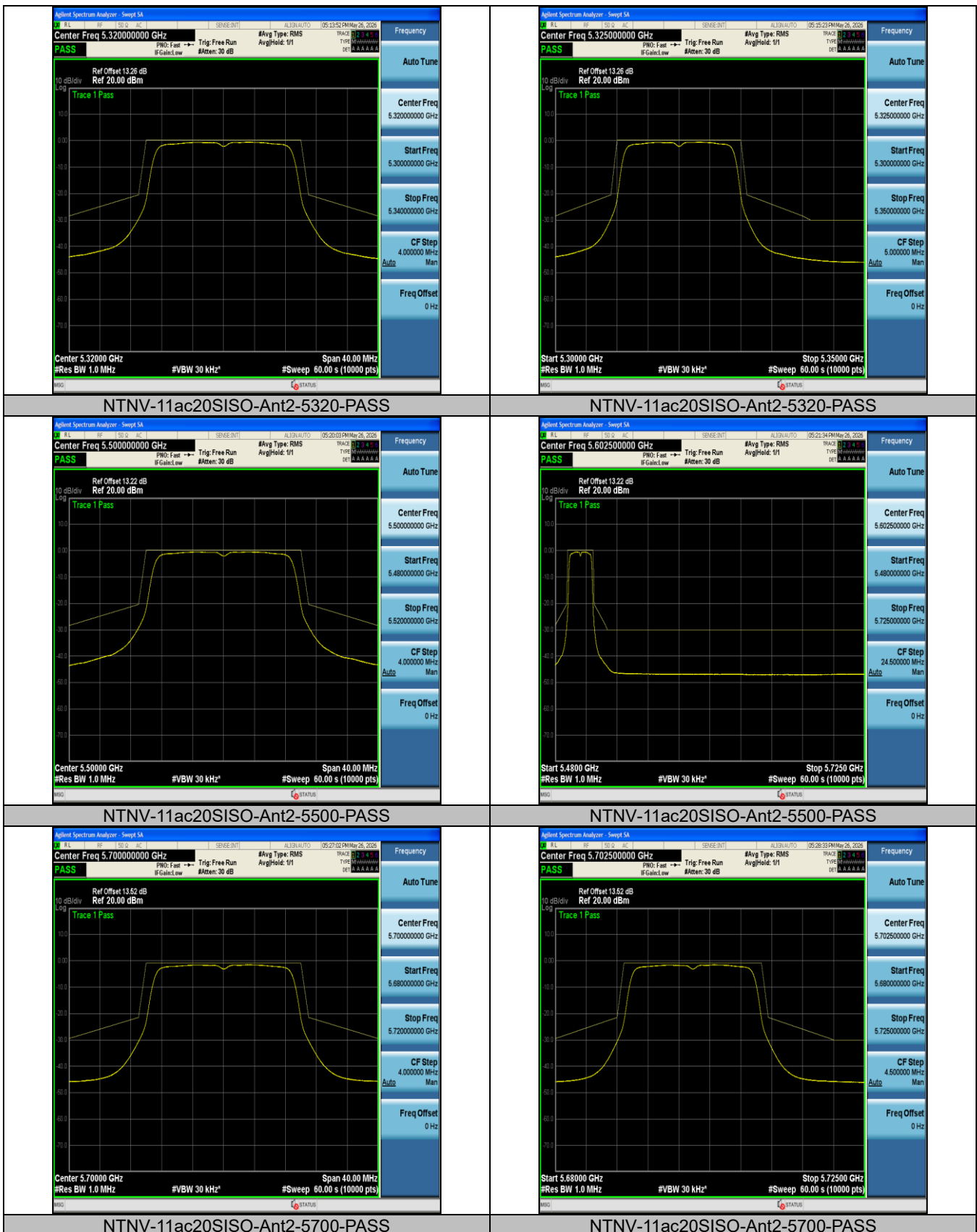


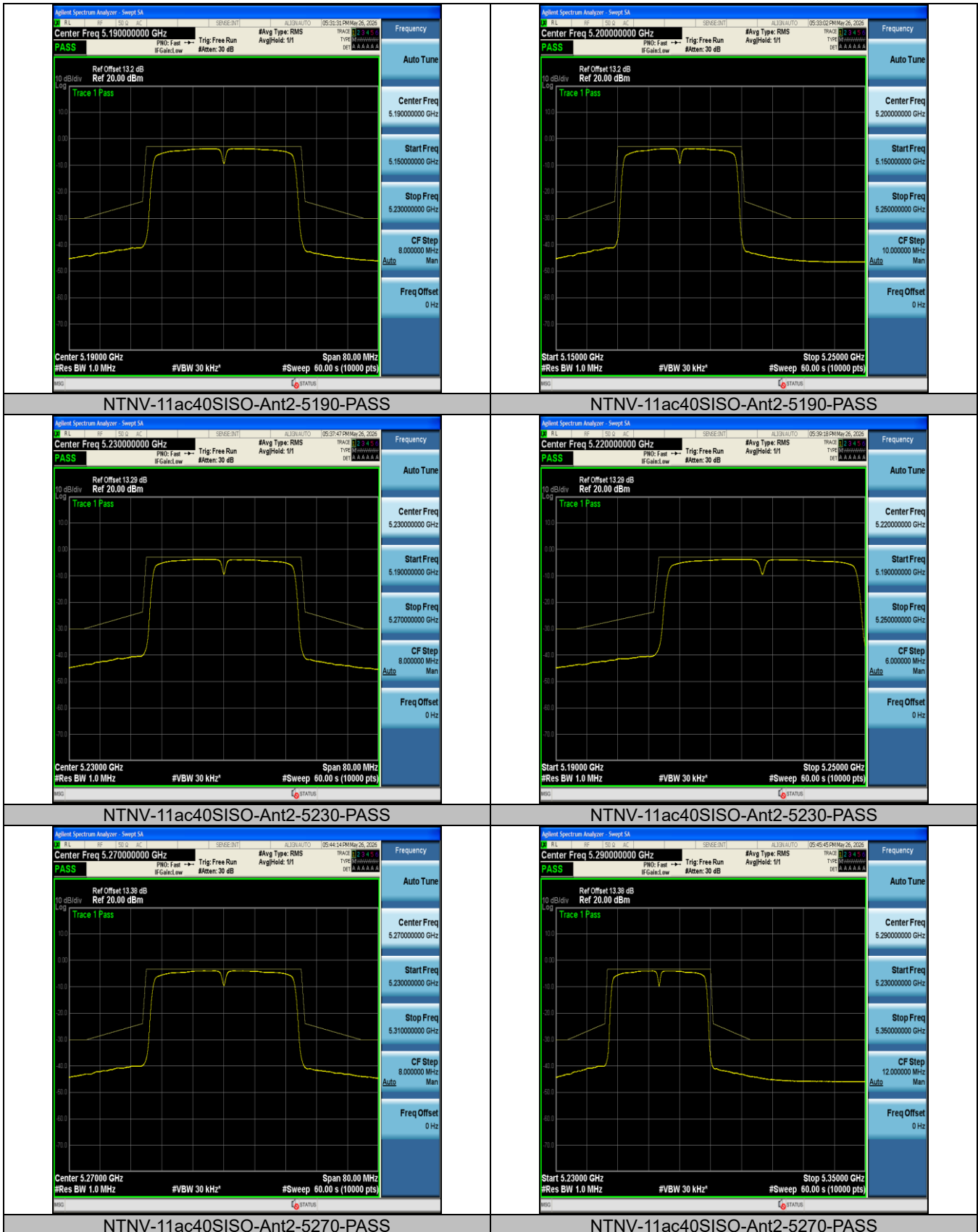
NTVN-11a-Ant2-5700-PASS

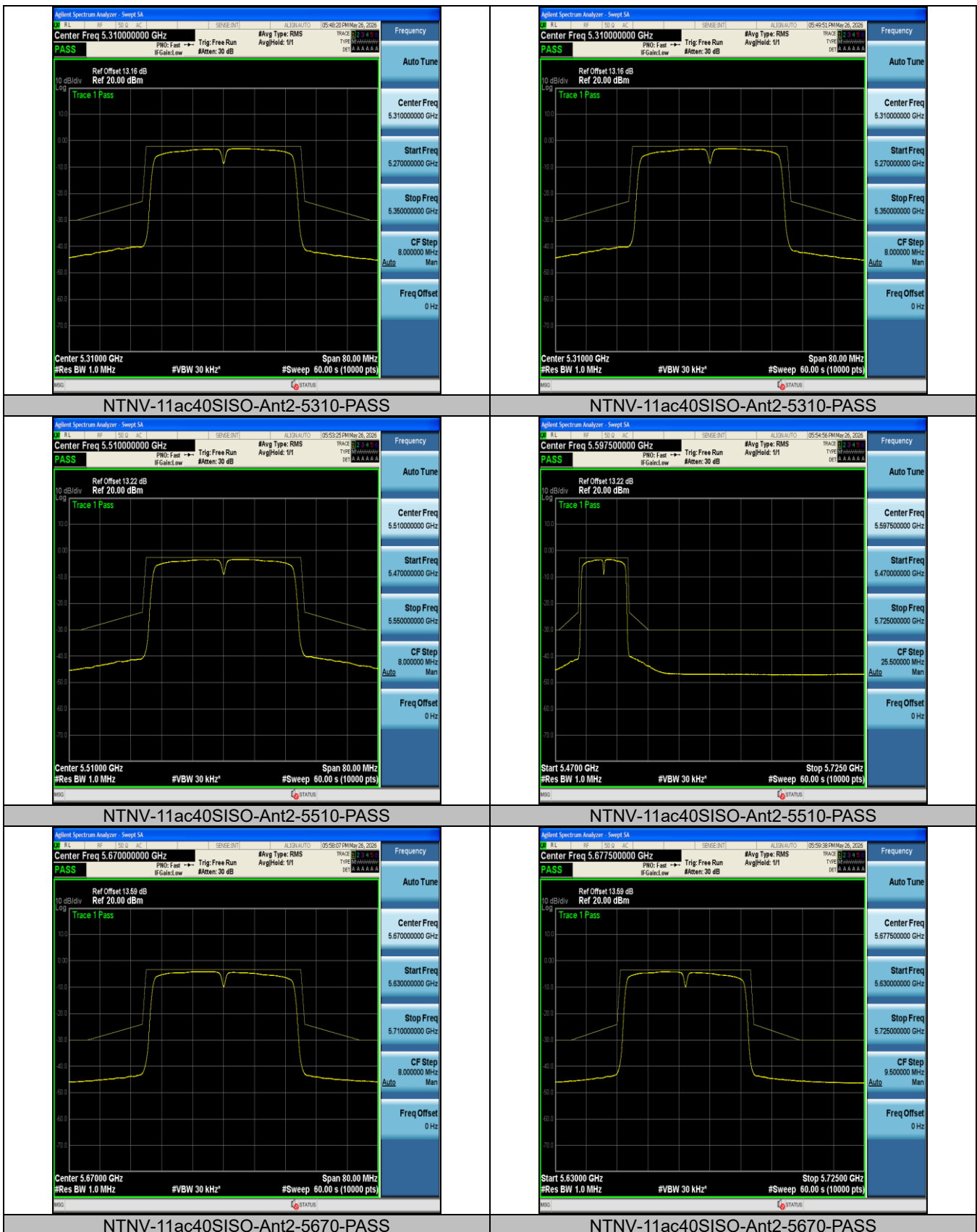


NTVN-11a-Ant2-5700-PASS







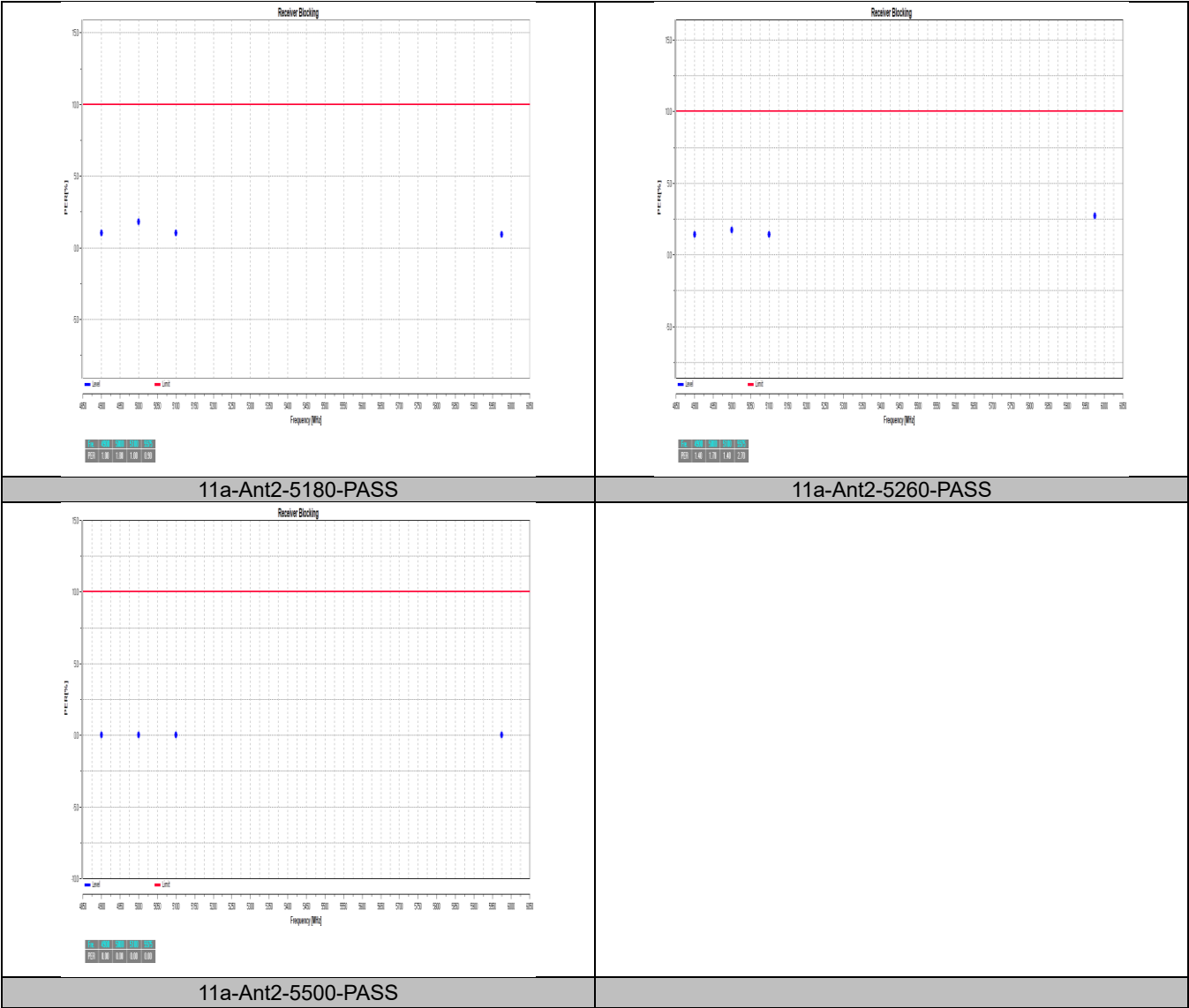


Receiver Blocking

Test Result

TestMode	Antenna	Frequency[MHz]	Pmin [dBm]	Wanted signal [dBm]	Freq. [MHz]	CW [dBm]	PER [%]	Limit [%]	Verdict
11a	Ant2	5180	-90	-84	4900	-53	1.00	≤10	PASS
11a	Ant2	5180	-90	-84	5000	-53	1.80	≤10	PASS
11a	Ant2	5180	-90	-84	5100	-59	1.00	≤10	PASS
11a	Ant2	5180	-90	-84	5975	-53	0.90	≤10	PASS
11a	Ant2	5260	-90	-84	4900	-53	1.40	≤10	PASS
11a	Ant2	5260	-90	-84	5000	-53	1.70	≤10	PASS
11a	Ant2	5260	-90	-84	5100	-59	1.40	≤10	PASS
11a	Ant2	5260	-90	-84	5975	-53	2.70	≤10	PASS
11a	Ant2	5500	-87	-81	4900	-53	0.00	≤10	PASS
11a	Ant2	5500	-87	-81	5000	-53	0.00	≤10	PASS
11a	Ant2	5500	-87	-81	5100	-59	0.00	≤10	PASS
11a	Ant2	5500	-87	-81	5975	-53	0.00	≤10	PASS

Test Graphs

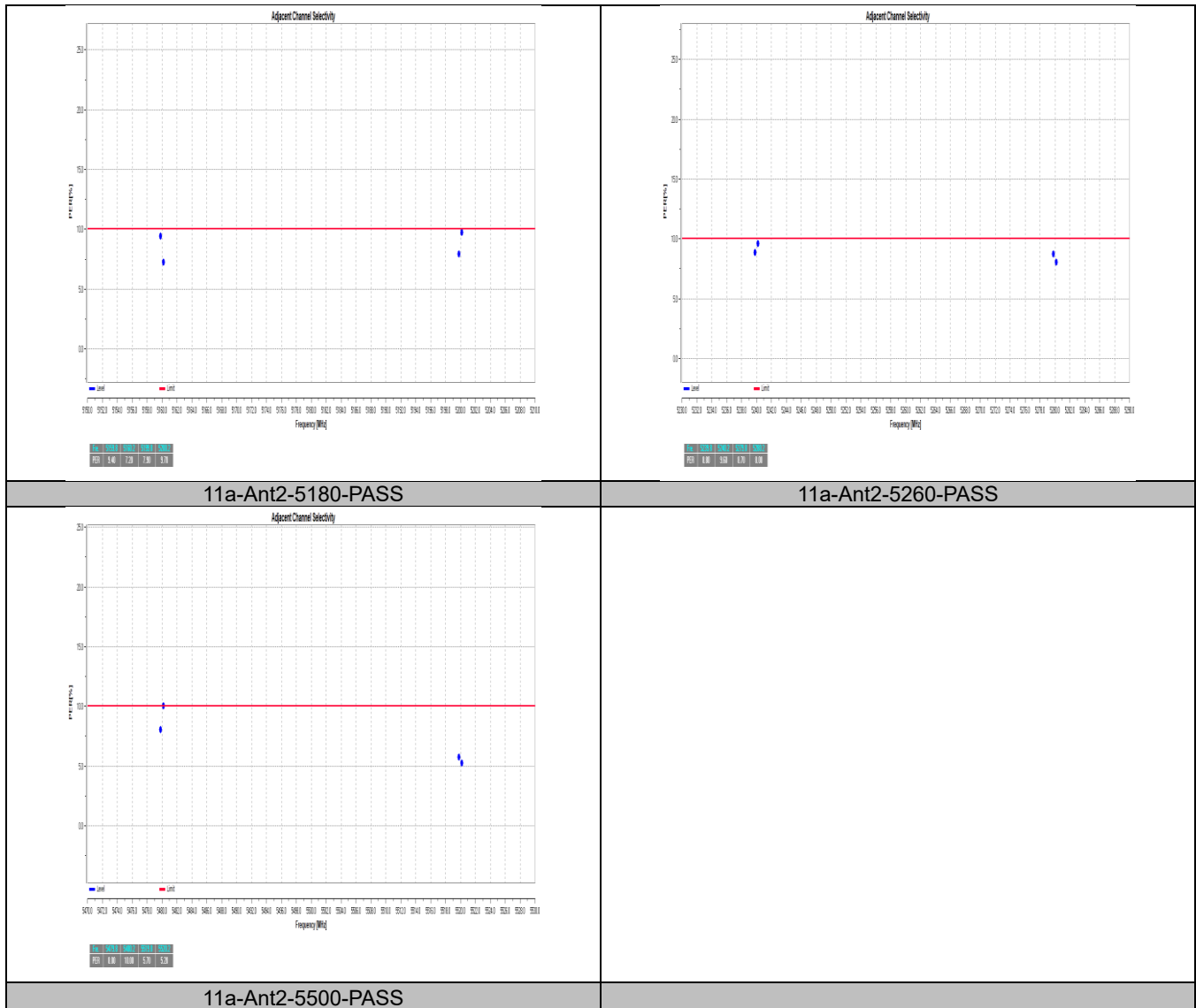


Receiver Adjacent Channel Selectivity

Test Result

TestMode	Antenna	Frequency [MHz]	Pmin [dBm]	Wanted signal [dBm]	Freq. [MHz]	CW [dBm]	PER [%]	Limit [%]	Verdict
11a	Ant2	5180	-90	-80	5159.8	-49	9.40	≤10	PASS
11a	Ant2	5180	-90	-80	5160.2	-51	7.20	≤10	PASS
11a	Ant2	5180	-90	-80	5199.8	-50	7.90	≤10	PASS
11a	Ant2	5180	-90	-80	5200.2	-48	9.70	≤10	PASS
11a	Ant2	5260	-90	-80	5239.8	-49	8.80	≤10	PASS
11a	Ant2	5260	-90	-80	5240.2	-50	9.60	≤10	PASS
11a	Ant2	5260	-90	-80	5279.8	-51	8.70	≤10	PASS
11a	Ant2	5260	-90	-80	5280.2	-49	8.00	≤10	PASS
11a	Ant2	5500	-87	-77	5479.8	-47	8.00	≤10	PASS
11a	Ant2	5500	-87	-77	5480.2	-48	10.00	≤10	PASS
11a	Ant2	5500	-87	-77	5519.8	-49	5.70	≤10	PASS
11a	Ant2	5500	-87	-77	5520.2	-48	5.20	≤10	PASS

Test Graphs

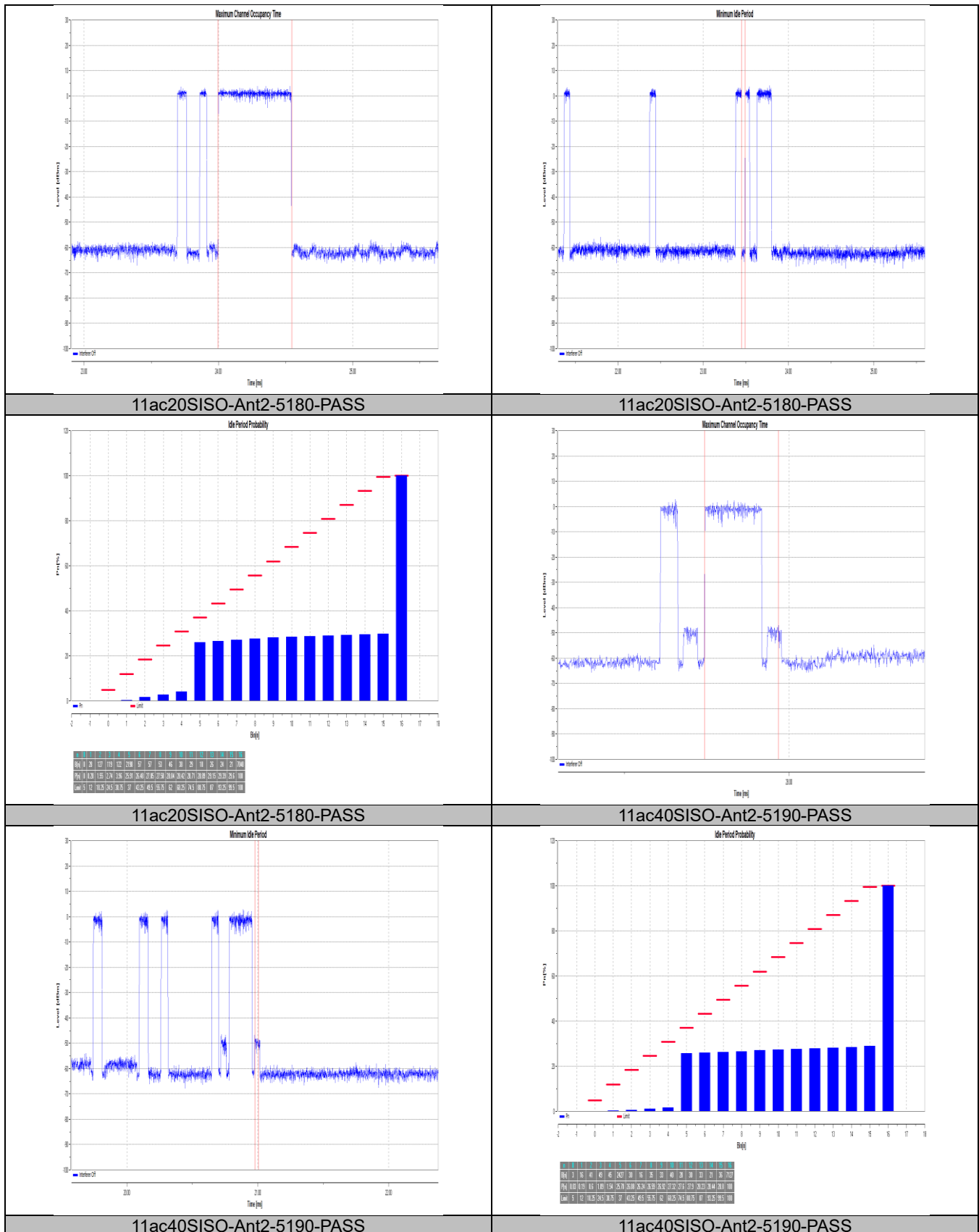


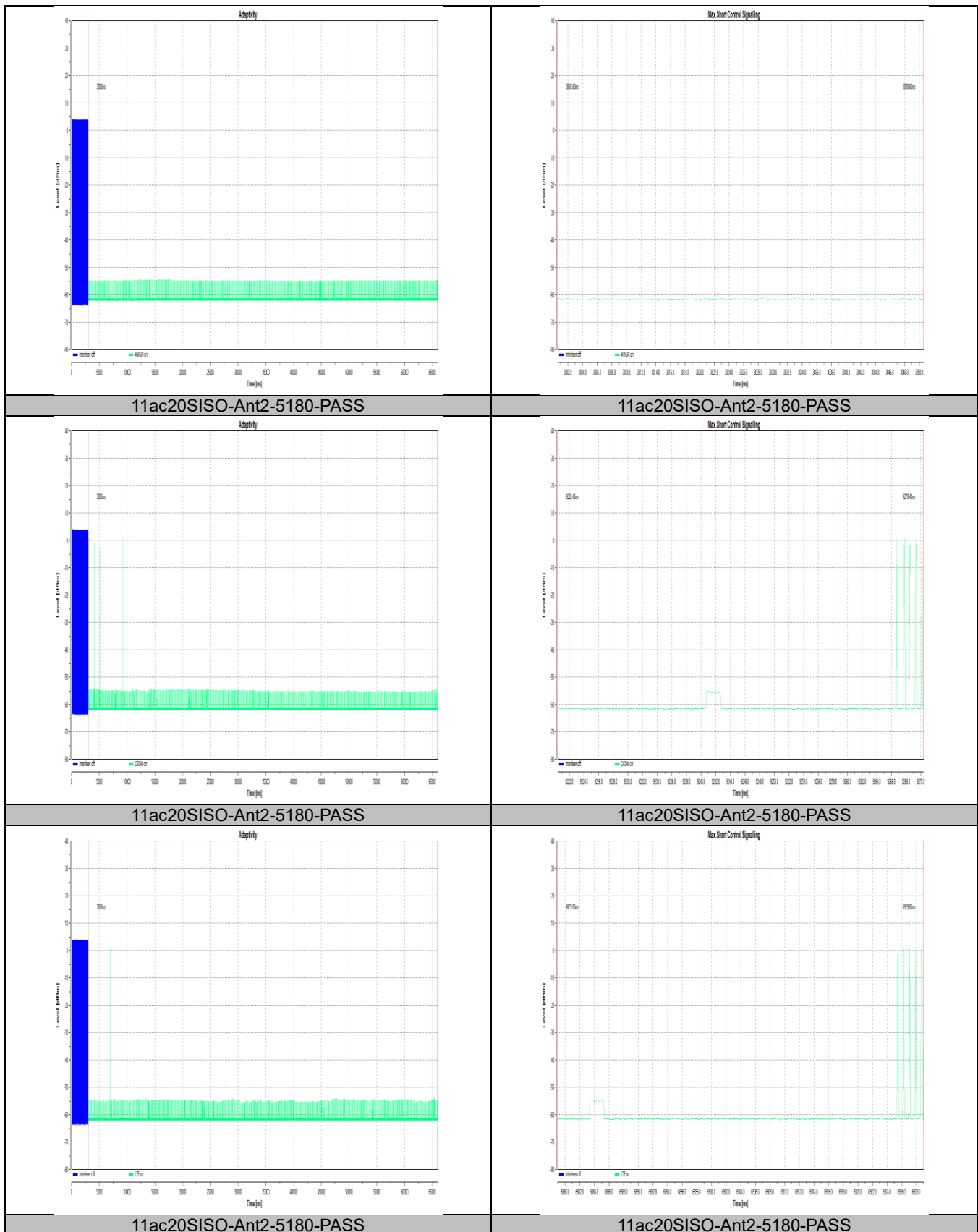
**Adaptivity
Test Result**

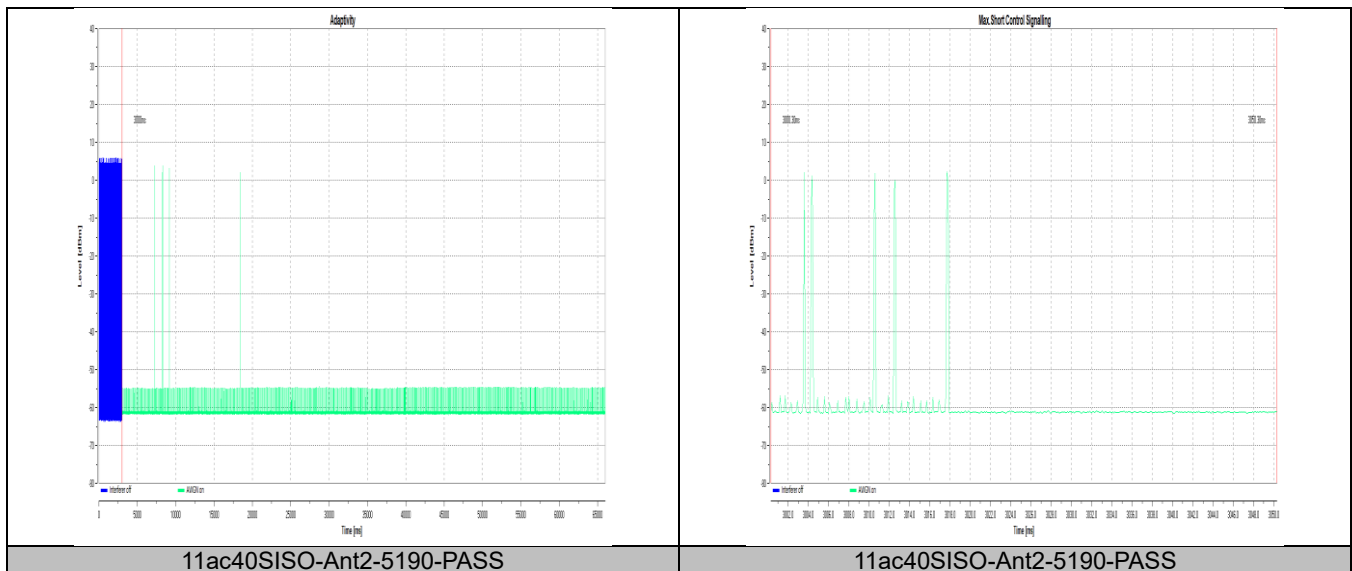
Test Mode	ANT	Freq. [MHz]	Priority Class	Max. COT [ms]	Limit [ms]	Min.Idle Time[ms]	Limit [ms]	Idle Period probability	Verdict
11ac20SISO	Ant2	5180	2	0.546	6.000	0.043	0.027	See the graph	PASS
11ac40SISO	Ant2	5190	2	0.223	6.000	0.028	0.027	See the graph	PASS

Test Mode	ANT	Freq. [MHz]	Interference Type	Add interference Time [ms]	Interference Level [dBm/MHz]	Max. Short Control number [n]	Limit [n]	Max. Short Control Time [ms]	Limit [ms]	Verdict
11ac20SISO	Ant2	5180	AWGN	3000	-75.00	0	50	0.00	2.5	PASS
11ac20SISO	Ant2	5180	OFDM	3000	-75.00	5	50	0.70	2.5	PASS
11ac20SISO	Ant2	5180	LTE	3000	-75.00	5	50	0.70	2.5	PASS
11ac40SISO	Ant2	5190	AWGN	3000	-75.00	5	50	0.90	2.5	PASS

Test Graphs



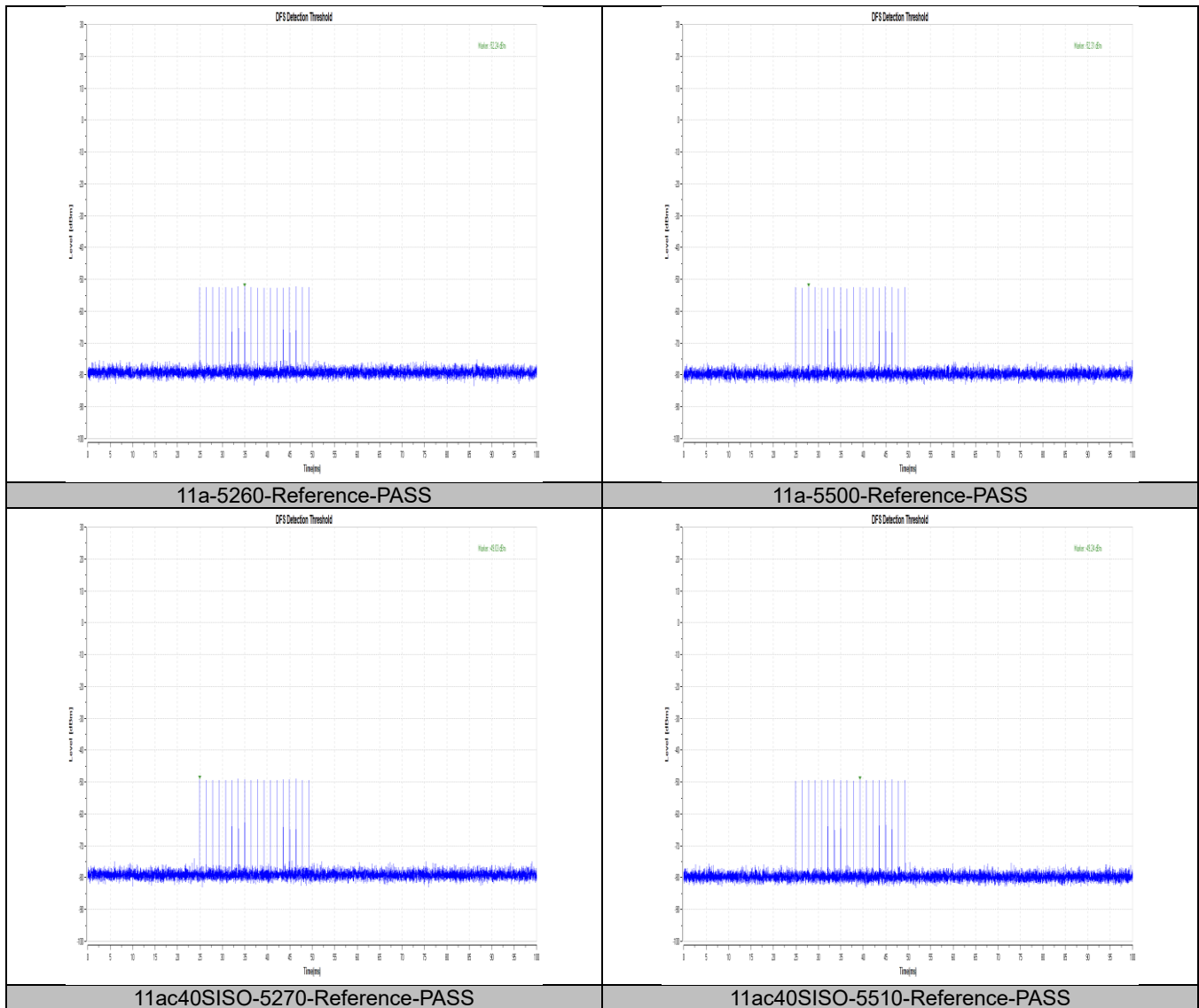




**DFS Detection Thresholds
Test Result**

TestMode	Frequency[MHz]	Radar Type	Result	Limit[dbm]	Verdict
11a	5260	Reference	-52.24	-51.83	PASS
11a	5500	Reference	-52.31	-52.07	PASS
11ac40SISO	5270	Reference	-49.03	-48.64	PASS
11ac40SISO	5510	Reference	-49.24	-49.10	PASS

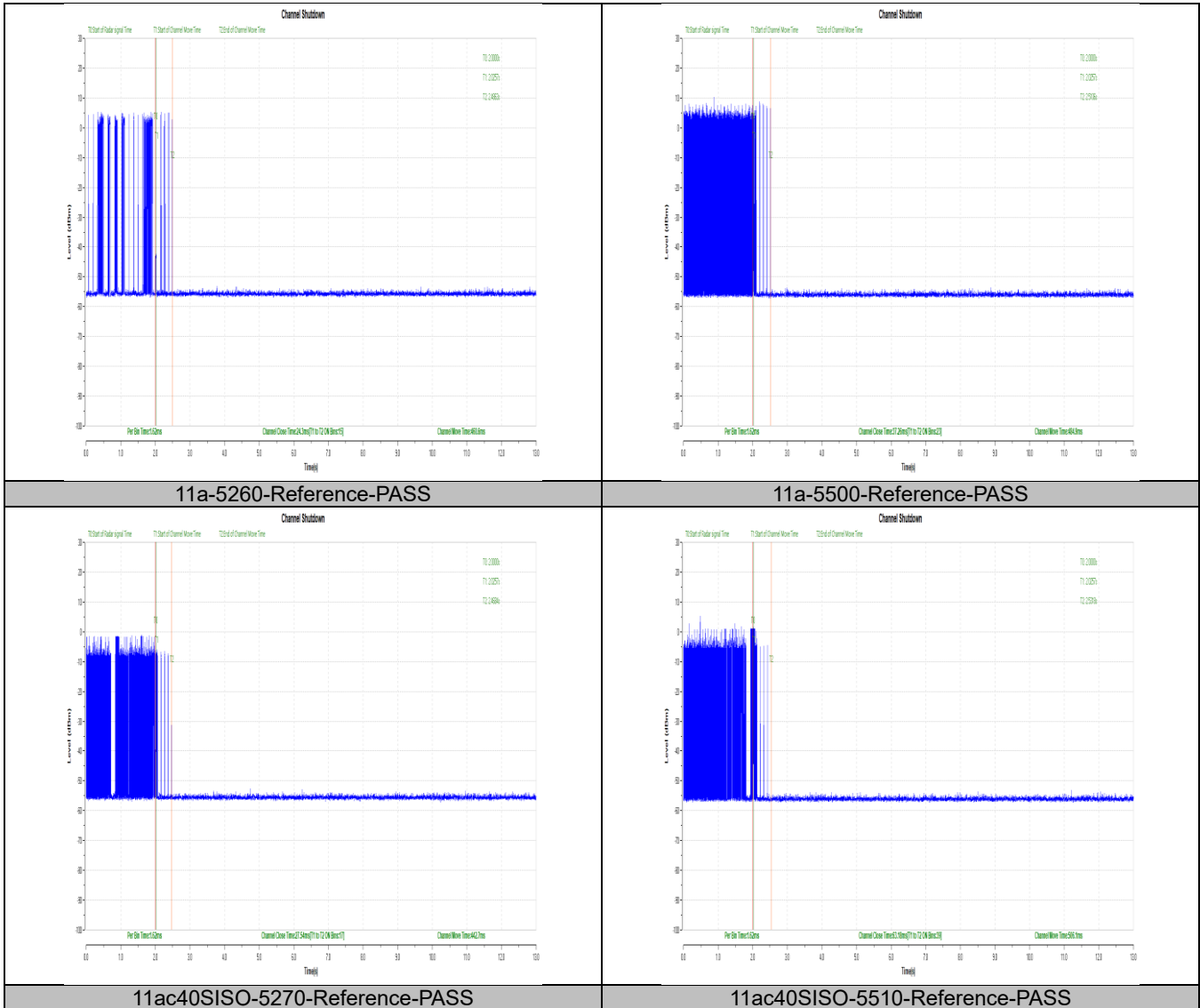
Test Graphs



Channel Move Time and Channel Closing Transmission Time Test Result

TestMode	Frequency[MHz]	CCTT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11a	5260	24.3	1000	460.6	10000	PASS
11a	5500	37.26	1000	484.9	10000	PASS
11ac40SISO	5270	27.54	1000	442.7	10000	PASS
11ac40SISO	5510	63.18	1000	506.1	10000	PASS

Test Graphs



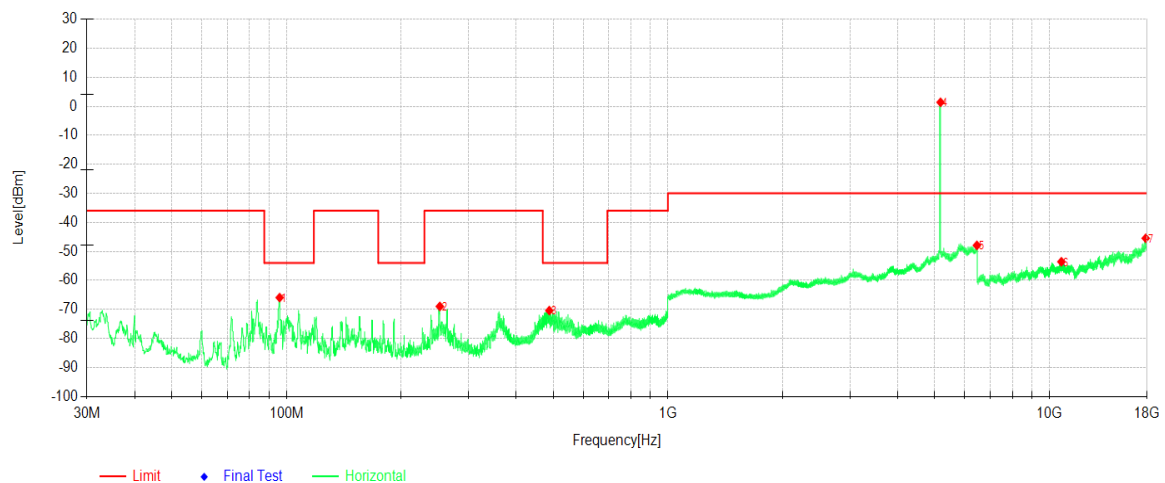
Transmitter unwanted emissions outside the transmitter's operating bands

Test for spot check:

Test Result

Project Information			
Mode:	802.11a	Band:	5150~5250MHz
Bandwidth:	-	Channel:	Low
IMEI:	862063070036368	Engineer:	Zhangweizhi
Remark:			

Test Graph



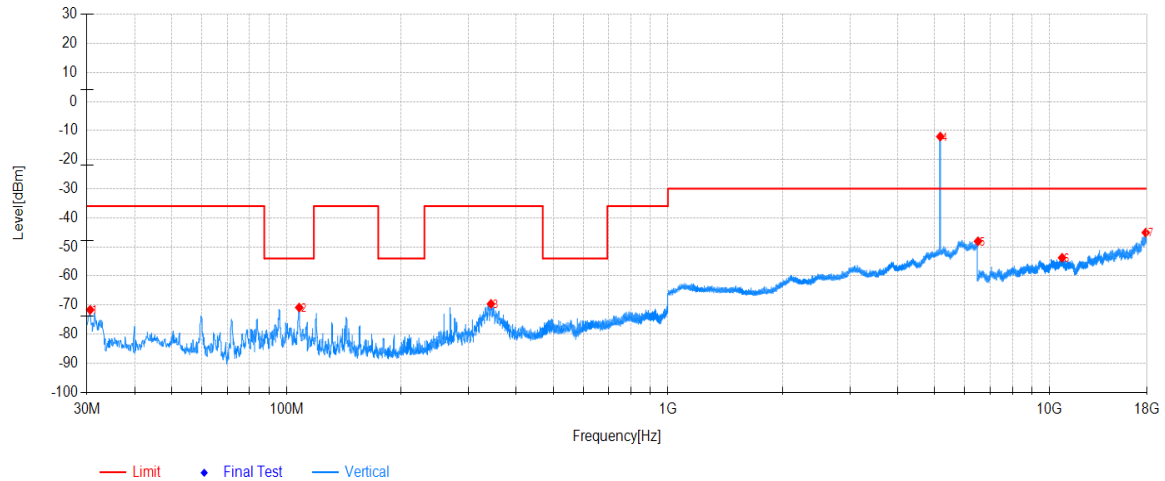
Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	95.97	-51.54	-65.93	-54.00	11.93	-14.39	Horizontal
2	252.35	-59.13	-68.98	-36.00	32.98	-9.85	Horizontal
3	488.66	-64.24	-70.40	-54.00	16.40	-6.16	Horizontal
4	5183.51	-24.62	1.38	-	-	26.00	Horizontal
5	6456.00	-76.81	-47.94	-30.00	17.94	28.87	Horizontal
6	10751.31	-68.48	-53.59	-30.00	23.59	14.89	Horizontal
7	17884.61	-73.75	-45.49	-30.00	15.49	28.26	Horizontal

Project Information

Mode:	802.11a	Band:	5150~5250MHz
Bandwidth:	-	Channel:	Low
IMEI:	862063070036368	Engineer:	Zhangweizhi
Remark:			

Test Graph



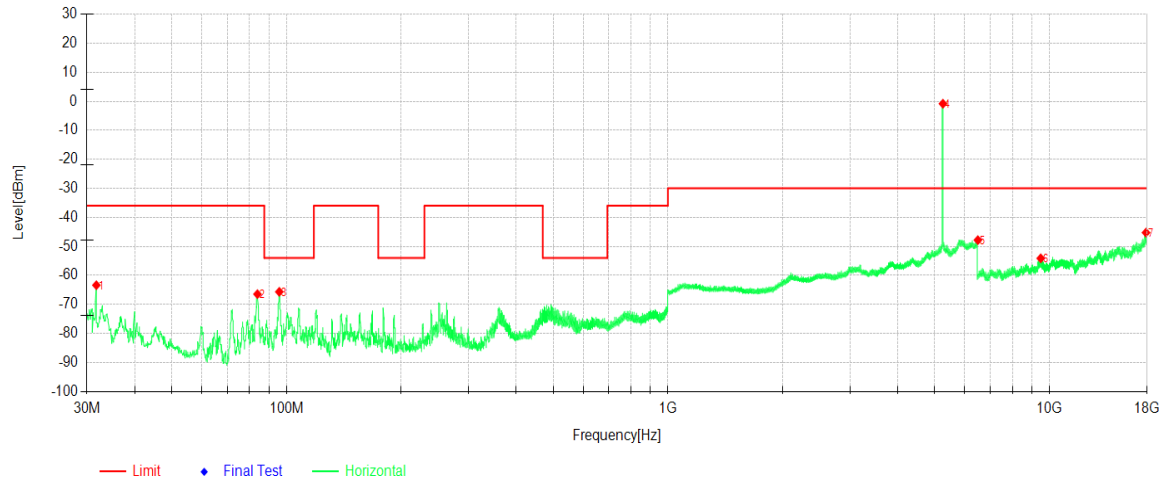
Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	30.58	-58.80	-71.66	-36.00	35.66	-12.86	Vertical
2	108.00	-56.85	-70.88	-54.00	16.88	-14.03	Vertical
3	343.63	-60.44	-69.62	-36.00	33.62	-9.18	Vertical
4	5176.91	-38.15	-12.05	-	-	26.10	Vertical
5	6498.35	-77.26	-48.09	-30.00	18.09	29.17	Vertical
6	10795.01	-68.67	-53.76	-30.00	23.76	14.91	Vertical
7	17885.00	-73.57	-45.08	-30.00	15.08	28.49	Vertical

Project Information

Mode:	802.11a	Band:	5250~5350MHz
Bandwidth:	-	Channel:	Low
IMEI:	862063070036368	Engineer:	Zhangweizhi
Remark:			

Test Graph



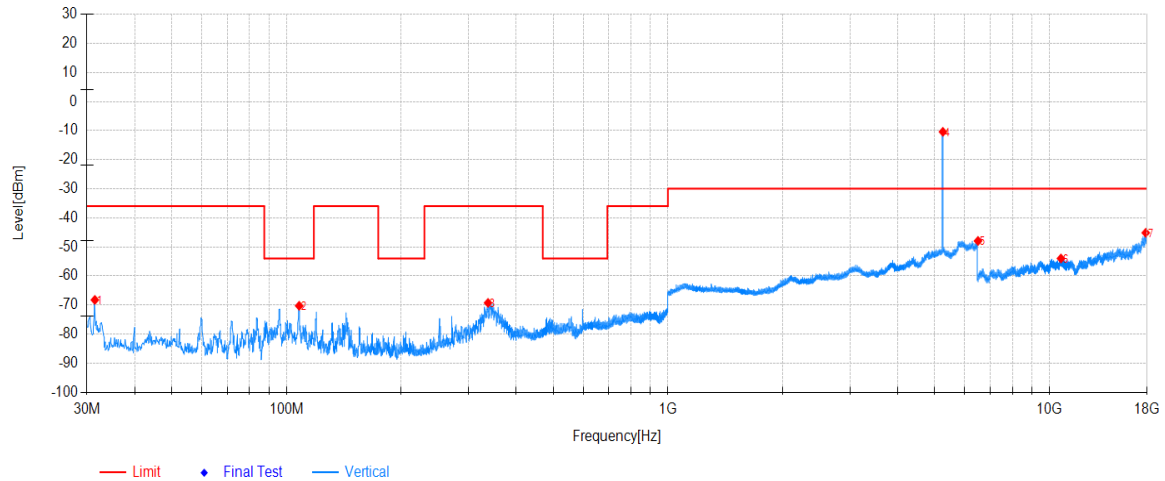
Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	31.75	-52.36	-63.39	-36.00	27.39	-11.03	Horizontal
2	83.94	-49.15	-66.46	-36.00	30.46	-17.31	Horizontal
3	95.77	-51.24	-65.67	-54.00	11.67	-14.43	Horizontal
4	5258.59	-26.93	-0.82	-	-	26.11	Horizontal
5	6493.40	-77.43	-47.85	-30.00	17.85	29.58	Horizontal
6	9491.63	-67.57	-54.13	-30.00	24.13	13.44	Horizontal
7	17915.28	-73.67	-45.27	-30.00	15.27	28.40	Horizontal

Project Information

Mode:	802.11a	Band:	5250~5350MHz
Bandwidth:	-	Channel:	Low
IMEI:	862063070036368	Engineer:	Zhangweizhi
Remark:			

Test Graph



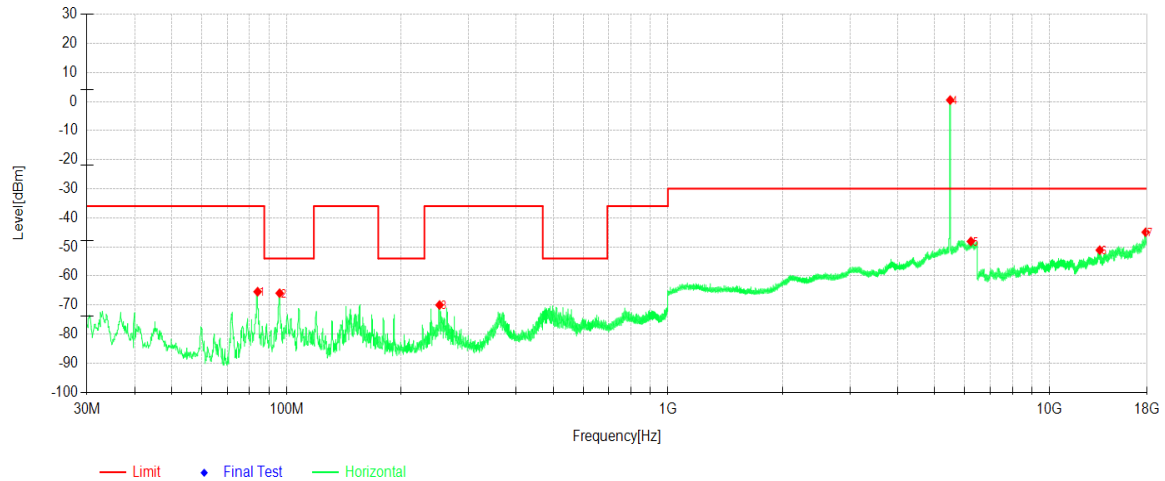
Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	31.46	-55.48	-68.26	-36.00	32.26	-12.78	Vertical
2	108.00	-56.25	-70.28	-54.00	16.28	-14.03	Vertical
3	337.62	-59.85	-69.26	-36.00	33.26	-9.41	Vertical
4	5258.04	-36.61	-10.42	-	-	26.19	Vertical
5	6498.35	-77.14	-47.97	-30.00	17.97	29.17	Vertical
6	10722.17	-69.07	-54.00	-30.00	24.00	15.07	Vertical
7	17889.60	-73.79	-45.17	-30.00	15.17	28.62	Vertical

Project Information

Mode:	802.11a	Band:	5470~5725MHz
Bandwidth:	-	Channel:	Low
IMEI:	862063070036368	Engineer:	Zhangweizhi
Remark:			

Test Graph



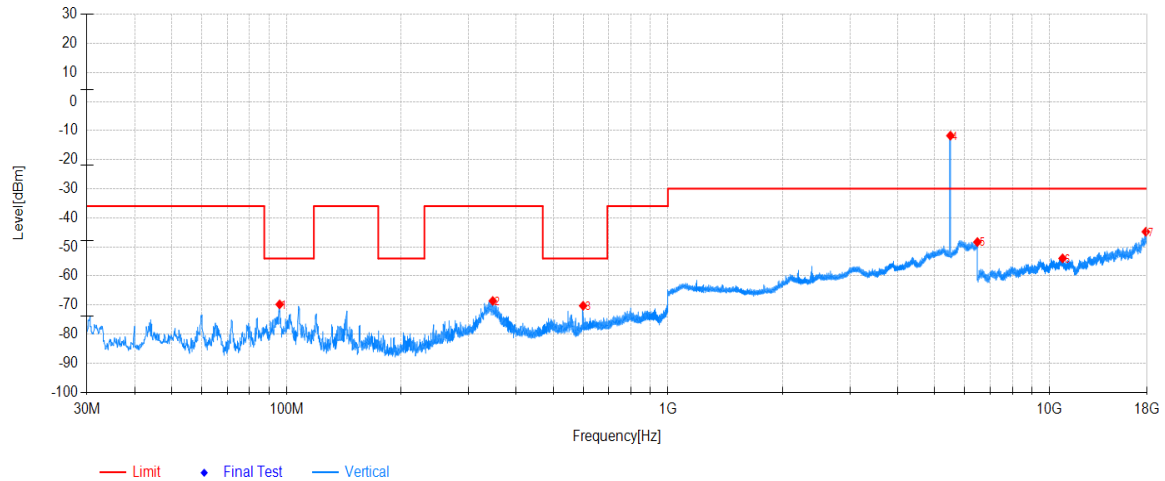
Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	84.03	-48.14	-65.43	-36.00	29.43	-17.29	Horizontal
2	95.97	-51.55	-65.94	-54.00	11.94	-14.39	Horizontal
3	251.96	-60.18	-70.01	-36.00	34.01	-9.83	Horizontal
4	5495.65	-24.52	0.50	-	-	25.02	Horizontal
5	6226.09	-76.32	-48.11	-30.00	18.11	28.21	Horizontal
6	13551.27	-70.23	-51.12	-30.00	21.12	19.11	Horizontal
7	17883.46	-73.18	-44.95	-30.00	14.95	28.23	Horizontal

Project Information

Mode:	802.11a	Band:	5470~5725MHz
Bandwidth:	-	Channel:	Low
IMEI:	862063070036368	Engineer:	Zhangweizhi
Remark:			

Test Graph



Data List

NO.	Freq. [MHz]	Reading [dBm]	Level [dBm]	Limit [dBm]	Margin [dB]	Factor [dB]	Polarity
1	95.97	-55.51	-69.80	-54.00	15.80	-14.29	Vertical
2	347.42	-59.54	-68.59	-36.00	32.59	-9.05	Vertical
3	599.35	-66.82	-70.27	-54.00	16.27	-3.45	Vertical
4	5503.08	-36.57	-11.74	-	-	24.83	Vertical
5	6475.52	-77.12	-48.34	-30.00	18.34	28.78	Vertical
6	10828.36	-68.82	-53.96	-30.00	23.96	14.86	Vertical
7	17899.56	-73.70	-44.79	-30.00	14.79	28.91	Vertical

~The End~