



TEST REPORT

ETSI EN 300 328 V2.2.2 (2019-07)

Product : KidsTablet
Model Name : Q88,C1,C3,C5,C6,C8,C9,Q80,K1,K2,K3,K4,K5,K6,K7,K8,K9,T1,T4,T5,
T6,T7,T9,T8
Brand : BDF
Report No. : PTC26011002301E-EM01

Prepared for

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Report No.: PTC26011002301E-EM01

1 TEST RESULT CERTIFICATION

Applicant's name : Shenzhen Bu Dong Feng Technology Co., Ltd
Address : 204, Factory building 2, No. 16 Kangzheng Road, Danzhutou Community, Nanwan Street, Longgang District, Shenzhen
Manufacture's name : Shenzhen Bu Dong Feng Technology Co., Ltd
Address : 204, Factory building 2, No. 16 Kangzheng Road, Danzhutou Community, Nanwan Street, Longgang District, Shenzhen
Product name : KidsTablet
Model name : Q88,C1,C3,C5,C6,C8,C9,Q80,K1,K2,K3,K4,K5,K6,K7,K8,K9,T1,T4,T5,T6,T7,T9,T8

This device described above has been tested by PTC, and the test results show that the equipment under test (EUT) is in compliance with the requirements as documented in this report. And it is applicable only to the tested sample identified in the report.

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Date of Test

Date (s) of performance of tests: Jan. 16, 2026 to Jan. 28, 2026
Date of Issue: Feb. 10, 2026
Test Result: **Pass**

Test Engineer:

Technical Manager:



Simon Pu / Manager



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2 Test Summary

Clause (EN 300 328)	Test Parameter	Verdict	Remark
4.3.1.2	RF Output Power	PASS	
4.3.1.3	Duty Cycle and Tx-Sequence and Tx-Gap	N/A (See Note1)	Only applicable for non-adaptive equipment Output Power >10dBm
4.3.1.4	Accumulated Transmit Time, Frequency Occupation	PASS	
4.3.1.4	Hopping Frequency Sequence	PASS	
4.3.1.5	Hopping Frequency Separation	PASS	
4.3.1.6	Medium Utilisation Factor	N/A (See Note1)	Only applicable for non-adaptive equipment Output Power >10dBm
4.3.1.7	Adaptivity (Adaptive Frequency Hopping)	N/A (See Note1)	Only applicable for adaptive equipment Output Power >10dBm
4.3.1.8	Occupied Channel Bandwidth	PASS	
4.3.1.9	Transmitter Unwanted Emission in the out-of Band	PASS	
4.3.1.10	Transmitter Unwanted Emissions in the Spurious Domain	PASS	
4.3.1.11	Receiver Spurious Emissions	PASS	
4.3.1.12	Receiver Blocking	PASS	
4.3.1.13	Geo-location capability	N/A (See Note1)	Only applicable for have Geo-location function equipment
N/A means not applicable Receiver category 1(Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p. shall be considered as receiver category 1 equipment.) Receiver category 2(Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % or adaptive equipment with a maximum RF output power of 10 dBm e.i.r.p. shall be considered as receiver category 2 equipment.) Receiver category 3(Non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % or adaptive equipment with a maximum RF output power of 0 dBm e.i.r.p. shall be considered as receiver category 3 equipment.) NOTE1: NOTE2:			



3 General Information

3.1 General Description of E.U.T.

Product Name	:	KidsTablet
Model Name	:	Q88
Additional model	:	C1,C3,C5,C6,C8,C9,Q80,K1,K2,K3,K4,K5,K6,K7,K8,K9,T1,T4,T5,T6,T7,T9,T8
Models Difference	:	Model coverage: The differences between the main inspection model and this one are as follows: only the exterior color and camera position differ.
Specification	:	BT BDR+EDR
Operating frequency	:	2402-2480MHz
Modulation	:	GFSK, $\pi/4$ -DQPSK, 8DPSK
Number of Channel	:	79 channels
Antenna installation	:	FPC antenna
Antenna Gain	:	0 dBi
Power supply	:	Input:DC5V
Hardware Version	:	N/A
Software Version	:	N/A



3.2 Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	-	-



4 Equipment During Test

4.1 Equipments List

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Last Calibration	Calibration Interval
MXG Signal Analyzer	Agilent	N9020A	SER MY5111038	10Hz-26.5GHz	Aug. 14, 2025	1 Year
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Aug. 14, 2025	1 Year
Power Meter	Anritsu	ML2495A	0949003	300MHz-40GHz	Aug. 14, 2025	1 Year
Power Sensor	Anritsu	MA2411B	0917017	300MHz-40GHz	Aug. 14, 2025	1 Year
MXG Vector Signal Generator	Agilent	N5182A	AT0-71847	9kHz-6GHz	Aug. 14, 2025	1 Year
Analog Signal Generator	HP	83620A	3420A01830	10M~20GHz	Aug. 14, 2025	1 Year
Test S/W	Tonscend	JS1120-3	/	/	/	/

Radiated Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Last Calibration	Calibration Interval
EMI Test Receiver	Rohde&Schwarz	ESC17	101671	9KHz-7GHz	Aug. 14, 2025	1 Year
Loop Antenna	Schwarzbeck	FMZB 1519B	192	9 KHz - 30MHz	Aug. 14, 2025	1 Year
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Aug. 14, 2025	1 Year
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Aug. 14, 2025	1 Year
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Aug. 14, 2025	1 year
Spectrum Analyzer	Rohde&Schwarz	FSV40	6625-01-588-5515	9KHz-40GHz	Aug. 14, 2025	1 Year



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Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Aug. 14, 2025	1 Year
Power Amplifier	ZHINAN	ZN3380C	15002	1GHz-26.5GHz	Aug. 14, 2025	1 Year
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-1066	15GHz-40GHz	Aug. 14, 2025	1 Year
Amplifier	SCHWARZBECK	BBV 9721	9721-205	18GHz-40GHz	Aug. 14, 2025	1 Year
Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Aug. 14, 2025	1 Year
RF Cable	R&S	R204	R21X	1GHz-40GHz	Aug. 14, 2025	1 Year
Test S/W	Tonscend	JS36-RSE	/	/	/	/



4.2 Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	$\pm 5\%$
RF output power, conducted	$\pm 1.5\text{dB}$
Power Spectral Density, conducted	$\pm 3\text{dB}$
Unwanted Emissions, conducted	$\pm 3\text{dB}$
All emissions, radiated	$\pm 6\text{dB}$
Time	$\pm 2\%$
Duty Cycle	$\pm 2\%$
Temperature	$\pm 1^\circ\text{C}$
Humidity	$\pm 5\%$
DC and low frequency voltages	$\pm 3\%$
Conduction disturbance(150kHz~30MHz)	$\pm 3.26\text{dB}$
Radiated Emission(30MHz~1GHz)	$\pm 4.76\text{dB}$
Radiated Emission(1GHz~25GHz)	$\pm 5.39\text{dB}$
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.	



5 RF Requirements

1. Test Conditions:

Environment Parameter	Selected Values During the Testes	
Relative Humidity	Ambient	
Value	Temperature(°C)	Voltage(V)
NTNV	25	5
LTLV	-10	4.5
LTHV	-10	5.5
HTLV	40	4.5
HTHV	40	5.5

Note:

NV: Normal Voltage; NT: Normal Temperature

LT: Low Extreme Test Temperature; HT: High Extreme Test Temperature

LV: Low Extreme Test Voltage; HV: High Extreme Test Voltage

Note: For tests at extreme temperatures, measurements shall be made over the extremes of the operating temperature range as declared by the manufacturer.

2. Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Modulation	Test mode	Low channel	Middle channel	High channel
GFSK	Transmitting	2402MHz	2441MHz	2480MHz
GFSK	Receiving	2402MHz	2441MHz	2480MHz
$\pi/4$ -DQPSK	Transmitting	2402MHz	2441MHz	2480MHz
$\pi/4$ -DQPSK	Receiving	2402MHz	2441MHz	2480MHz
8DPSK	Transmitting	2402MHz	2441MHz	2480MHz
8DPSK	Receiving	2402MHz	2441MHz	2480MHz



4. Additional Information

EN 300 328	Information Is Provided By The Manufacturer																								
The Type Of Modulation Used By The Equipment	☒ FHSS ☐ other forms of modulation																								
In Case Of FHSS Modulation:	☐ In case of non-Adaptive Frequency Hopping equipment The number of Hopping Frequencies: ☒ In case of Adaptive Frequency Hopping Equipment The maximum number of Hopping Frequencies:79 The minimum number of Hopping Frequencies: 79																								
The Worst Case Operational Mode For Each Of The Following Tests:	<table border="0"> <tr> <td>RF Output Power</td><td>PASS</td></tr> <tr> <td>Power Spectral Density</td><td>N/A</td></tr> <tr> <td>Duty Cycle, Tx-Sequence, Tx-gap.</td><td>N/A</td></tr> <tr> <td>Accumulated Transmit time, Frequency Occupation & Hopping Sequence (only for FHSS equipment)</td><td>PASS</td></tr> <tr> <td>Hopping Frequency Separation (only for FHSS equipment)</td><td>PASS</td></tr> <tr> <td>Medium Utilisation.</td><td>N/A</td></tr> <tr> <td>Adaptivity</td><td>N/A</td></tr> <tr> <td>Receiver Blocking</td><td>PASS</td></tr> <tr> <td>Nominal Channel Bandwidth</td><td>PASS</td></tr> <tr> <td>Transmitter Unwanted Emissions in the OOB domain.</td><td>PASS</td></tr> <tr> <td>Transmitter Unwanted Emissions in the spurious domain</td><td>PASS</td></tr> <tr> <td>Receiver spurious emissions</td><td>PASS</td></tr> </table>	RF Output Power	PASS	Power Spectral Density	N/A	Duty Cycle, Tx-Sequence, Tx-gap.	N/A	Accumulated Transmit time, Frequency Occupation & Hopping Sequence (only for FHSS equipment)	PASS	Hopping Frequency Separation (only for FHSS equipment)	PASS	Medium Utilisation.	N/A	Adaptivity	N/A	Receiver Blocking	PASS	Nominal Channel Bandwidth	PASS	Transmitter Unwanted Emissions in the OOB domain.	PASS	Transmitter Unwanted Emissions in the spurious domain	PASS	Receiver spurious emissions	PASS
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Transmitter Unwanted Emissions in the spurious domain	PASS																								
Receiver spurious emissions	PASS																								
The Different Transmit Operating Modes (Tick All That Apply):	☒ Operating mode 1: Single Antenna Equipment <table border="0"> <tr> <td>☒ Equipment with only 1 antenna</td></tr> <tr> <td>☐ Equipment with 2 diversity antennas but only 1 antenna active at any moment in time</td></tr> <tr> <td>☐ 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)</td></tr> </table> ☐ Operating mode 2: Smart Antenna Systems - Multiple Antennas without beam forming <table border="0"> <tr> <td>☐ Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)</td></tr> </table>	☒ 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)	☐ Single spatial stream / Standard throughput / (e.g. IEEE 802.11™ [i.3] legacy mode)																				
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☐ 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
	☐ 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
Operating Frequency Range(S) Of The Equipment:	Operating Frequency Range: 2402 MHz to 2480 MHz
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
Describe the test modes available which can facilitate testing:	Modulation Mode: GFSK, $\pi/4$ -DQPSK, 8DPSK Test Frequency: Low Frequency, Middle Frequency, High Frequency
The equipment type (e.g. Bluetooth®, IEEE 802.11™ [i.3], proprietary, etc.):	Bluetooth Classical
NOTE: N/A means not applicable	

5.1 RF Output power

5.1.1 Definition

The RF output power is defined as the mean equivalent isotropically radiated power (e.i.r.p.) of the equipment during a transmission burst.

5.1.2 Limit

The RF output power for FHSS equipment shall be equal to or less than 20 dBm.

NOTE: For Non-adaptive FHSS equipment, the manufacturer may have declared a reduced RF Output Power (see clause 5.4.1 m) and associated Duty Cycle (see clause 5.4.1 e) that will ensure that the equipment meets the requirement for the Medium Utilization (MU) factor further described in clause 4.3.1.6. This is verified by the conformance test referred to in clause 4.3.1.6.4.

For non-adaptive FHSS equipment, where the manufacturer has declared an RF output power lower than 20 dBm e.i.r.p., the RF output power shall be equal to or less than that declared value.

This limit shall apply for any combination of power level and intended antenna assembly.

5.1.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

5.1.4 Test Procedure

1. Use a fast power sensor with a minimum sensitivity of -40 dBm and capable of minimum 1 MS/s.
2. Use the following settings:
 - Sample speed 1 MS/s or faster.
 - The samples shall represent the RMS power of the signal.
 - Measurement duration: For non-adaptive equipment: equal to the observation period defined in clause 4.3.1.3.2 or clause 4.3.2.4.2. For adaptive equipment, the measurement duration shall be long enough to ensure a minimum number of bursts (at least 10) is captured.
 - For adaptive equipment, to increase the measurement accuracy, a higher number of bursts may be used.
 - For conducted measurements on devices with one transmit chain:
 - Connect the power sensor to the transmit port, sample the transmit signal and store the raw data. Use these stored samples in all following steps.
 - For conducted measurements on devices with multiple transmit chains:
 - Connect the power sensor to the transmit port, sample the transmit signal and store the raw data. Use these stored samples in all following steps.
 - Trigger the power sensors so that they start sampling at the same time. Make sure the time difference between the samples of all sensors is less than half the time between two samples.
 - For each instant in time, sum the power of the individual samples of all ports and store them. Use these stored samples in all following steps.
3. Find the start and stop times of each burst in the stored measurement samples.

NOTE 2: The start and stop times are defined as the points where the power is at least 20 dB below the RMS burst power calculated in step 5.
4. Between the start and stop times of each individual burst calculate the RMS power over the burst. Save these burst values, as well as the start and stop times for each burst.
5. The highest of all Pburst values (value "A" in dBm) will be used for maximum e.i.r.p. calculations.
6. Add the (stated) antenna assembly gain "G" in dBi of the individual antenna.
7. If applicable, add the additional beamforming gain "Y" in dB.



8. If more than one antenna assembly is intended for this power setting, the maximum overall antenna gain (G or G + Y) shall be used.
9. The RF Output Power (P) shall be calculated using the formula below: $P = A + G + Y$
10. This value, which shall comply with the limit given in clauses 4.3.1.1.2 or 4.3.2.1.2, shall be recorded in the test report.

5.1.5 Measurement Record

Test Mode:				TX(CH00/CH39/CH78)-GFSK		
TEST CONDITIONS				Total e.i.r.p (dBm)		
				CH00	CH39	CH78
T nom (°C)	NT	V nom (V)	NV	4.45	4.66	4.87
T min (°C)	LT	V nom (V)	NV	4.43	4.59	4.85
T max (°C)	HT	V nom (V)	NV	3.76	4.35	4.04
Max RF Power				4.87		
Limits				20dBm		
Result				PASS		

Test Mode:				TX(CH00/CH39/CH78)- π/4-DQPSK		
TEST CONDITIONS				Total e.i.r.p (dBm)		
				CH00	CH39	CH78
T nom (°C)	NT	V nom (V)	NV	4.34	4.79	4.48
T min (°C)	LT	V nom (V)	NV	4.13	4.74	4.12
T max (°C)	HT	V nom (V)	NV	4.37	4.70	4.67
Max RF Power				4.79		
Limits				20dBm		
Result				PASS		



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Test Mode:				TX(CH00/CH39/CH78)- 8DPSK		
TEST CONDITIONS				Total e.i.r.p (dBm)		
				CH00	CH39	CH78
T nom (°C)	NT	V nom (V)	NV	4.43	4.34	4.48
T min (°C)	LT	V nom (V)	NV	4.19	3.95	4.30
T max (°C)	HT	V nom (V)	NV	4.44	4.48	3.50
Max RF Power				4.48		
Limits				20dBm		
Result				PASS		

5.2 ACCUMULATED TRANSMIT TIME, FREQUENCY OCCUPATION

5.2.1 Applicable standard

ETSI EN 300 328 clause 4.3.1.4

5.2.2 Conformance Limit

The requirement applies to all types of frequency hopping equipment.

- For non-adaptive frequency hopping system

The Accumulated Transmit Time on any hopping frequency shall not be greater than 15 ms within any observation period of 15 ms multiplied by the minimum number of hopping frequencies (N) that have to be used.

In order for the equipment to comply with the Frequency Occupation requirement, it shall meet either of the following two options:

Option 1: Each hopping frequency of the hopping sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use.

Option 2: The occupation probability for each frequency shall be between $((1 / U) \times 25 \%)$ and 77 % where U is the number of hopping frequencies in use.

- For adaptive frequency hopping system

Adaptive Frequency Hopping equipment shall be capable of operating over a minimum of 70 % of the band specified in clause 1.

The Accumulated Transmit Time on any hopping frequency shall not be greater than 400 ms within any observation period of 400 ms multiplied by the minimum number of hopping frequencies (N) that have to be used.

In order for the equipment to comply with the Frequency Occupation requirement, it shall meet either of the following two options:

Option 1: Each hopping frequency of the hopping sequence shall be occupied at least once within a period not exceeding four times the product of the dwell time and the number of hopping frequencies in use.

Option 2: The occupation probability for each frequency shall be between $((1 / U) \times 25 \%)$ and 77 % where U is the number of hopping frequencies in use.



5.2.3 Test Configuration

The measurements for dwell time shall be performed at normal environmental conditions of the operating temperature range.

Radiated measurements shall only be used for integral antenna equipment that does not have a temporary antenna connector(s) provided.

Conducted measurements shall be used for antenna equipment provided a temporary antenna connector(s).

5.2.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.4.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.4.2 for the measurement method.

The test procedure shall be as follows:

■ Conducted measurements

Step 1:

- The output of the transmitter shall be connected to a spectrum analyzer or equivalent.
- The analyzer shall be set as follows:
 - Centre Frequency: Equal to the hopping frequency being investigated
 - Frequency Span: 0 Hz
 - RBW: ~ 50 % of the Occupied Channel Bandwidth
 - VBW: $\geq$ RBW
 - Detector Mode: RMS
 - Sweep time: Equal to the applicable observation period (see clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2)
 - Number of sweep points: 30 000
 - Trace mode: Clear / Write
 - Trigger: Free Run



Step 2:

- Save the trace data to a file for further analysis by a computing device using an appropriate software application or program.

Step 3:

- Identify the data points related to the frequency being investigated by applying a threshold.

The data points resulting from transmissions on the hopping frequency being investigated are assumed to have much higher levels compared to data points resulting from transmissions on adjacent hopping frequencies. If a clear determination between these transmissions is not possible, the RBW in step 1 shall be further reduced. In addition, a channel filter may be used.

- Count the number of data points identified as resulting from transmissions on the frequency being investigated and multiply this number by the time difference between two consecutive data points.

Step 4:

- The result in step 3 is the Accumulated Transmit Time which shall comply with the limit provided in clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2 and which shall be recorded in the test report.

Step 5:

This step is only applicable for equipment implementing Option 1 in clause 4.3.1.4.3.1 or Option 1 in clause 4.3.1.4.3.2 for complying with the Frequency Occupation requirement and the manufacturer decides to demonstrate compliance with this requirement via measurement.

- Make the following changes on the analyser and repeat step 2 and step 3.

Sweep time: $4 \times \text{Dwell Time} \times \text{Actual number of hopping frequencies in use}$.

The hopping frequencies occupied by the equipment without having transmissions during the dwell time (blacklisted frequencies) should be taken into account in the actual number of hopping frequencies in use. If this number cannot be determined (number of blacklisted frequencies unknown) it shall be assumed that the equipment uses the maximum possible number of hopping frequencies.



- The result shall be compared to the limit for the Frequency Occupation defined in clause 4.3.1.4.3.1, Option 1 or clause 4.3.1.4.3.2, Option 1. The result of this comparison shall be recorded in the test report.

Step 6:

- Make the following changes on the analyzer:
 - Start Frequency: 2400 MHz
 - Stop Frequency: 2483,5 MHz
 - RBW: ~ 50 % of the Occupied Channel Bandwidth (single hopping frequency)
 - VBW: $\geq$ RBW
 - Detector Mode: RMS
 - Sweep time: 1 s; this setting may result in long measuring times. To avoid such long measuring times, an FFT analyser may be used
 - Trace Mode: Max Hold
 - Trigger: Free Run
- Wait for the trace to stabilize. Identify the number of hopping frequencies used by the hopping sequence.
- The result shall be compared to the limit (value N) defined in clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2. This value shall be recorded in the test report.

For equipment with blacklisted frequencies, it might not be possible to verify the number of hopping frequencies in use. However, they shall comply with the requirement for Accumulated Transmit Time and

Frequency Occupation assuming the minimum number of hopping frequencies (N) defined in clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2 is used.



Step 7:

• For adaptive frequency hopping equipment, it shall be verified whether the equipment uses 70 % of the band specified in table 1. This verification can be done using the lowest and highest -20 dB points from the total spectrum envelope obtained in step 6. The result shall be recorded in the test report.

■ Radiated measurements

A test site as described in annex B and applicable measurement procedures as described in annex C may be used. Alternatively, a test fixture may be used.

The test procedure is further as described under clause 5.4.4.2.1.

5.2.5 Test Results

TestMode	Antenna	Frequency[MHz]	Result [ms]	Limit[ms]	Verdict
DH5	Ant1	Hop_2402	311.806	400	PASS
DH5	Ant1	Hop_2480	318.127	400	PASS
2DH5	Ant1	Hop_2402	316.020	400	PASS
2DH5	Ant1	Hop_2480	313.913	400	PASS
3DH5	Ant1	Hop_2402	277.044	400	PASS
3DH5	Ant1	Hop_2480	290.738	400	PASS

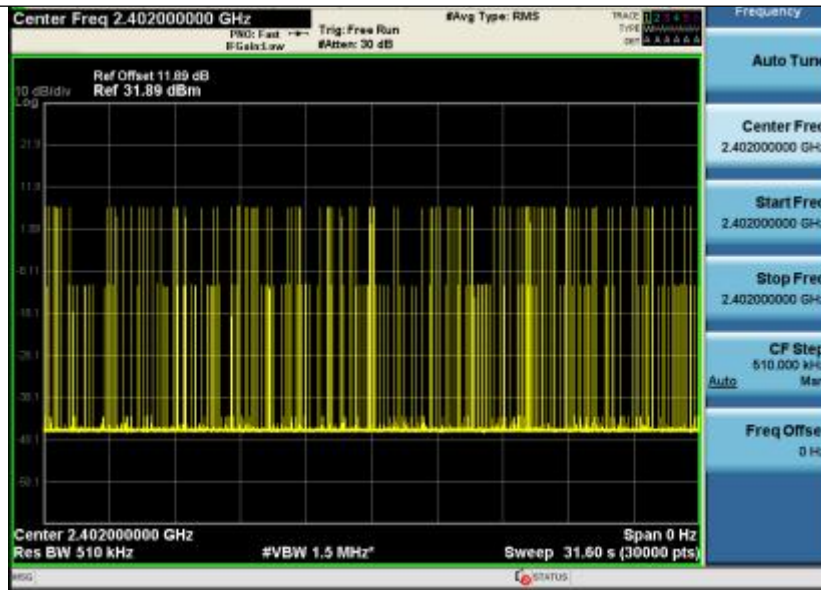
TestMode	Antenna	Frequency[MHz]	Result [Num.]	Limit [Num.]	Verdict
DH5	Ant1	Hop_2402	3	1	PASS
DH5	Ant1	Hop_2480	4	1	PASS
2DH5	Ant1	Hop_2402	6	1	PASS
2DH5	Ant1	Hop_2480	1	1	PASS
3DH5	Ant1	Hop_2402	3	1	PASS
3DH5	Ant1	Hop_2480	3	1	PASS

Test Graphs:

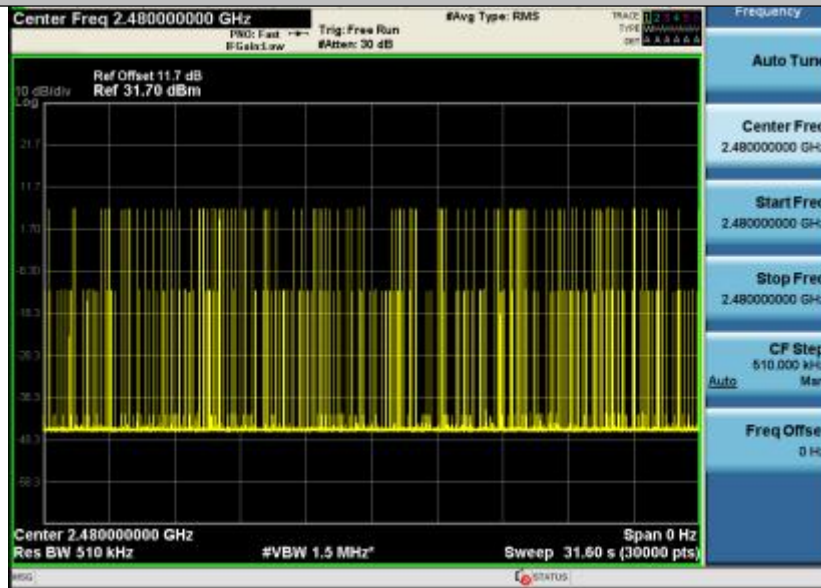




Report No.: PTC26011002301E-EM01



2DH5-Ant1-Hop_2480-PASS



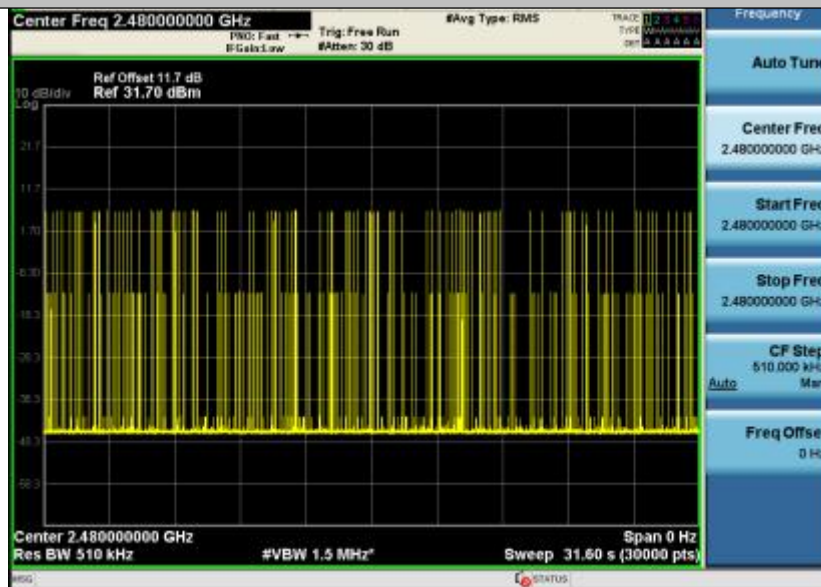
3DH5-Ant1-Hop_2402-PASS



Report No.: PTC26011002301E-EM01



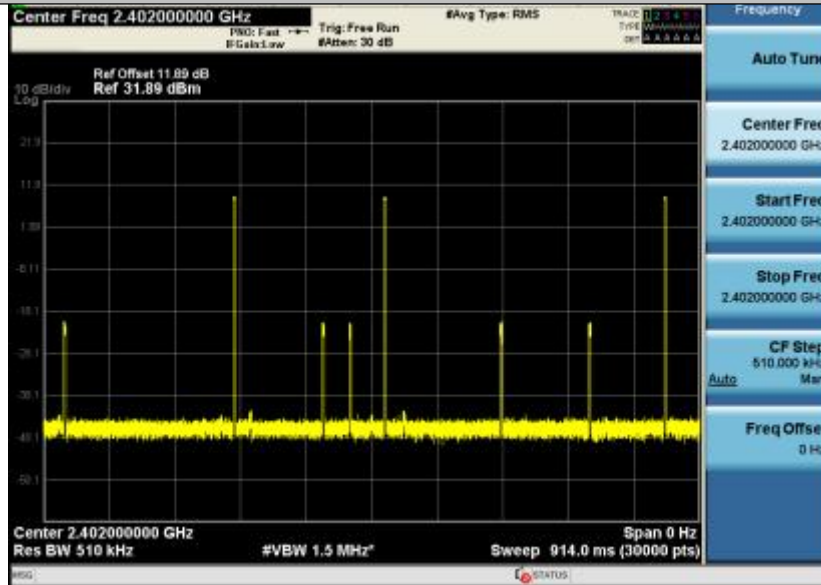
3DH5-Ant1-Hop_2480-PASS



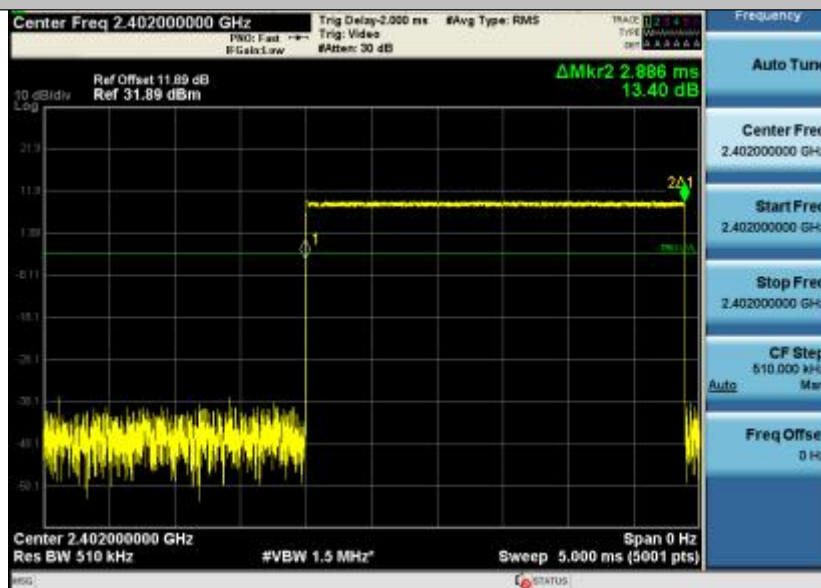


Report No.: PTC26011002301E-EM01

DH5-Ant1-Hop_2402-PASS



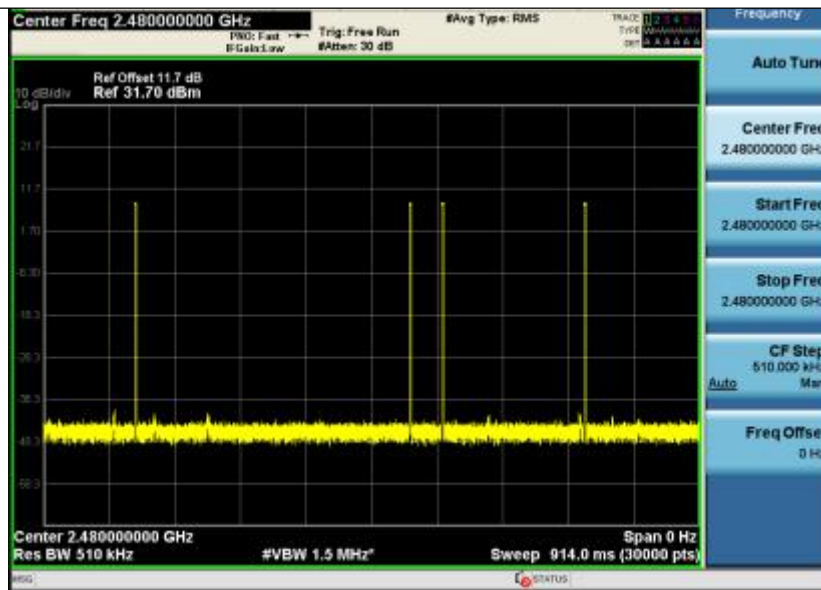
DH5-Ant1-Hop_2402-PASS



DH5-Ant1-Hop_2480-PASS



Report No.: PTC26011002301E-EM01



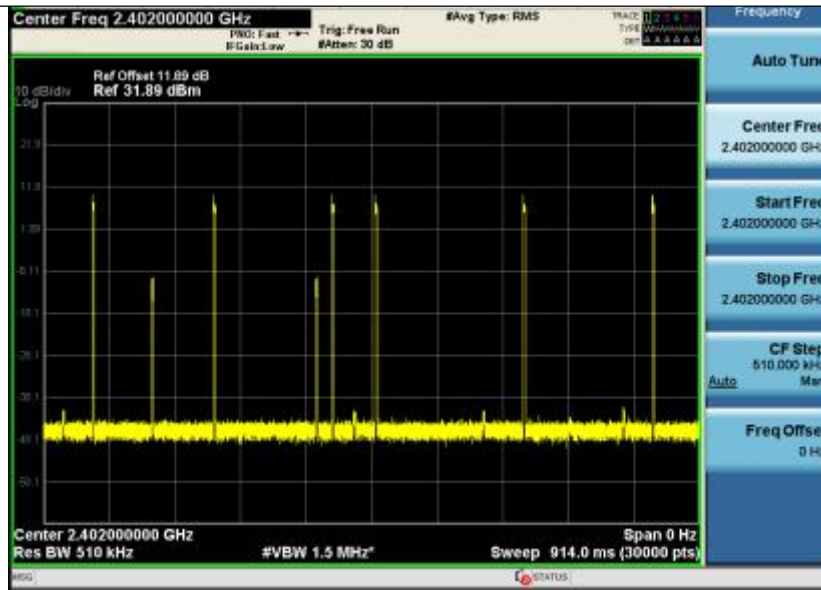
DH5-Ant1-Hop_2480-PASS



2DH5-Ant1-Hop_2402-PASS



Report No.: PTC26011002301E-EM01



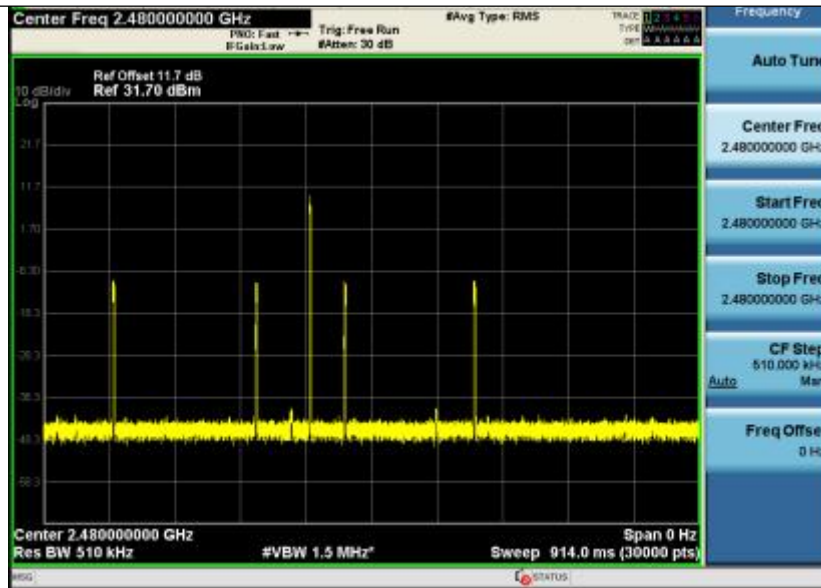
2DH5-Ant1-Hop_2402-PASS



2DH5-Ant1-Hop_2480-PASS



Report No.: PTC26011002301E-EM01



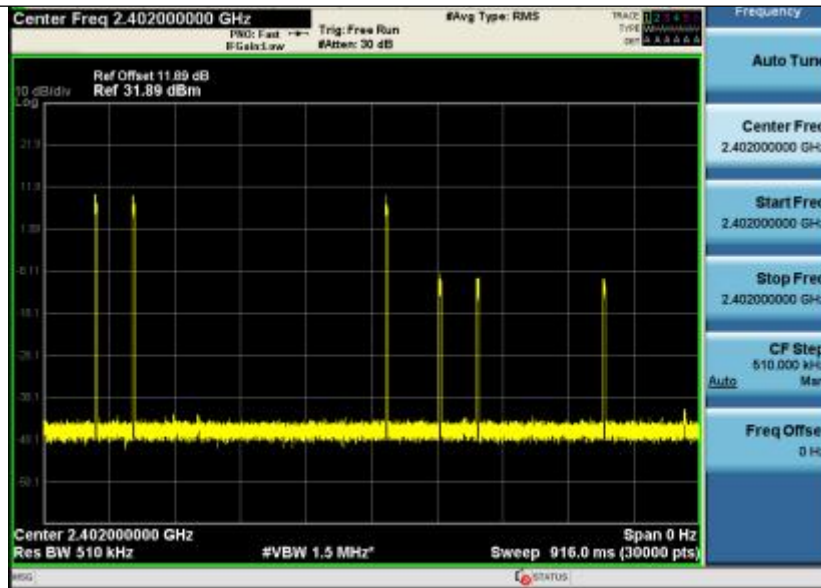
2DH5-Ant1-Hop_2480-PASS



3DH5-Ant1-Hop_2402-PASS



Report No.: PTC26011002301E-EM01



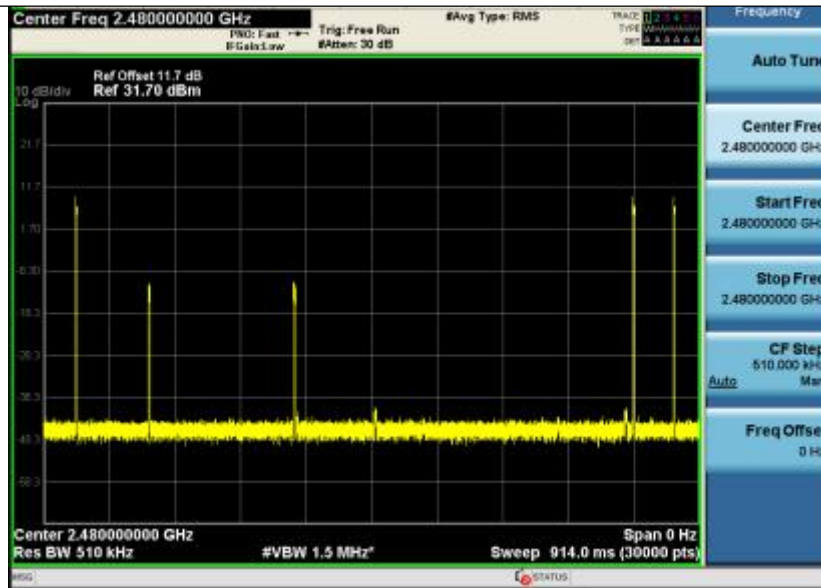
3DH5-Ant1-Hop_2402-PASS



3DH5-Ant1-Hop_2480-PASS



Report No.: PTC26011002301E-EM01



3DH5-Ant1-Hop_2480-PASS





5.3 HOPPING FREQUENCY SEQUENCE

5.3.1 Applicable standard

ETSI EN 300 328 clause 4.3.1.4

5.3.2 Conformance Limit

The requirement applies to all types of frequency hopping equipment.

- For non-adaptive frequency hopping system
The hopping sequence(s) shall contain at least N hopping frequencies where N is either 5 or the result of 15 MHz divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.
According to clause 4.3.1.5.3.1 the minimum Hopping Frequency Separation for non-adaptive equipment is equal to the Occupied Channel Bandwidth with a minimum of 100 kHz.
- For adaptive frequency hopping system
The hopping sequence(s) shall contain at least N hopping frequencies at all times, where N is either 15 or the result of 15 MHz divided by the minimum Hopping Frequency Separation in MHz, whichever is the greater.

5.3.3 Test Configuration

The measurements for hopping sequences shall be performed at normal environmental conditions of the operating temperature range.

Radiated measurements shall only be used for integral antenna equipment that does not have a temporary antenna connector(s) provided.

Conducted measurements shall be used for antenna equipment provided a temporary antenna connector(s).

5.3.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.4.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.4.2 for the measurement method.

The test procedure shall be as follows:

■ Conducted measurements

Step 1:

- The output of the transmitter shall be connected to a spectrum analyzer or equivalent.
- The analyzer shall be set as follows:
 - Centre Frequency: Equal to the hopping frequency being investigated



- Frequency Span: 0 Hz
- RBW: ~ 50 % of the Occupied Channel Bandwidth
- VBW: $\geq$ RBW
- Detector Mode: RMS
- Sweep time: Equal to the applicable observation period (see clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2)
- Number of sweep points: 30 000
- Trace mode: Clear / Write
- Trigger: Free Run

Step 2:

- Save the trace data to a file for further analysis by a computing device using an appropriate software application or program.

Step 3:

- Identify the data points related to the frequency being investigated by applying a threshold.

The data points resulting from transmissions on the hopping frequency being investigated are assumed to have much higher levels compared to data points resulting from transmissions on adjacent hopping frequencies. If a clear determination between these transmissions is not possible, the RBW in step 1 shall be further reduced. In addition, a channel filter may be used.

- Count the number of data points identified as resulting from transmissions on the frequency being investigated and multiply this number by the time difference between two consecutive data points.

Step 4:

- The result in step 3 is the Accumulated Transmit Time which shall comply with the limit provided in clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2 and which shall be recorded in the test report.



Step 5:

This step is only applicable for equipment implementing Option 1 in clause 4.3.1.4.3.1 or Option 1 in clause 4.3.1.4.3.2 for complying with the Frequency Occupation requirement and the manufacturer decides to demonstrate compliance with this requirement via measurement.

- Make the following changes on the analyser and repeat step 2 and step 3.

Sweep time: $4 \times \text{Dwell Time} \times \text{Actual number of hopping frequencies in use}$.

The hopping frequencies occupied by the equipment without having transmissions during the dwell time

(blacklisted frequencies) should be taken into account in the actual number of hopping frequencies in use.

If this number cannot be determined (number of blacklisted frequencies unknown) it shall be assumed that the equipment uses the maximum possible number of hopping frequencies.

- The result shall be compared to the limit for the Frequency Occupation defined in clause 4.3.1.4.3.1, Option 1 or clause 4.3.1.4.3.2, Option 1. The result of this comparison shall be recorded in the test report.

Step 6:

- Make the following changes on the analyzer:

- Start Frequency: 2400 MHz

- Stop Frequency: 2483,5 MHz

- RBW: ~ 50 % of the Occupied Channel Bandwidth (single hopping frequency)

- VBW: $\geq$ RBW

- Detector Mode: RMS

- Sweep time: 1 s; this setting may result in long measuring times. To avoid such long measuring times, an FFT analyser may be used

- Trace Mode: Max Hold

- Trigger: Free Run

- Wait for the trace to stabilize. Identify the number of hopping frequencies used by the hopping sequence.



- The result shall be compared to the limit (value N) defined in clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2. This value shall be recorded in the test report.

For equipment with blacklisted frequencies, it might not be possible to verify the number of hopping frequencies in use. However, they shall comply with the requirement for Accumulated Transmit Time and Frequency Occupation assuming the minimum number of hopping frequencies (N) defined in clause 4.3.1.4.3.1 or clause 4.3.1.4.3.2 is used.

Step 7:

- For adaptive frequency hopping equipment, it shall be verified whether the equipment uses 70 % of the band specified in table 1. This verification can be done using the lowest and highest -20 dB points from the total spectrum envelope obtained in step 6. The result shall be recorded in the test report.

■ Radiated measurements

A test site as described in annex B and applicable measurement procedures as described in annex C may be used. Alternatively, a test fixture may be used.

The test procedure is further as described under clause 5.4.4.2.1.

5.3.5 Test Results

TestMode	Antenna	Channel	Hop. [Num.]	Limit[Num.]	Band Use [%]	Limit [%]	Verdict
DH5	Ant1	Hop_2402	79	15	94.64	70	PASS
DH5	Ant1	Hop_2480	79	15	93.69	70	PASS
2DH5	Ant1	Hop_2402	79	15	96.20	70	PASS
2DH5	Ant1	Hop_2480	79	15	96.20	70	PASS
3DH5	Ant1	Hop_2402	79	15	97.92	70	PASS
3DH5	Ant1	Hop_2480	79	15	96.20	70	PASS



Test Graphs:

DH5-Ant1-Hop_2402-PASS



DH5-Ant1-Hop_2480-PASS



2DH5-Ant1-Hop_2402-PASS



Report No.: PTC26011002301E-EM01



2DH5-Ant1-Hop_2480-PASS



3DH5-Ant1-Hop_2402-PASS



Report No.: PTC26011002301E-EM01



3DH5-Ant1-Hop_2480-PASS





5.4 Hopping Frequency Separation

5.4.1 Definition:

The Hopping Frequency Separation is the frequency separation between 2 adjacent hopping frequencies.

5.4.2 Limit

Non-adaptive frequency hopping systems:

The minimum Hopping Frequency Separation shall be equal to Occupied Channel Bandwidth (see clause 4.3.1.7) of a single hop, with a minimum separation of 100kHz.

Adaptive frequency hopping systems:

The minimum Hopping Frequency Separation shall be 100kHz.

5.4.3 EUT Operation Condition

The EUT was programmed to be in hopping on mode.

5.4.4 Test Procedure

1. The output of the transmitter shall be connected to a spectrum analyzer or equivalent.
2. The analyzer shall be set as follows:
 - Centre Frequency: Centre of the two adjacent hopping frequencies
 - Frequency Span: Sufficient to see the complete power envelope of both hopping frequencies
 - RBW: 1 % of the Span (30kHz)
 - VBW: 3 × RBW (100kHz)
 - Detector Mode: RMS
 - Trace Mode: Max Hold
 - Sweep Time: Auto
3. Allow the trace to stabilize.
4. Use the marker-delta function to determine the Hopping Frequency Separation between the peaks of the two adjacent hopping frequencies. This value shall be compared with the limits defined in clause 4.3.1.4.2 and shall be recorded in the test report.

5.4.5 Measurement Record

Please refer to the below photos for more details

TestMode	Antenna	Frequency[MHz]	Result [MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	0.996	0.100	PASS
2DH5	Ant1	Hop	1.176	0.100	PASS
3DH5	Ant1	Hop	0.966	0.100	PASS



Test Graphs:

DH5-Ant1-Hop-PASS



2DH5-Ant1-Hop-PASS



3DH5-Ant1-Hop-PASS



Report No.: PTC26011002301E-EM01



5.5 Adaptivity (Adaptive Frequency Hopping)

5.5.1 Definition

Adaptive Frequency Hopping using LBT based DAA is a mechanism by which a given hopping frequency is made 'unavailable' because signal was detected before any transmission on that frequency.

In addition, this requirement does not apply for equipment with a maximum declared RF Output power level of less than 10 dBm e.i.r.p. or for equipment when operating in a mode where the RF Output power is less than 10 dBm e.i.r.p.

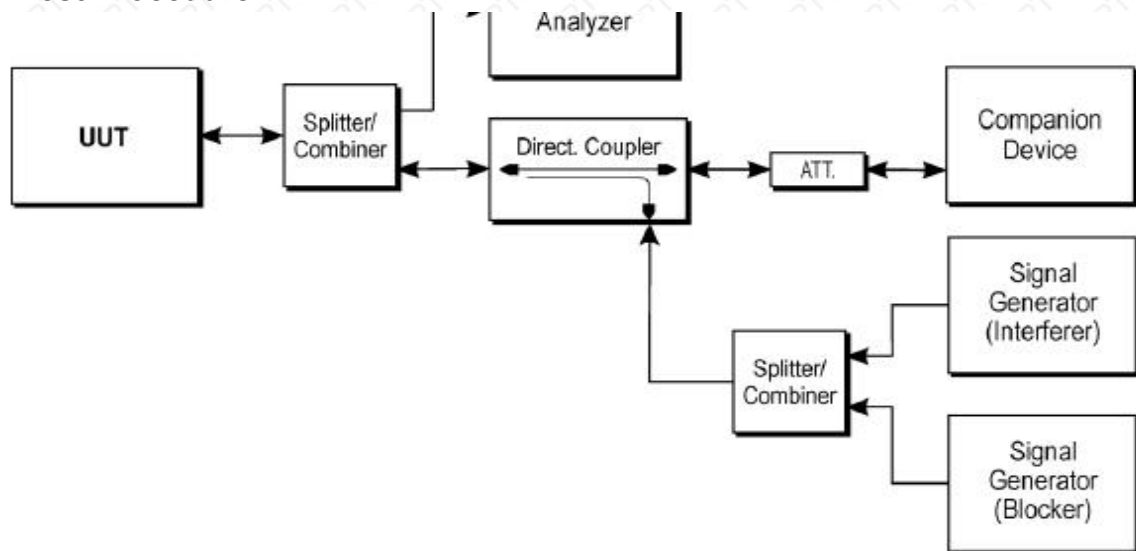
5.5.2 Limit

Refer to section 4.3.1.6.1.2 of EN 300 328 V2.2.2

5.5.3 EUT Operation Condition

The EUT was programmed to be in hopping on mode.

5.5.4 Test Procedure



5.5.5 Measurement Record

The EIRP is less than 10dBm, so the test is not applicable



5.6 Occupied Channel Bandwidth

5.6.1 Definition

The Occupied Channel Bandwidth is the bandwidth that contains 99 % of the power of the signal.

5.6.2 Limit

The Occupied Channel Bandwidth for each hopping frequency shall fall completely within the band given in clause 1.

For non-adaptive Frequency Hopping equipment with e.i.r.p greater than 10 dBm, the Occupied Channel Bandwidth for every occupied hopping frequency shall be equal to or less than the value declared by the supplier. This declared value shall not be greater than 5 MHz.

5.6.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

5.6.4 Test Procedure

1. Connect the UUT to the spectrum analyzer and use the following settings:

- Centre Frequency: The centre frequency of the channel under test
- Resolution BW: ~ 1 % of the span without going below 1 % (30kHz)
- Video BW: $3 \times \text{RBW}$
- Frequency Span: $2 \times \text{Occupied Channel Bandwidth}$ (2 MHz)
- Detector Mode: RMS
- Trace Mode: Max Hold

2. Wait until the trace is completed. Find the peak value of the trace and place the analyzer marker on this peak.

3. Use the 99 % bandwidth function of the spectrum analyzer to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.

NOTE: Make sure that the power envelope is sufficiently above the noise floor of the analyzer to avoid the noise signals left and right from the power envelope being taken into account by this measurement.



Report No.: PTC26011002301E-EM01

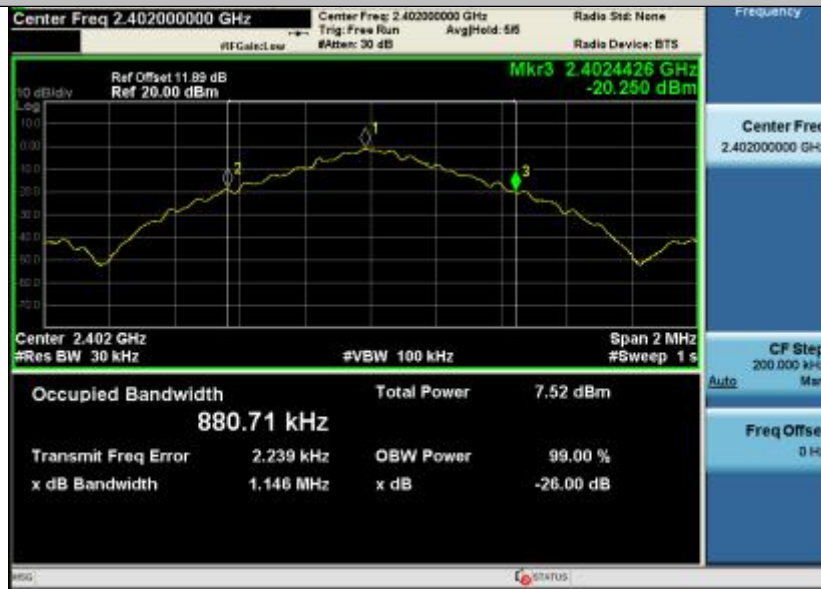
5.6.5 Measurement Record

TestMode	Antenna	Frequency[MHz]	OCB[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.88071	2401.5619	2402.4426	2400 to 2483.5	PASS
DH5	Ant1	2441	0.88069	2440.5611	2441.4418	2400 to 2483.5	PASS
DH5	Ant1	2480	0.88110	2479.5611	2480.4422	2400 to 2483.5	PASS
2DH5	Ant1	2402	1.1852	2401.4087	2402.5939	2400 to 2483.5	PASS
2DH5	Ant1	2441	1.1855	2440.4083	2441.5938	2400 to 2483.5	PASS
2DH5	Ant1	2480	1.1873	2479.4083	2480.5956	2400 to 2483.5	PASS
3DH5	Ant1	2402	1.1955	2401.4041	2402.5996	2400 to 2483.5	PASS
3DH5	Ant1	2441	1.1954	2440.4037	2441.5991	2400 to 2483.5	PASS
3DH5	Ant1	2480	1.1960	2479.4038	2480.5998	2400 to 2483.5	PASS



Test Graphs:

DH5-Ant1-2402-PASS



DH5-Ant1-2441-PASS



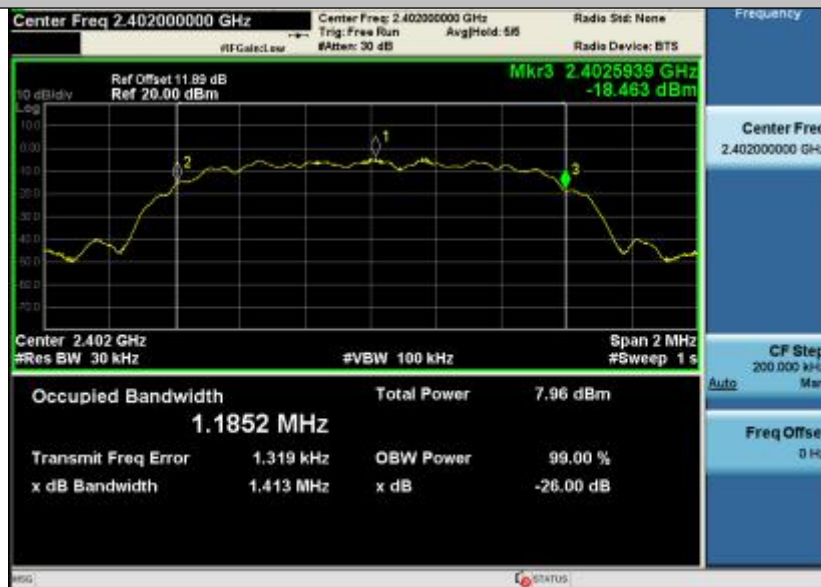
DH5-Ant1-2480-PASS



Report No.: PTC26011002301E-EM01



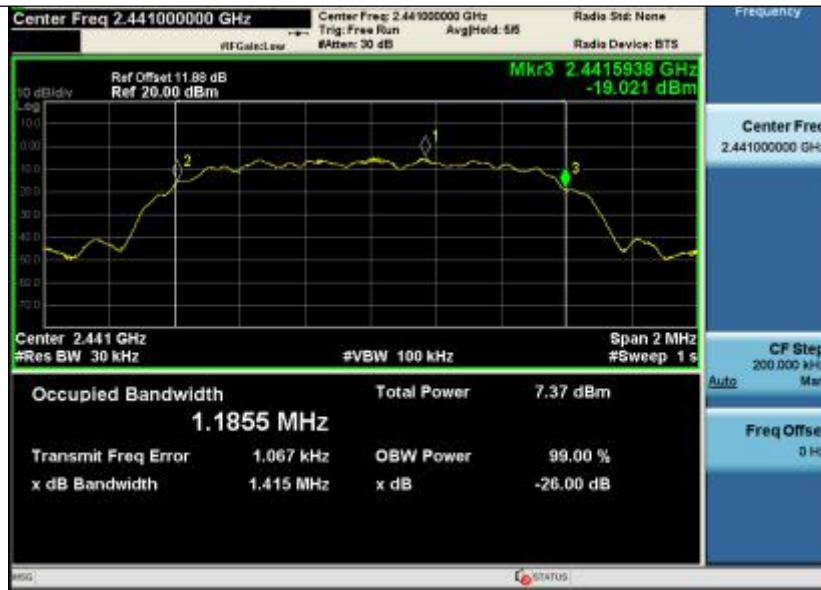
2DH5-Ant1-2402-PASS



2DH5-Ant1-2441-PASS



Report No.: PTC26011002301E-EM01



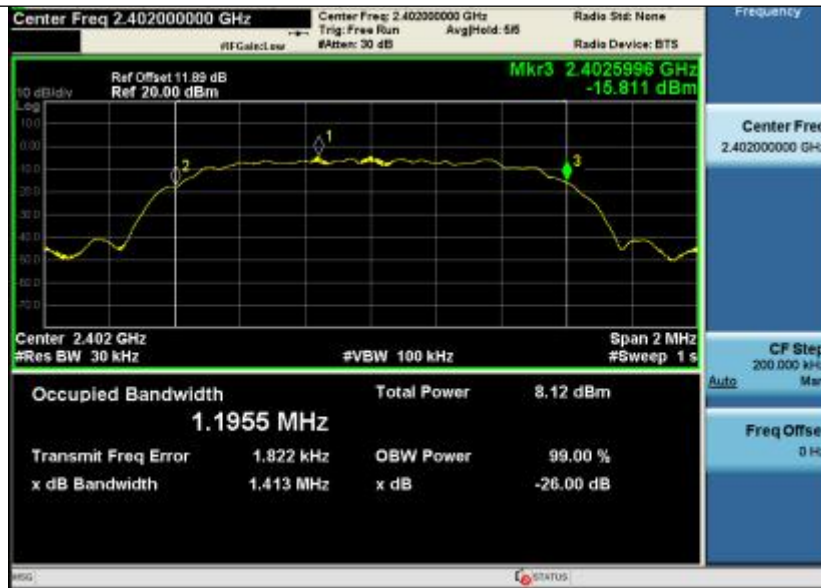
2DH5-Ant1-2480-PASS



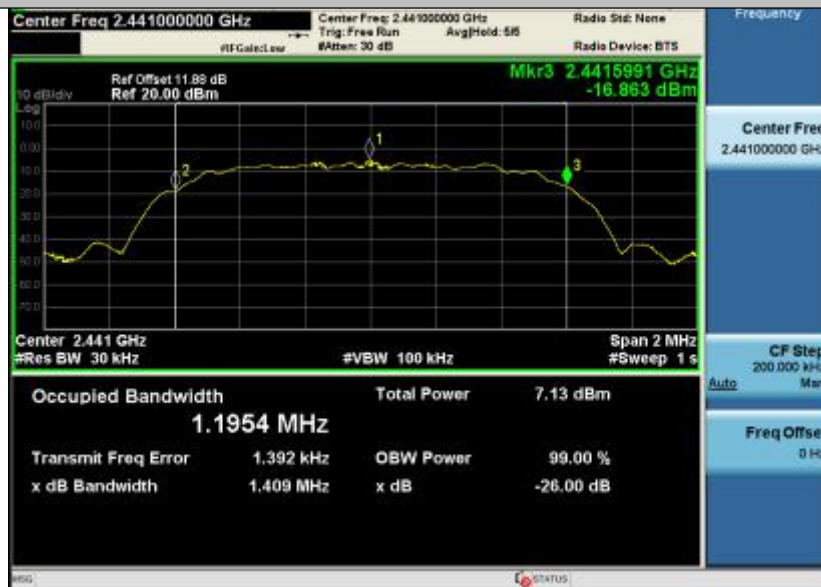
3DH5-Ant1-2402-PASS



Report No.: PTC26011002301E-EM01



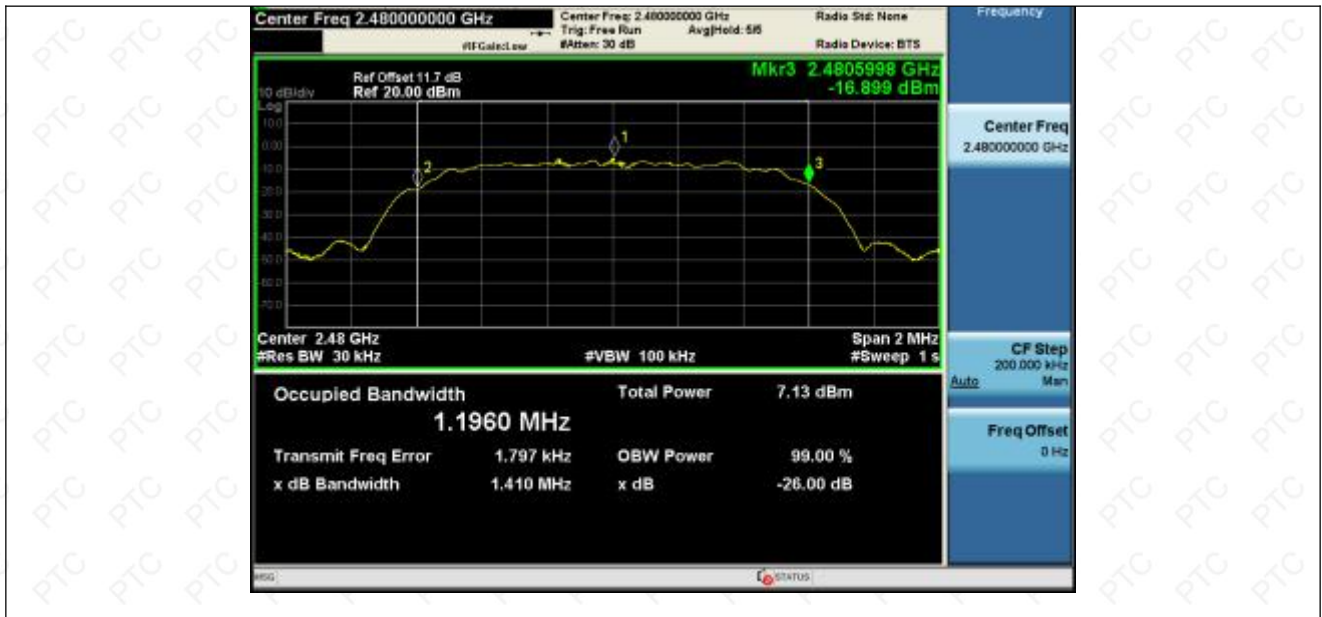
3DH5-Ant1-2441-PASS



3DH5-Ant1-2480-PASS



Report No.: PTC26011002301E-EM01



5.7 Transmitter unwanted emissions in the out-of-band domain

5.7.1 Definition

Transmitter unwanted emissions in the out-of-band domain are emissions when the equipment is in Transmit mode, on frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious.

5.7.2 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 figure 1.

NOTE: Within the 2400 MHz to 2483,5 MHz band, the Out-of-band emissions are fulfilled by compliance with the Occupied Channel Bandwidth requirement in clause 4.3.1.7.

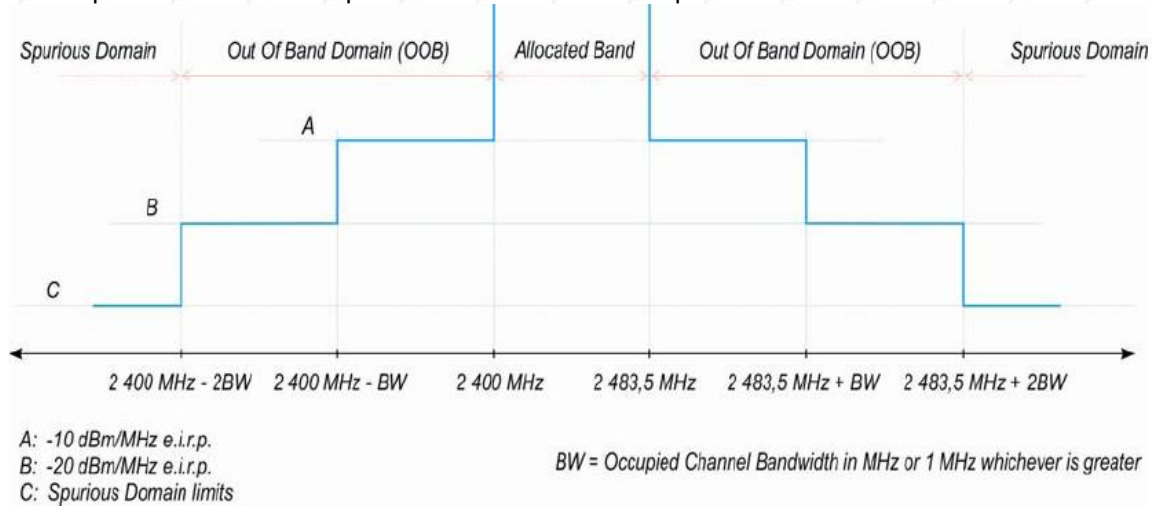


Figure 1: Transmit mask

5.7.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

5.7.4 Test Procedure

1. Connect the UUT to the spectrum analyzer and use the following settings:

- Centre Frequency: 2 484 MHz
- Span: 0 Hz
- Resolution BW: 1 MHz
- Filter mode: Channel filter
- Video BW: 3 MHz
- Detector Mode: RMS
- Trace Mode: Clear / Write
- Sweep Mode: Continuous
- Sweep Points: 5 000
- Trigger Mode: Video trigger

2. (segment 2483,5 MHz to 2483,5 MHz + BW)

- 1) Adjust the trigger level to select the transmissions with the highest power level.
- 2) For frequency hopping equipment operating in a normal hopping mode, the different hops will result in signal bursts with different power levels. In this case the burst with the highest power level shall be selected.
- 3) Set a window (start and stop lines) to match with the start and end of the burst and in which the RMS power shall be measured using the Time Domain Power function.
- 4) Select RMS power to be measured within the selected window and note the result which is the RMS power within this 1 MHz segment (2483,5 MHz to 2 484,5 MHz). Compare this value with the applicable limit provided by the mask.
- 5) Increase the centre frequency in steps of 1 MHz and repeat this measurement for every 1 MHz segment within the range 2483,5 MHz to 2483,5 MHz + BW. The centre frequency of the last 1 MHz segment shall be set to 2483,5 MHz + BW - 0,5 MHz (which means this may partly overlap with the previous 1 MHz segment).

3. (segment 2483,5 MHz + BW to 2483,5 MHz + 2BW):

Change the centre frequency of the analyzer to 2 484 MHz + BW and perform the measurement for the first 1MHz segment within range 2483,5MHz + BW to 2483,5MHz + 2BW. Increase the centre frequency in 1MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1MHz segment shall be set to 2483,5MHz + 2 BW - 0,5MHz.

4. (segment 2400 MHz - BW to 2400 MHz):

Change the centre frequency of the analyzer to 2 399,5MHz and perform the measurement for the first 1MHz segment within range 2400MHz - BW to 2400MHz. Reduce the centre frequency in 1MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1MHz segment shall be set to 2400MHz - 2BW + 0,5MHz.

5. (segment 2400 MHz - 2BW to 2400 MHz - BW):

- 1) Change the centre frequency of the analyzer to 2 399,5MHz - BW and perform the measurement for the first 1MHz segment within range 2400MHz - 2BW to 2400MHz - BW. Reduce the centre frequency in 1MHz steps and repeat the measurements to cover this whole range. The centre frequency of the last 1 MHz segment shall be set to 2400MHz - 2BW + 0,5MHz.
- 2) In case of conducted measurements on equipment with a single transmit chain, the declared antenna assembly gain "G" in dBi shall be added to the results for each of the 1 MHz segments and compared with the limits provided by the mask given in figures 1 or 3. If more than one antenna assembly is intended for this power setting, the antenna with the highest gain shall be



considered.

- 3) In case of conducted measurements on smart antenna systems (equipment with multiple transmit chains), the measurements need to be repeated for each of the active transmit chains. The declared antenna assembly gain "G" in dBi for a single antenna shall be added to these results. If more than one antenna assembly is intended for this power setting, the antenna with the highest gain shall be considered. Comparison with the applicable limits shall be done using any of the options given below:

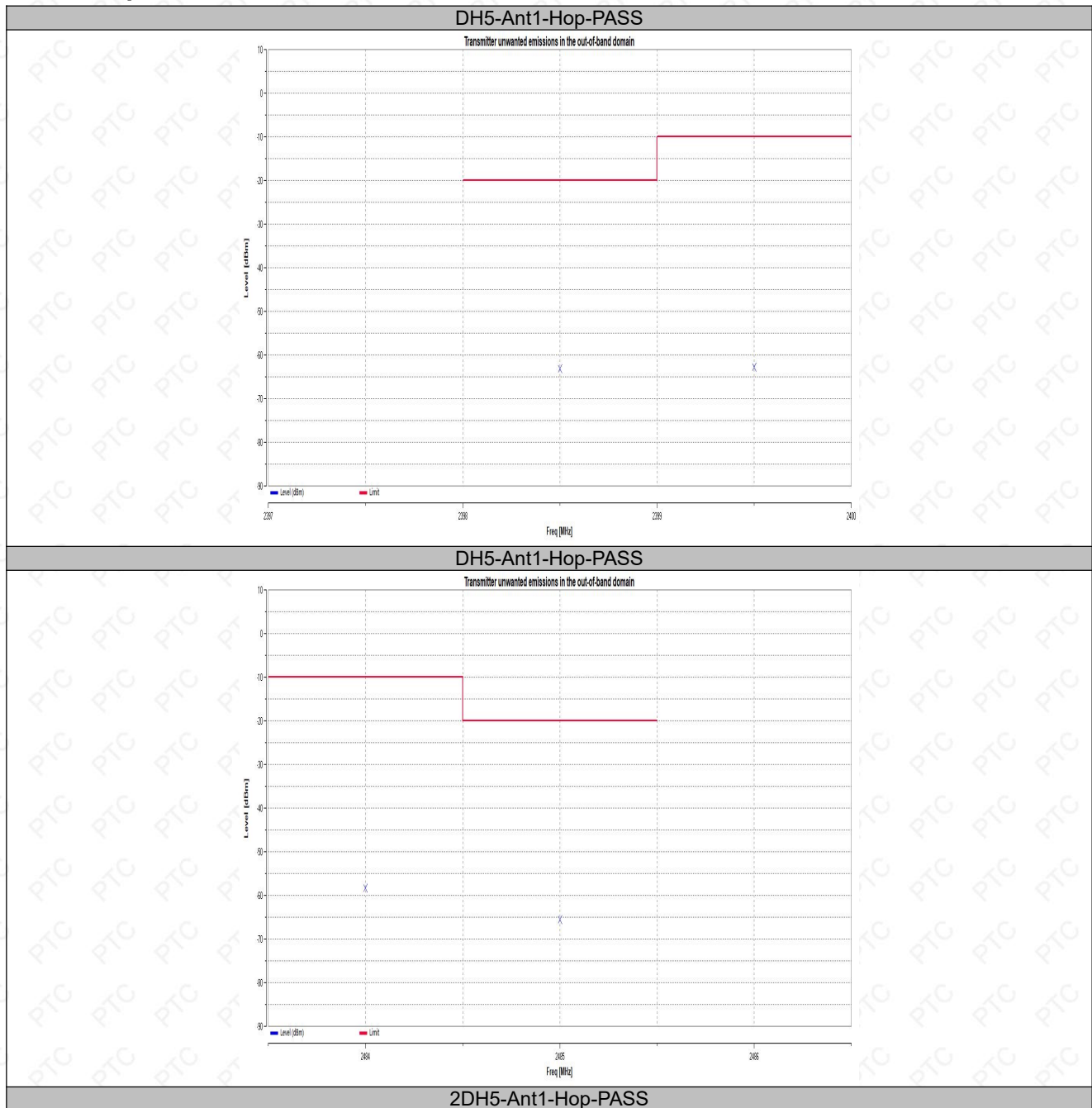
- Option 1: the results for each of the transmit chains for the corresponding 1 MHz segments shall be added. The additional beamforming gain "Y" in dB shall be added as well and the resulting values compared with the limits provided by the mask given in figures 1 or 3.
- Option 2: the limits provided by the mask given in figures 1 or 3 shall be reduced by $10 \times \log_{10}(A_{ch})$ and the additional beamforming gain "Y" in dB. The results for each of the transmit chains shall be individually compared with these reduced limits.

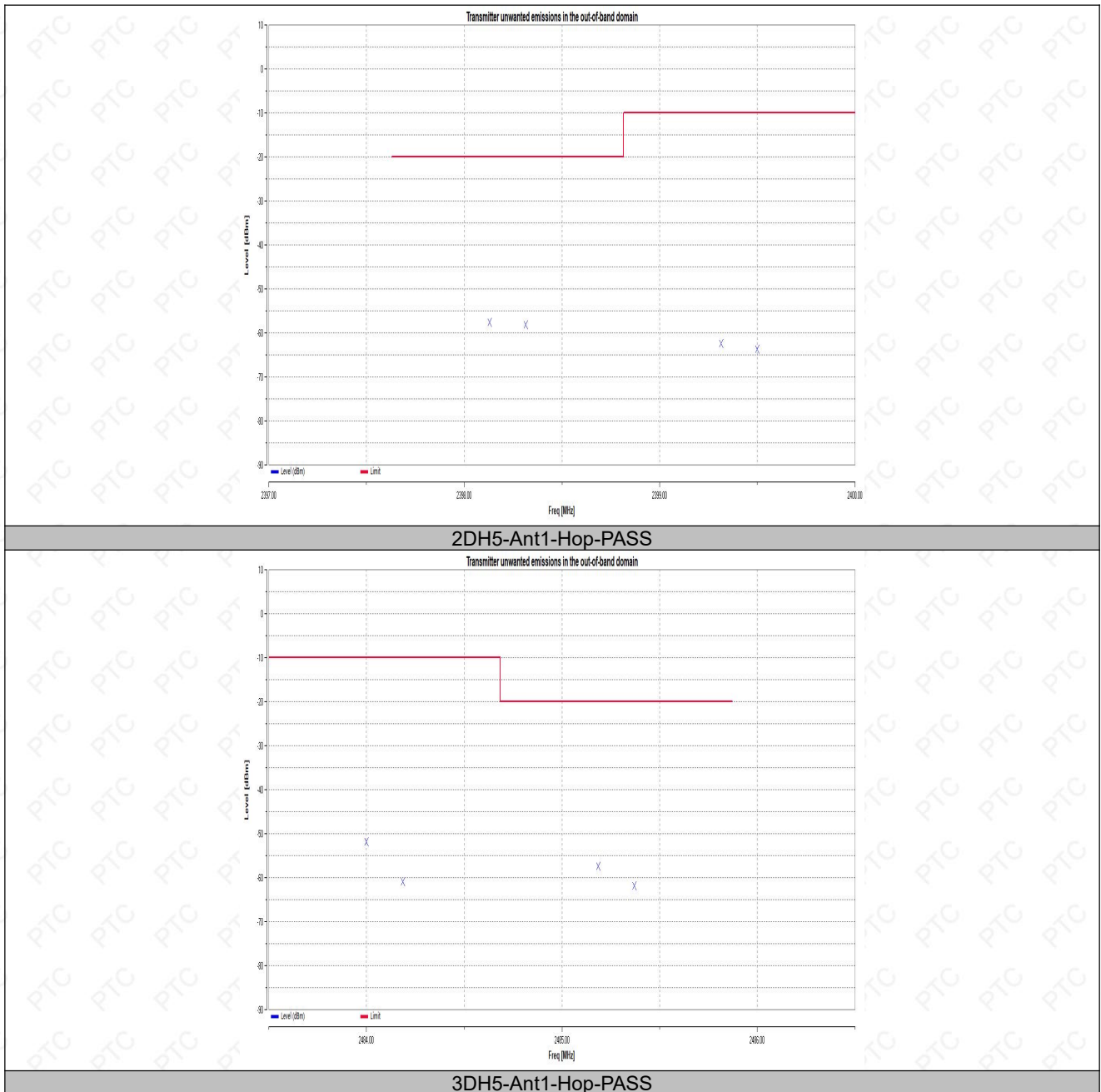
5.7.5 Measurement Record

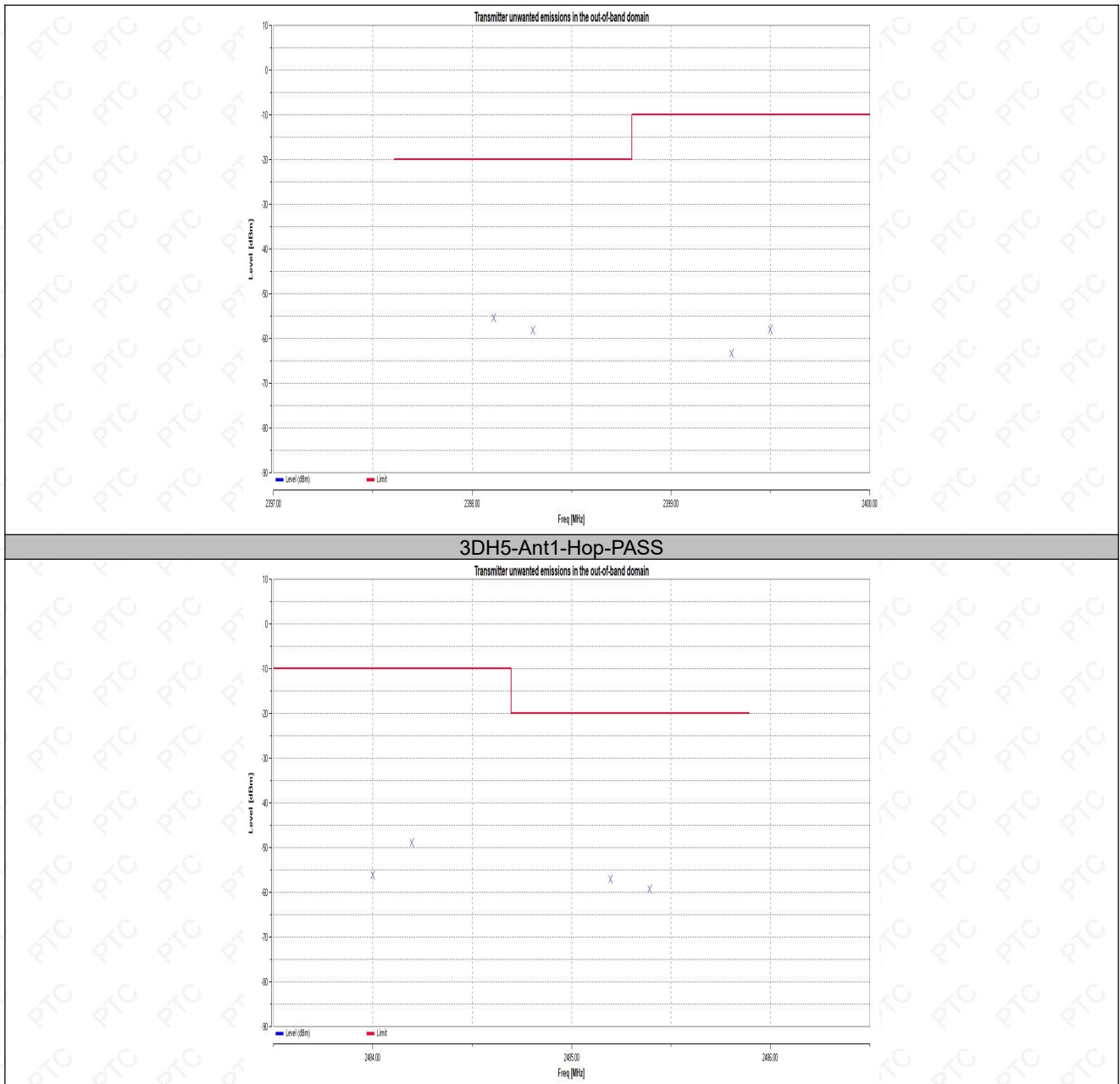
TestMode	Antenna	Frequency[MHz]	Freq. [MHz]	Level[dBm]	Limit[dBm]	Verdict
DH5	Ant1	Hop	2398.5	-62.75	-20.00	PASS
DH5	Ant1	Hop	2399.5	-61.58	-10.00	PASS
DH5	Ant1	Hop	2484	-56.82	-10.00	PASS
DH5	Ant1	Hop	2485	-62.07	-20.00	PASS
2DH5	Ant1	Hop	2398.31	-55.66	-20.00	PASS
2DH5	Ant1	Hop	2399.31	-57.22	-10.00	PASS
2DH5	Ant1	Hop	2484.19	-56.37	-10.00	PASS
2DH5	Ant1	Hop	2485.37	-57.44	-20.00	PASS
3DH5	Ant1	Hop	2398.3	-54.81	-20.00	PASS
3DH5	Ant1	Hop	2399.5	-61.53	-10.00	PASS
3DH5	Ant1	Hop	2484	-57.06	-10.00	PASS
3DH5	Ant1	Hop	2485.39	-56.99	-20.00	PASS



Test Graphs:







5.8 Transmitter unwanted emissions in the spurious domain

5.8.1 Definition

Transmitter unwanted emissions in the spurious domain are emissions outside the allocated band and outside the out-of-band domain as indicated in figure 1 when the equipment is in Transmit mode.

5.8.2 Limit

Table 1: Transmitter limits for spurious emissions

Frequency range	Maximum power,e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	Bandwidth
30 MHz to 47 MHz	-36 dBm	100 kHz
47 MHz to 74 MHz	-54 dBm	100 kHz
74 MHz to 87.5 MHz	-36 dBm	100 kHz
87.5 MHz to 118 MHz	-54 dBm	100 kHz
118 MHz to 174 MHz	-36 dBm	100 kHz
174 MHz to 230 MHz	-54 dBm	100 kHz
230 MHz to 470 MHz	-36 dBm	100 kHz
470 MHz to 694 MHz	-54 dBm	100 kHz
694 MHz to 1 GHz	-36 dBm	100 kHz
1 GHz to 12.75 GHz	-30 dBm	1 MHz

5.8.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

5.8.4 Test Procedure

The test site as described in annex B and applicable measurement procedures as described in annex C shall be used.

The test procedure is further as described under clause 5.3.10.2.1.

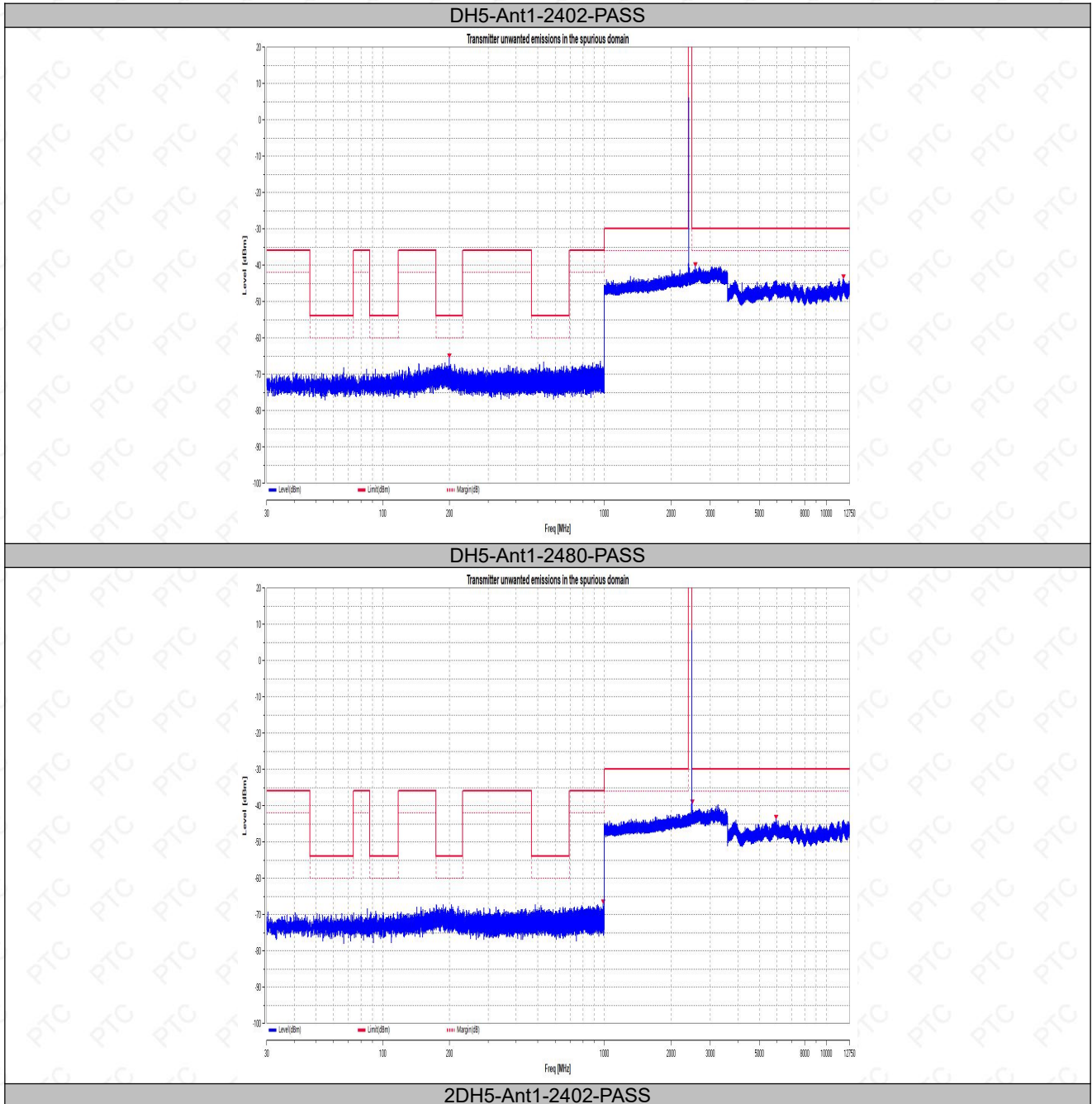


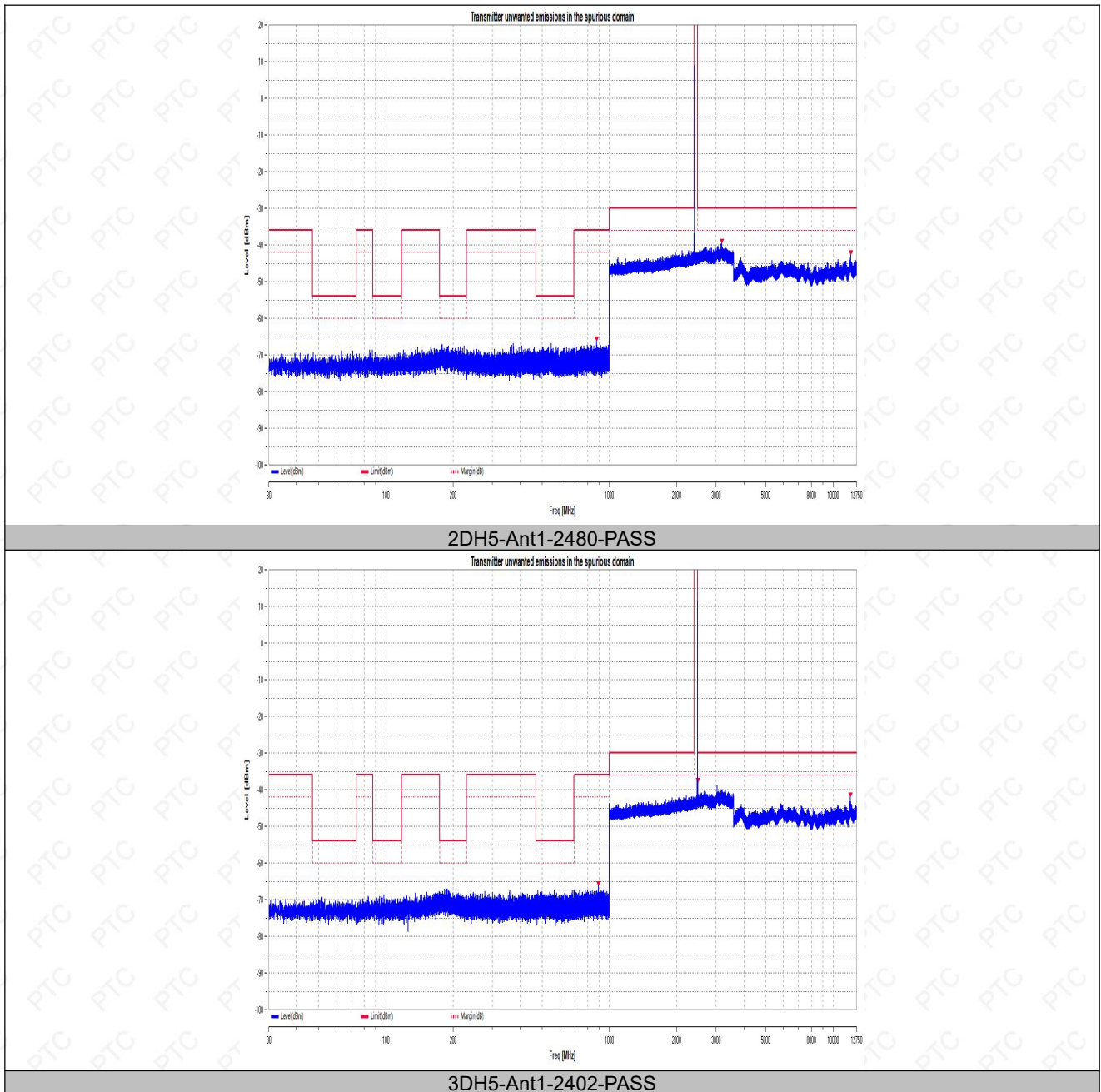
5.8.5 Measurement Record

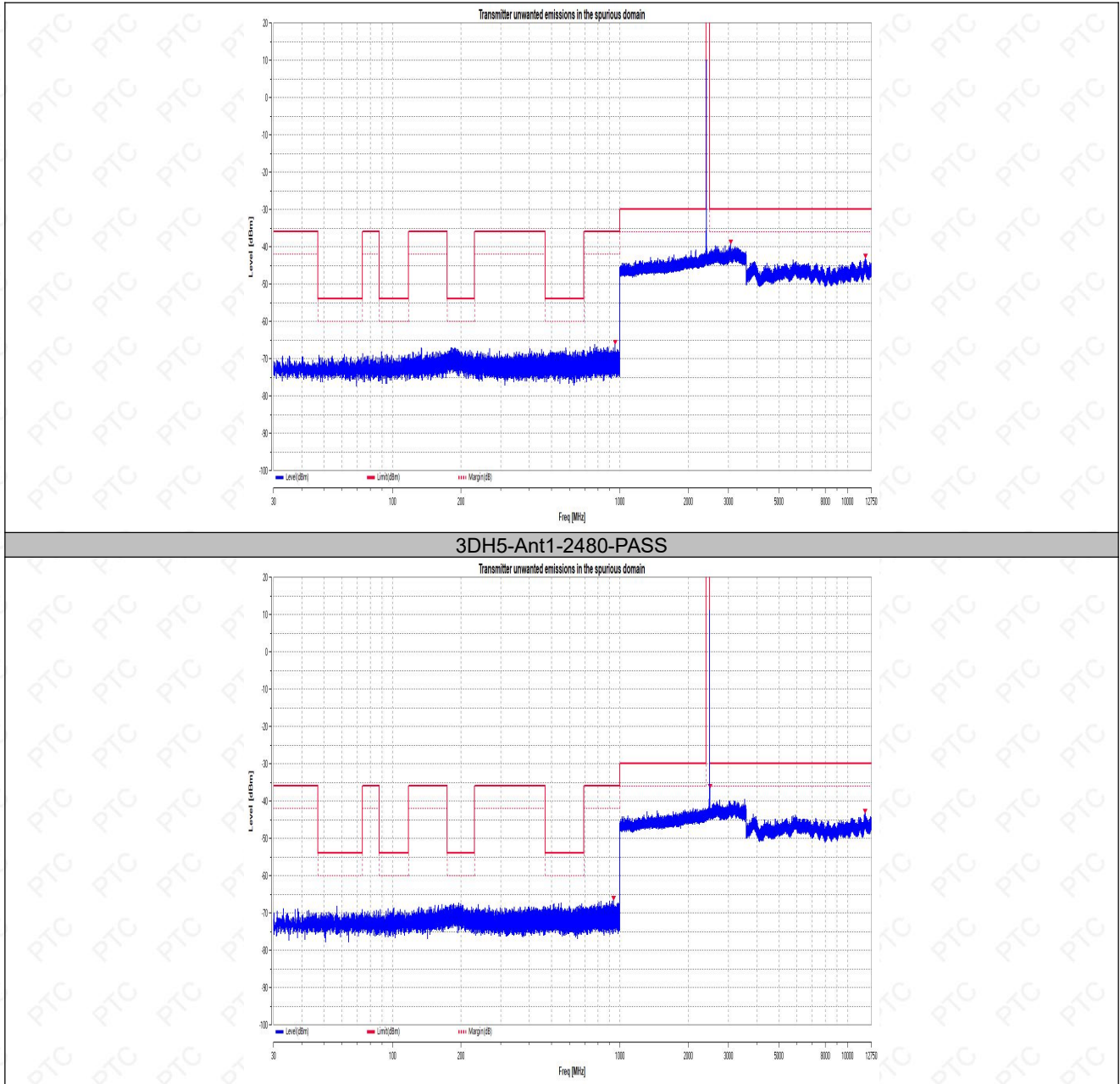
TestMode	Antenna	Frequency[MHz]	Freq. [MHz]	Level[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	199.98	-63.49	-54	PASS
DH5	Ant1	2402	2598.17	-40.38	-30	PASS
DH5	Ant1	2402	12351.52	-44.12	-30	PASS
DH5	Ant1	2480	987.45	-67.68	-36	PASS
DH5	Ant1	2480	2511.59	-38.82	-30	PASS
DH5	Ant1	2480	5894.52	-43.80	-30	PASS
2DH5	Ant1	2402	903.21	-67.53	-36	PASS
2DH5	Ant1	2402	3188.34	-39.13	-30	PASS
2DH5	Ant1	2402	12353.64	-41.41	-30	PASS
2DH5	Ant1	2480	895.95	-65.48	-36	PASS
2DH5	Ant1	2480	2562.15	-37.60	-30	PASS
2DH5	Ant1	2480	11728.64	-42.74	-30	PASS
3DH5	Ant1	2402	983.15	-64.28	-36	PASS
3DH5	Ant1	2402	3036.07	-38.62	-30	PASS
3DH5	Ant1	2402	11640.28	-41.86	-30	PASS
3DH5	Ant1	2480	928.06	-64.73	-36	PASS
3DH5	Ant1	2480	2561.59	-36.56	-30	PASS
3DH5	Ant1	2480	11725.60	-42.88	-30	PASS



Test Graphs:







5.9 Receiver spurious emissions

5.9.1 Definition

Receiver spurious emissions are emissions at any frequency when the equipment is in receive mode.

5.9.2 Limit

Table 2: Spurious emission limits for receivers

Frequency range	Maximum power e.r.p. (≤ 1 GHz) e.i.r.p. (> 1 GHz)	Measurement bandwidth
30 MHz to 1 GHz	-57 dBm	100 kHz
1 GHz to 12.75 GHz	-47 dBm	1 MHz

5.9.3 EUT Operation Condition

The EUT was programmed to be in continuously transmitting mode.

5.9.4 Test Procedure

The test site as described in annex B and applicable measurement procedures as described in annex C shall be used.

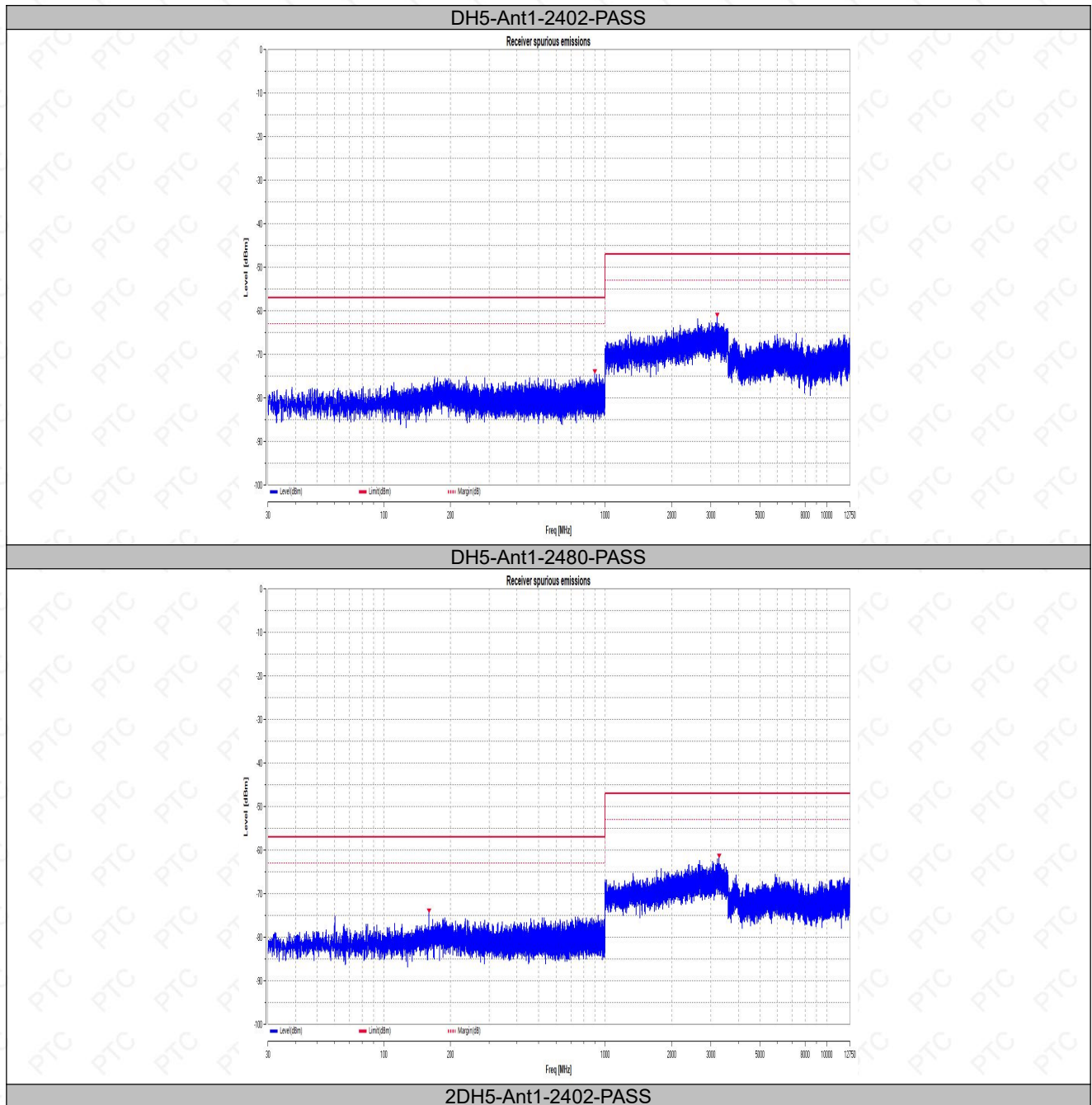
The test procedure is further as described under clause 5.3.11.2.1.

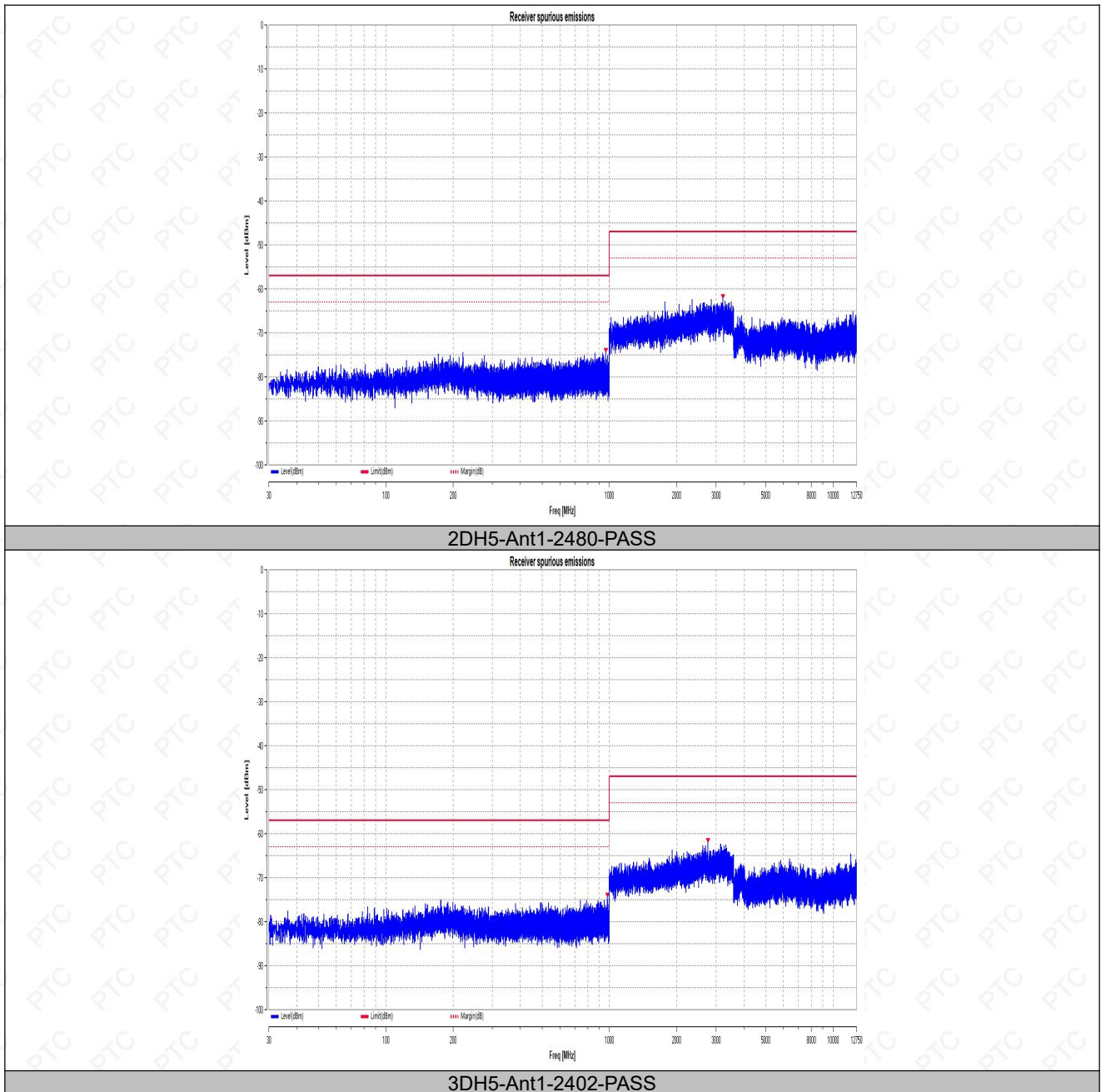
5.9.5 Test Result

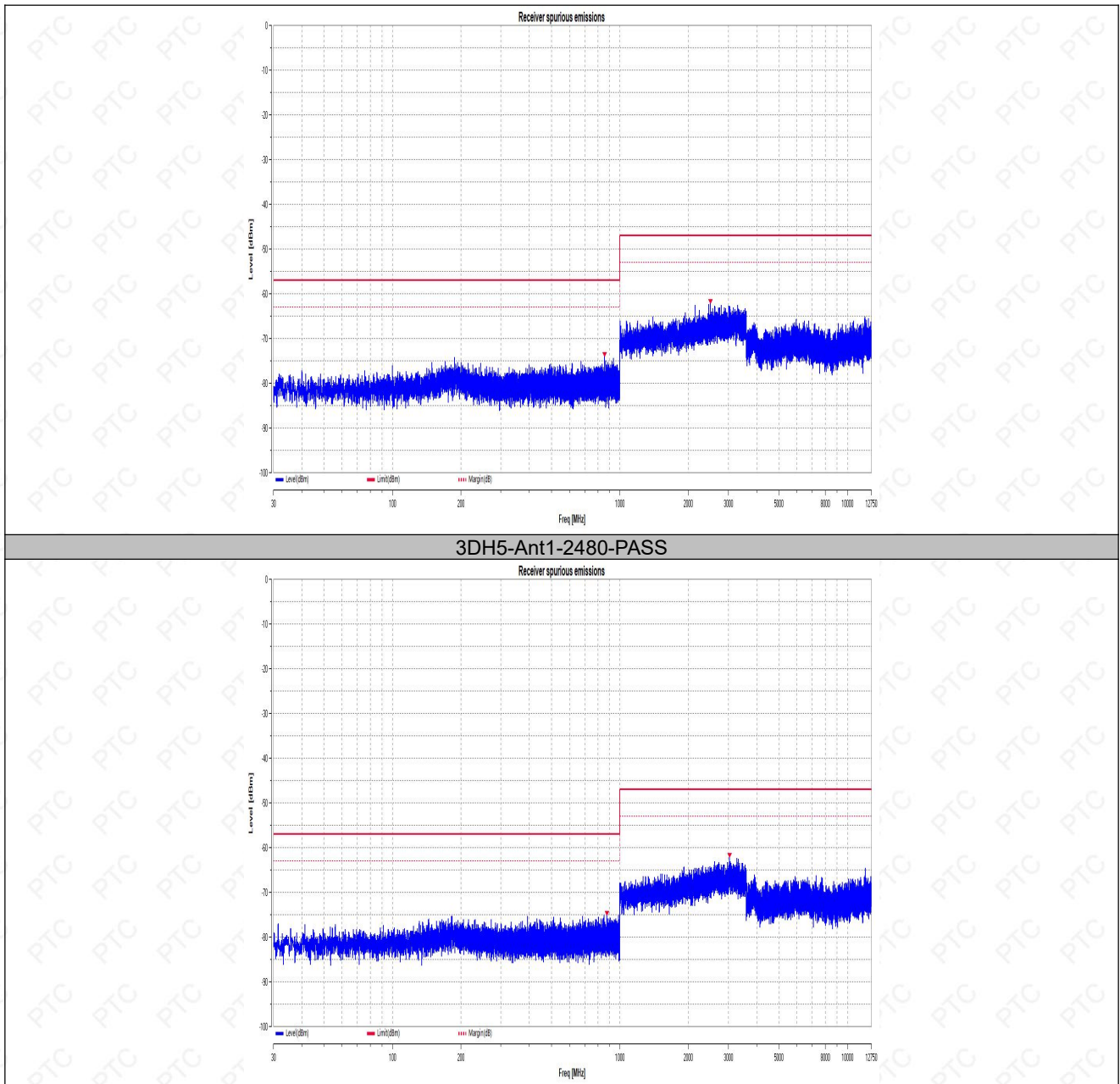
TestMode	Antenna	Frequency[MHz]	Freq. [MHz]	Level[dBm]	Limit[dBm]	Verdict
DH5	Ant1	2402	881.24	-75.28	-57.00	PASS
DH5	Ant1	2402	3205.08	-59.72	-47.00	PASS
DH5	Ant1	2480	160.37	-76.60	-57.00	PASS
DH5	Ant1	2480	3373.04	-61.17	-47.00	PASS
2DH5	Ant1	2402	945.45	-74.39	-57.00	PASS
2DH5	Ant1	2402	3226.63	-61.51	-47.00	PASS
2DH5	Ant1	2480	1010.67	-73.77	-57.00	PASS
2DH5	Ant1	2480	2763.68	-62.05	-47.00	PASS
3DH5	Ant1	2402	855.66	-71.84	-57.00	PASS
3DH5	Ant1	2402	2477.80	-61.59	-47.00	PASS
3DH5	Ant1	2480	860.56	-75.85	-57.00	PASS
3DH5	Ant1	2480	3124.95	-62.75	-47.00	PASS



Test Graphs:









5.10 Receiver Blocking

5.10.1 Applicable standard

ETSI EN 300 328 clause 4.3.1.12

5.10.2 Conformance Limit

The minimum performance criterion shall be a PER less than or equal to 10 %. The manufacturer may declare alternative performance criteria as long as that is appropriate for the intended use of the equipment (see clause 5.4.1.t)).

■ General

While maintaining the minimum performance criteria as defined in clause 4.3.1.12.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined for the applicable receiver category provided in below.

● Receiver Category 1

Receiver Blocking parameters for Receiver Category 1 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
$(-133 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}))$ or -68 dBm whichever is less (see note 2)	2380 2504	-34	CW
$(-139 \text{ dBm} + 10 \times \log_{10}(\text{OCBW}))$ or -74 dBm whichever is less (see note 3)	2300 2330 2360 2524 2584 2674		

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\text{min}} + 26 \text{ dB}$ where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{\text{min}} + 20 \text{ dB}$ where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 4: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

●Receiver Category 2

Receiver Blocking parameters receiver category 2 equipment

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
(-139 dBm + 10 × log ₁₀ (OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less (see note 2)	2380 2504 2300 2584	-34	CW

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{min} + 26$ dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

●Receiver Category 3

Receiver Blocking parameters receiver category 3 equipment

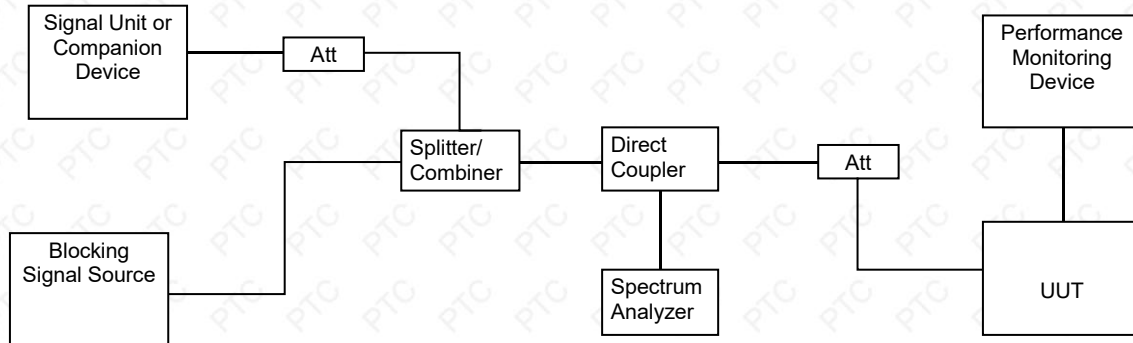
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm) (see note 2)	Type of blocking signal
(-139 dBm + 10 × log ₁₀ (OCBW) + 20 dB) or (-74 dBm + 20 dB) whichever is less (see note 2)	2380 2504 2300 2584	-34	CW

NOTE 1: OCBW is in Hz.

NOTE 2: In case of radiated measurements using a companion device and the level of the wanted signal from the companion device cannot be determined, a relative test may be performed using a wanted signal up to $P_{min} + 30$ dB where P_{min} is the minimum level of wanted signal required to meet the minimum performance criteria as defined in clause 4.3.1.12.3 in the absence of any blocking signal.

NOTE 3: The level specified is the level at the UUT receiver input assuming a 0 dBi antenna assembly gain. In case of conducted measurements, this level has to be corrected for the (in-band) antenna assembly gain (G). In case of radiated measurements, this level is equivalent to a power flux density (PFD) in front of the UUT antenna with the UUT being configured/positioned as recorded in clause 5.4.3.2.2.

5.10.3 Test Configuration



5.10.4 Test Procedure

1. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.11.1 for the test conditions.
2. Please refer to ETSI EN 300 328 (V2.2.2) clause 5.4.11.2 for the measurement method.

■ Conducted measurement

Adaptive Frequency Hopping equipment using DAA

Step 1:

- For non-frequency hopping equipment, the UUT shall be set to the lowest operating channel.

Step 2:

- The blocking signal generator is set to the first frequency as defined in the appropriate table corresponding to the receiver category and type of equipment.

Step 3:

- With the blocking signal generator switched off, a communication link is established between the UUT and the associated companion device using the test setup shown in figure 6. The attenuation of the variable attenuator shall be increased in 1 dB steps to a value at which the minimum performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is still met. The resulting level for the wanted signal at the input of the UUT is P_{min} .
- This signal level (P_{min}) is increased by the value provided in the table corresponding to the receiver category and type of equipment.



Step 4:

- The blocking signal at the UUT is set to the level provided in the table corresponding to the receiver category and type of equipment. It shall be verified and recorded in the test report that the performance criteria as specified in clause 4.3.1.12.3 or clause 4.3.2.11.3 is met.

Step 5:

- Repeat step 4 for each remaining combination of frequency and level for the blocking signal as provided in the table corresponding to the receiver category and type of equipment.

Step 6:

- For non-frequency hopping equipment, repeat step 2 to step 5 with the UUT operating at the highest operating channel.

■ Radiated measurements

When performing radiated measurements on equipment with dedicated antennas, measurements shall be repeated for each alternative dedicated antenna.

A test site as described in annex B and applicable measurement procedures as described in annex C shall be used.

The test procedure is further as described under clause 5.4.11.2.1.

The level of the blocking signal at the UUT referred to in step 4 is assumed to be the level in front of the UUT antenna(s). The UUT shall be positioned with its main beam pointing towards the antenna radiating the blocking signal. The position recorded in clause 5.4.2.2.2 can be used.



5.10.5 Test Results

■ Receiver category

☐	Receiver category 1	Adaptive equipment with a maximum RF output power greater than 10 dBm e.i.r.p. shall be considered as receiver category 1 equipment.
☒	Receiver category 2	Non-adaptive equipment with a Medium Utilization (MU) factor greater than 1 % and less than or equal to 10 % or adaptive equipment with a maximum RF output power of 10 dBm e.i.r.p. shall be considered as receiver category 2 equipment.
☐	Receiver category 3	Non-adaptive equipment with a maximum Medium Utilization (MU) factor of 1 % or adaptive equipment with a maximum RF output power of 0 dBm e.i.r.p. shall be considered as receiver category 3 equipment.

Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Type of blocking signal	PER(%)	Result
(-139 dBm + 10 × log ₁₀ (OCBW) + 10 dB) or (-74 dBm + 10 dB) whichever is less	2380	-34	CW	0.00	PASS
	2504			0.00	
	2300			0.00	
	2584			0.00	



6. TEST SETUP PHOTOGRAPHS

Photo of Radiation Spurious Emission Below 1 GHz

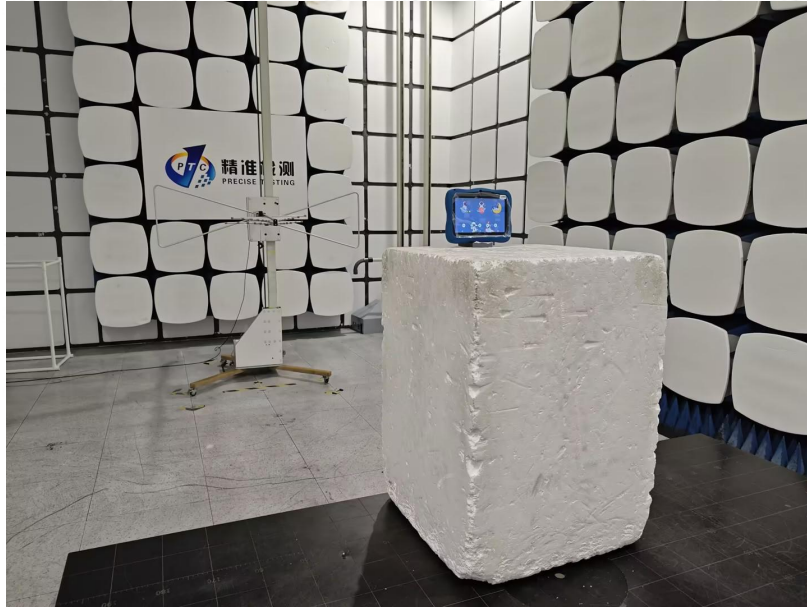


Photo of Radiation Spurious Emission Above 1 GHz



*****THE END REPORT*****