

TEST REPORT N°: KSK-ESH-P24071264B-4

EN 300 328 RF Test Report

Applicant:	K-tronics (Suzhou) Technology Co., Ltd.
Address:	No.1088, Dajing Road, Economic and Technological Development Zone, Wujiang District, Suzhou, Jiangsu Province, 215200, P.R. China
Manufacturer:	i3-TECHNOLOGIES NV
Address:	Nijverheidslaan 60, 8540 Deerlijk, BELGIUM
This document includes : 135 pages	

Product Name:	Interactive Flat Panel	
Model Number:	i3TOUCH V-ONE 86, i3TOUCH V-ONE 86xxxxxxx (x=0-9, A-Z, a-z, +, - (hyphen), /, \ or blank)	
Brand:	i3TOUCH	
Rated Voltage/Power	100-240V~, 50/60Hz, 4.8A	
Received Date:	Jul.15, 2024	
Test Date:	Jul.15 to Sep.03, 2024	
Applicable Standards:	EN 300 328 V2.2.2(2019-07)	
Clause Examined :	All Clauses Relevant	

Test Location: Building C, No. 829, Xin Zhuan Road, Shanghai, CHINA

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Test done by:	Approved by:
Name: Yuan ZHANG	Name: Sean YU
Title: Project Engineer	Title: RF Supervisor
Date: Sep.06, 2024	Date: Sep.06, 2024

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Release Control Record

Issue No.	Description	Date Issued
KSK-ESH-P24071264B-4	Original release	Sep.06, 2024



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1 Summary of Test Results

The EUT has been tested according to the following specifications:

EN 300 328 V2.2.2		
Clause	Test Parameter	Results
4.3.2.2	RF Output Power	Pass
4.3.2.3	Power Spectral Density	Pass
4.3.2.6	Adaptivity (Adaptive Equipment using modulation other than FHSS)	Pass
4.3.2.7	Occupied Channel Bandwidth	Pass
4.3.2.8	Transmitter Unwanted Emissions in the out-of-band Domain	Pass
4.3.2.9	Transmitter Unwanted Emissions in the Spurious Domain	Pass
4.3.2.10	Receiver Spurious Emissions	Pass
4.3.2.11	Receiver Blocking	Pass
4.3.2.12	Geo-location capability	Not Applicable Note

Note: This product has no Geo-location capability, so the test is not applicable.

Special Comments: None.



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1.1 Test Instruments

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Double Ridged Broadband Horn (30MHz-1.5GHz)	Schwarzbeck	VULB9168	E1A1012	Aug.17,23	Aug.16,25
Horn Antenna (1GHz -18GHz)	Schwarzbeck	BBHA9120D	E1A1041	Apr.11,23	Apr.10,25
Pre-Amplifier(9kHz-1GHz)	Tonscend	TAP9K3G40	E1A2012	Apr.19,23	Apr.18,25
Pre-Amplifier(1GHz-18GHz)	Tonscend	TAP01018050	E1A2013	Mar.01,24	Feb.28,25
Pre-Amplifier(18GHz-40GHz)	Tonscend	TAP18040048	E1A2014	May.24,24	May.23,25
Pre-Amplifier(9kHz-1GHz)	SONOMA	11909A(310)	E1A2007	Feb.18,24	Feb.17,25
Pre-Amplifier(1GHz-26.5GHz)	Agilent	8449B	E1A2002	Feb.18,24	Feb.17,25
Signal Generator	Keysight	N5171B	E1S9016	Feb.19,24	Feb.18,25
Signal Generator	Keysight	N5182B	E1S9017	Feb.19,24	Feb.18,25
Wireless Connectivity Tester	R&S	CMW270	E1S9021	Oct.28,22	Oct.26,24
Spectrum Analyzer	R&S	FSQ	E1S1005	Aug.12,24	Aug.11,25
Spectrum Analyzer	Keysight	N9030B	E1S1003	Sep.14,23	Sep.13,24
Spectrum Analyzer	Keysight	N9020A	E1S1004	Mar.01,24	Feb.28,25
RF Control Unit	Toscend	JS0806-2	E1C5003	NCR	NCR
DC Power supply	Chroma	62024p-80-60	S1S1009	Mar.21,24	Mar.20,25
Humidity&Temp Programmable Tester	ESPEC	SE TH-Z-042U	C1TH002	Jun.06,24	Jun.05,25
Test Software	Toscend	JS1120-3	N/A	N/A	N/A
Test Software	Toscend	JS36-RSE	N/A	N/A	N/A



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1.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Parameter	Uncertainty
Occupied Channel Bandwidth	$\pm 1.132 \times 10^{-4} \%$
RF output power, conducted	$\pm 1.017 \text{ dB}$
Power Spectral Density, conducted	$\pm 1.017 \text{ dB}$
Unwanted Emissions, conducted	$\pm 2.855 \text{ dB}$
All emissions, radiated	$\pm 2.855 \text{ dB}$
Temperature	$\pm 0.7^\circ \text{C}$
Supply voltages	$\pm 0.04 \%$
Time	$\pm 5 \%$

1.3 Maximum Measurement Uncertainty

For the test methods, according to EN 300 328 standard, the measurement uncertainty figures shall be calculated in accordance with ETR 100 028-1 [4] and shall correspond to an expansion factor (coverage factor) $k = 1,96$ or $k = 2$ (which provide confidence levels of respectively 95 % and 95,45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Maximum 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	$\pm 6 \text{ dB}$
Temperature	$\pm 1^\circ \text{C}$
Supply voltages	$\pm 3 \%$
Time	$\pm 5 \%$

1.4 Modification Record

There were no modifications required for compliance.



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2 General Information

2.1 General Description of EUT

Product	Interactive Flat Panel
Brand	i3TOUCH
Model	i3TOUCH V-ONE 86, i3TOUCH V-ONE 86xxxxxxx (x=0-9, A-Z, a-z, +, - (hyphen), /, \ or blank)
Model difference	All models are identical to each other except for different model name.
Nominal Voltage	100-240V~, 50/60Hz, 4.8A
Temperature Operating Range	+0deg.c to +40deg.c
Modulation Type	DSSS, OFDM
Modulation Technology	802.11b/g/n20/n40 for Wireless Module(WCT1DR2201D, WC0NR2201)
Operating Frequency	802.11b, 802.11g and 802.11n (HT20):2412MHz~2472MHz, 802.11n (HT40):2422MHz~2462MHz for Wireless Module(WCT1DR2201D, WC0NR2201)
Number of Channel	802.11b, 802.11g and 802.11n (HT20):13 ; 802.11n (HT40):9 for Wireless Module(WCT1DR2201D, WC0NR2201)
Adaptive/Non-Adaptive	☐ non-adaptive Equipment ☒ adaptive Equipment without the possibility to switch to a non-adaptive mode ☐ adaptive Equipment which can also operate in a non-adaptive mode
EIRP Power (Measured Max. Average)	17.82dBm for Wireless Module(WCT1DR2201D) 19.29dBm for Wireless Module(WC0NR2201)
Antenna Type	External Antenna for Wireless Module(WCT1DR2201D, WC0NR2201)
Antenna Gain	Ant1:2.8dBi, Ant2:2.8dBi for Wireless Module(WCT1DR2201D) Ant1:2.8dBi, Ant2:2.8dBi Wireless Module(WC0NR2201)
Data Cable Supplied	--

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.
2. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
3. The EUT contains two wireless modules.
The wireless module of model WCT1DR2201D supports BT/WIFI function.
The wireless module of model WC0NR2201 supports WIFI function.
The wireless module of model WC0NR2201 works as Hotspot mode only, the wireless module of model WCT1DR2201D works as Client mode only. The two wireless modules can work at the same time.



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2.2 Description of Test Modes

13 channels are provided for 802.11b, 802.11g, 802.11n20:

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	8	2447 MHz
2	2417 MHz	9	2452 MHz
3	2422 MHz	10	2457 MHz
4	2427 MHz	11	2462 MHz
5	2432 MHz	12	2467 MHz
6	2437 MHz	13	2472 MHz
7	2442 MHz	-	-

9 channels are provided for 802.11n40:

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422 MHz	8	2447 MHz
4	2427 MHz	9	2452 MHz
5	2432 MHz	10	2457 MHz
6	2437 MHz	11	2462 MHz
7	2442 MHz	-	-



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2.2.1 Test Mode Applicability:

EUT Configure Mode	Applicable to								Description
	ROP	PSD	AD	OCB	EOB	SE< 1G	SE> 1G	RB	
-	-	-	-	-	-	√	√	-	-

Where **ROP**: RF Output Power **PSD**: Power Spectral Density
DC/TS/TG: Duty Cycle/ Tx-Sequence / Tx-gap **MU**: Medium Utilization
AD: Adaptivity (Channel Access Mechanism) **OCB**: Occupied Channel Bandwidth
EOB: Transmitter unwanted emissions in the out-of-band domain **SE<1G**: Unwanted Emissions in the Spurious Domain below 1 GHz
SE> 1G: Unwanted Emissions in the Spurious Domain above 1 GHz **RB**: Receiver Blocking

2.2.2 Test Condition:

Applicable to	Normal Environmental Conditions	Normal Input Power	Extreme Temperature conditions
ROP	25deg. C, 60%RH	AC 230V	√
PSD	25deg. C, 60%RH	AC 230V	-
AD	25deg. C, 60%RH	AC 230V	-
OCB	25deg. C, 60%RH	AC 230V	-
EOB	25deg. C, 60%RH	AC 230V	-
SE<1G	25deg. C, 60%RH	AC 230V	-
SE>1G	25deg. C, 60%RH	AC 230V	-
RB	25deg. C, 60%RH	AC 230V	-

Extreme Temperature conditions	
Tmin	0deg. C
Tmax	+40deg. C



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2.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND/Manufacturer	MODEL NO.
1	PC	ThinkPad	L470

2.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standard:

EN 300 328 V2.2.2 (2019-07)

All relaxed test items have been performed and recorded as per the above standard.

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3 Test Procedure and Results

3.1 RF Output Power

3.1.1 Limits of RF Output Power

Condition	Frequency Band	Limit (e.i.r.p)
Under all test conditions	2400 ~ 2483.5 MHz	AV: 20dBm

3.1.2 Test Procedures

Refer to chapter 5.4.2.2 of EN 300 328 V2.2.2.

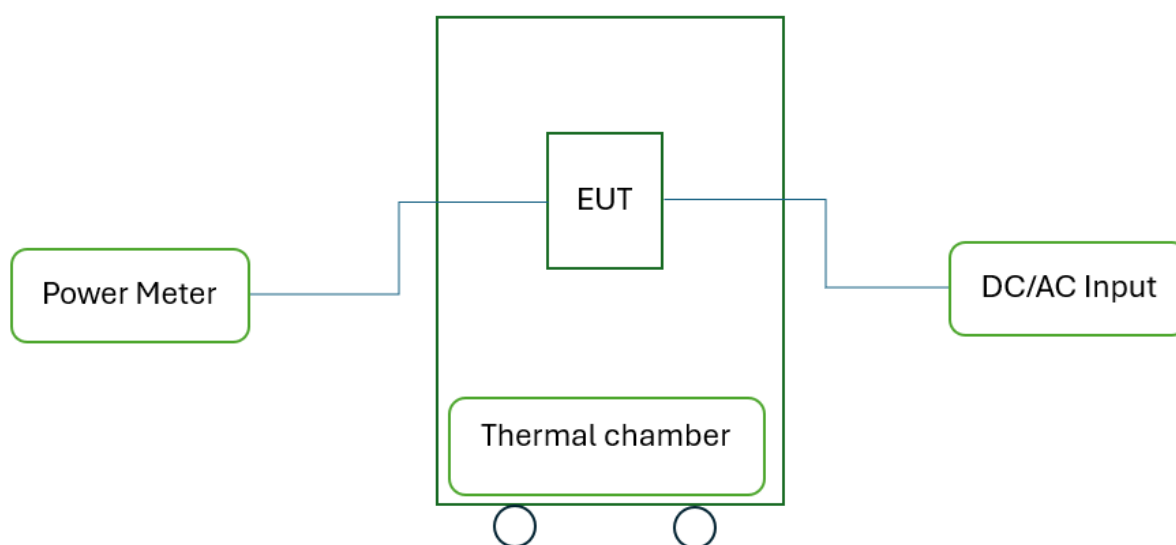
Measurement Method	
☒ Conducted measurement	☐ Radiated measurement

3.1.3 Deviation from Test Standard

No deviation.

3.1.4 Test Setup

The measurements for RF output power was performed at both normal environmental conditions and at the extremes of the operating temperature. The measurement was performed at the lowest, the middle, and the highest channel.





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3.1.5 Test Results

WCT1DR2201D

Test Condition	Test Mode	Antenna	Channel[MHz]	EIRP[dBm]	Limit[dBm]	Verdict
NTNV	11B	Ant1	2412	17.82	20	PASS
		Ant2	2412	16.96	20	PASS
		Ant1	2442	16.72	20	PASS
		Ant2	2442	16.41	20	PASS
		Ant1	2472	16.43	20	PASS
		Ant2	2472	15.70	20	PASS
	11G	Ant1	2412	16.71	20	PASS
		Ant2	2412	15.79	20	PASS
		Ant1	2442	15.71	20	PASS
		Ant2	2442	15.17	20	PASS
		Ant1	2472	15.39	20	PASS
		Ant2	2472	14.90	20	PASS
	11N20MIMO	Ant1	2412	15.49	20	PASS
		Ant2	2412	13.76	20	PASS
		total	2412	17.71	20	PASS
		Ant1	2442	14.42	20	PASS
		Ant2	2442	12.89	20	PASS
		total	2442	16.73	20	PASS
		Ant1	2472	14.19	20	PASS
		Ant2	2472	12.66	20	PASS
		total	2472	16.50	20	PASS
	11N40MIMO	Ant1	2422	15.03	20	PASS
		Ant2	2422	13.23	20	PASS
		total	2422	17.23	20	PASS
		Ant1	2442	14.20	20	PASS
		Ant2	2442	12.70	20	PASS
		total	2442	16.52	20	PASS
		Ant1	2462	13.76	20	PASS
		Ant2	2462	12.23	20	PASS
		total	2462	16.07	20	PASS
LTNV	11B	Ant1	2412	17.79	20	PASS
		Ant2	2412	16.98	20	PASS
		Ant1	2442	16.73	20	PASS
		Ant2	2442	16.41	20	PASS
		Ant1	2472	16.43	20	PASS
		Ant2	2472	15.70	20	PASS
	11G	Ant1	2412	16.70	20	PASS
		Ant2	2412	15.76	20	PASS
		Ant1	2442	15.69	20	PASS
		Ant2	2442	15.27	20	PASS
		Ant1	2472	15.35	20	PASS
		Ant2	2472	14.87	20	PASS
	11N20MIMO	Ant1	2412	15.51	20	PASS
		Ant2	2412	13.83	20	PASS
		total	2412	17.76	20	PASS
		Ant1	2442	14.37	20	PASS
		Ant2	2442	12.84	20	PASS
		total	2442	16.68	20	PASS

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		Ant1	2472	14.13	20	PASS
		Ant2	2472	12.58	20	PASS
		total	2472	16.43	20	PASS
	11N40MIMO	Ant1	2422	15.01	20	PASS
		Ant2	2422	13.23	20	PASS
		total	2422	17.21	20	PASS
		Ant1	2442	14.15	20	PASS
		Ant2	2442	12.64	20	PASS
		total	2442	16.46	20	PASS
		Ant1	2462	13.74	20	PASS
		Ant2	2462	12.21	20	PASS
		total	2462	16.06	20	PASS
HTNV	11B	Ant1	2412	17.82	20	PASS
		Ant2	2412	16.94	20	PASS
		Ant1	2442	16.72	20	PASS
		Ant2	2442	16.41	20	PASS
		Ant1	2472	16.42	20	PASS
		Ant2	2472	15.72	20	PASS
	11G	Ant1	2412	16.71	20	PASS
		Ant2	2412	15.79	20	PASS
		Ant1	2442	15.72	20	PASS
		Ant2	2442	15.33	20	PASS
		Ant1	2472	15.40	20	PASS
		Ant2	2472	14.92	20	PASS
	11N20MIMO	Ant1	2412	15.46	20	PASS
		Ant2	2412	13.74	20	PASS
		total	2412	17.69	20	PASS
		Ant1	2442	14.43	20	PASS
		Ant2	2442	12.91	20	PASS
		total	2442	16.74	20	PASS
		Ant1	2472	14.19	20	PASS
		Ant2	2472	12.67	20	PASS
		total	2472	16.50	20	PASS
	11N40MIMO	Ant1	2422	15.02	20	PASS
		Ant2	2422	13.23	20	PASS
		total	2422	17.21	20	PASS
		Ant1	2442	14.20	20	PASS
		Ant2	2442	12.72	20	PASS
		total	2442	16.53	20	PASS
		Ant1	2462	13.77	20	PASS
		Ant2	2462	12.24	20	PASS
		total	2462	16.08	20	PASS



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WC0NR2201

Test Condition	Test Mode	Antenna	Channel[MHz]	EIRP[dBm]	Limit[dBm]	Verdict
NTNV	11B	Ant1	2412	16.36	20	PASS
		Ant2	2412	16.30	20	PASS
		Ant1	2442	15.18	20	PASS
		Ant2	2442	15.82	20	PASS
		Ant1	2472	15.38	20	PASS
		Ant2	2472	15.09	20	PASS
	11G	Ant1	2412	16.98	20	PASS
		Ant2	2412	15.38	20	PASS
		Ant1	2442	16.16	20	PASS
		Ant2	2442	14.55	20	PASS
		Ant1	2472	16.22	20	PASS
		Ant2	2472	14.25	20	PASS
	11N20MIMO	Ant1	2412	16.69	20	PASS
		Ant2	2412	14.65	20	PASS
		total	2412	18.78	20	PASS
		Ant1	2442	15.11	20	PASS
		Ant2	2442	13.31	20	PASS
		total	2442	17.31	20	PASS
		Ant1	2472	15.07	20	PASS
		Ant2	2472	12.91	20	PASS
	11N40MIMO	total	2472	17.13	20	PASS
		Ant1	2422	16.75	20	PASS
		Ant2	2422	14.81	20	PASS
		total	2422	18.88	20	PASS
		Ant1	2442	15.22	20	PASS
		Ant2	2442	13.38	20	PASS
		total	2442	17.40	20	PASS
		Ant1	2462	13.07	20	PASS
		Ant2	2462	10.12	20	PASS
		total	2462	14.85	20	PASS
LTVN	11B	Ant1	2412	16.47	20	PASS
		Ant2	2412	16.30	20	PASS
		Ant1	2442	15.06	20	PASS
		Ant2	2442	15.81	20	PASS
		Ant1	2472	15.40	20	PASS
		Ant2	2472	15.08	20	PASS
	11G	Ant1	2412	16.94	20	PASS
		Ant2	2412	15.40	20	PASS
		Ant1	2442	16.12	20	PASS
		Ant2	2442	14.54	20	PASS
		Ant1	2472	16.20	20	PASS
		Ant2	2472	14.22	20	PASS
	11N20MIMO	Ant1	2412	17.06	20	PASS
		Ant2	2412	15.13	20	PASS
		total	2412	19.20	20	PASS
		Ant1	2442	15.64	20	PASS
		Ant2	2442	13.90	20	PASS
		total	2442	17.85	20	PASS
		Ant1	2472	15.07	20	PASS

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	11N40MIMO	Ant2	2472	12.89	20	PASS
		total	2472	17.12	20	PASS
		Ant1	2422	17.12	20	PASS
		Ant2	2422	15.26	20	PASS
		total	2422	19.29	20	PASS
		Ant1	2442	15.18	20	PASS
		Ant2	2442	13.33	20	PASS
		total	2442	17.35	20	PASS
		Ant1	2462	13.19	20	PASS
		Ant2	2462	10.26	20	PASS
		total	2462	14.97	20	PASS
		total	2462	14.97	20	PASS
HTNV	11B	Ant1	2412	16.29	20	PASS
		Ant2	2412	16.27	20	PASS
		Ant1	2442	15.23	20	PASS
		Ant2	2442	15.82	20	PASS
		Ant1	2472	15.38	20	PASS
		Ant2	2472	15.08	20	PASS
	11G	Ant1	2412	16.99	20	PASS
		Ant2	2412	15.37	20	PASS
		Ant1	2442	16.18	20	PASS
		Ant2	2442	14.56	20	PASS
		Ant1	2472	16.22	20	PASS
		Ant2	2472	14.23	20	PASS
	11N20MIMO	Ant1	2412	16.42	20	PASS
		Ant2	2412	14.35	20	PASS
		total	2412	18.51	20	PASS
		Ant1	2442	15.05	20	PASS
		Ant2	2442	13.22	20	PASS
		total	2442	17.23	20	PASS
		Ant1	2472	15.07	20	PASS
		Ant2	2472	12.91	20	PASS
	11N40MIMO	total	2472	17.13	20	PASS
		Ant1	2422	16.49	20	PASS
		Ant2	2422	14.50	20	PASS
		total	2422	18.61	20	PASS
		Ant1	2442	15.25	20	PASS
		Ant2	2442	13.42	20	PASS
		total	2442	17.43	20	PASS
		Ant1	2462	13.02	20	PASS
		Ant2	2462	10.03	20	PASS
		total	2462	14.78	20	PASS



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3.2 Power Spectral Density

3.2.1 Limit of Power Spectral Density

Condition	Frequency Band	Limit (e.i.r.p.)
Under normal conditions	2400 ~ 2483.5 MHz	10dBm / 1MHz

3.2.2 Test Procedures

1. Refer to chapter 5.4.3.2 of EN 300 328 V2.2.2.
2. These measurements shall only be performed at normal test conditions.
3. The measurement shall be repeated for the equipment being configured to operate at the lowest, the middle, and the highest frequency of the stated frequency range.
4. The test procedure shall be as follows:

Step 1:

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

Start Frequency : 2400MHz
Stop Frequency : 2483.5MHz
Resolution BW : 10kHz
Video BW : 30kHz
Sweep Points : 8350
Detector : RMS
Trace Mode : Max Hold
Sweep time : 10 sec

Step 2:

For conducted measurements on smart antenna systems using either operating mode 2 or operating mode 3 (see clause 5.3.2.2), repeat the measurement for each of the transmit ports. For each sampling point (frequency domain), add up the coincident power values (in mW) for the different transmit chains and use this as the new data set.

Step 3:

Add up the values for power for all the samples in the file using the formula below.

$$P_{Sum} = \sum_{n=1}^k P_{sample}(n)$$

Step 4:

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Normalize the individual values for power (in dBm) so that the sum is equal to the RF Output Power (e.i.r.p.)

Step 5:

Starting from the first sample PSamplecorr(n) (lowest frequency), add up the power (in mW) of the following samples representing a 1 MHz segment and record the results for power and position (i.e. sample #1 to sample #100). This is the Power Spectral Density (e.i.r.p.) for the first 1 MHz segment which shall be recorded.

Step 6:

Shift the start point of the samples added up in step 5 by one sample and repeat the procedure in step 5 (i.e. sample #2 to sample #101).

Step 7:

Repeat step 6 until the end of the data set and record the Power Spectral Density values for each of the 1 MHz segments.

From all the recorded results, the highest value is the maximum Power Spectral Density (PSD) for the UUT. This value, which shall comply with the limit given in clause 4.3.2.3.3, shall be recorded in the test report.

Measurement Method	
☒ Conducted measurement	☐ Radiated measurement
☒ Option 1: For equipment with continuous and non-continuous transmissions	
☐ Option 2: For equipment with continuous transmission capability or for equipment operating (or with the capability to operate) with a constant duty cycle (e.g. Frame Based equipment)	

3.2.3 Deviation of Test Standard

No deviation.

3.2.4 Test Setup

The test setup has been constructed as the normal test condition. The measurement was performed at the lowest, the middle, and the highest channel.





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3.2.5 Test Results WCT1DR2201D

Test Mode	Antenna	Channel [MHz]	PSD[dBm/MHz]	Limit[dBm/MHz]	Verdict
11B	Ant1	2412	8.65	10	PASS
	Ant2	2412	7.82	10	PASS
	Ant1	2442	7.58	10	PASS
	Ant2	2442	7.31	10	PASS
	Ant1	2472	7.22	10	PASS
	Ant2	2472	6.51	10	PASS
11G	Ant1	2412	5.45	10	PASS
	Ant2	2412	4.55	10	PASS
	Ant1	2442	4.57	10	PASS
	Ant2	2442	4.02	10	PASS
	Ant1	2472	3.82	10	PASS
	Ant2	2472	3.23	10	PASS
11N20MIMO	Ant1	2412	4.07	10	PASS
	Ant2	2412	2.42	10	PASS
	total	2412	6.31	10	PASS
	Ant1	2442	2.97	10	PASS
	Ant2	2442	1.49	10	PASS
	total	2442	5.30	10	PASS
	Ant1	2472	2.42	10	PASS
	Ant2	2472	0.75	10	PASS
	total	2472	4.67	10	PASS
11N40MIMO	Ant1	2422	0.51	10	PASS
	Ant2	2422	-1.30	10	PASS
	total	2422	2.70	10	PASS
	Ant1	2442	-0.23	10	PASS
	Ant2	2442	-1.75	10	PASS
	total	2442	2.08	10	PASS
	Ant1	2462	-0.89	10	PASS
	Ant2	2462	-2.34	10	PASS
	total	2462	1.45	10	PASS



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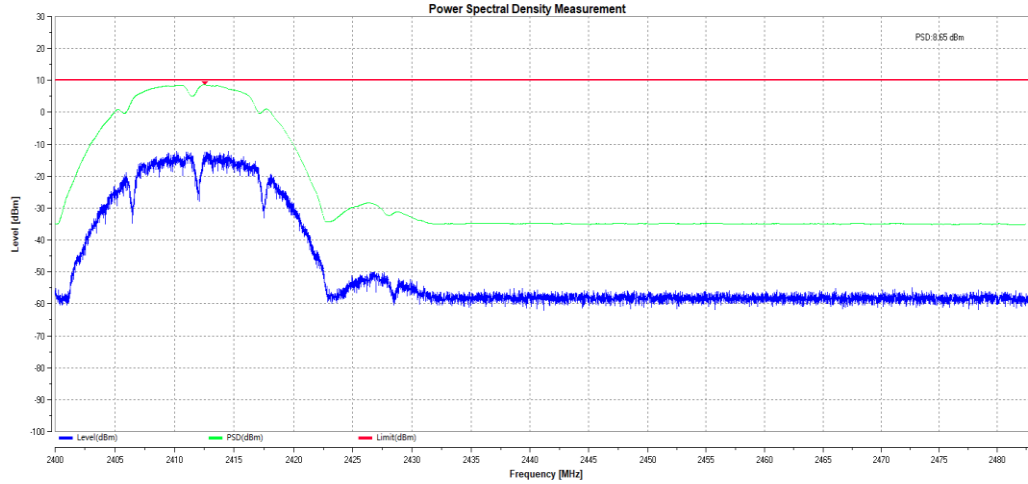
WC0NR2201

Test Mode	Antenna	Channel[MHz]	PSD[dBm/MHz]	Limit[dBm/MHz]	Verdict
11B	Ant1	2412	7.22	10	PASS
	Ant2	2412	7.15	10	PASS
	Ant1	2442	5.98	10	PASS
	Ant2	2442	6.68	10	PASS
	Ant1	2472	6.20	10	PASS
	Ant2	2472	6.04	10	PASS
11G	Ant1	2412	5.78	10	PASS
	Ant2	2412	4.17	10	PASS
	Ant1	2442	5.05	10	PASS
	Ant2	2442	3.33	10	PASS
	Ant1	2472	4.68	10	PASS
	Ant2	2472	2.68	10	PASS
11N20MIMO	Ant1	2412	5.21	10	PASS
	Ant2	2412	3.27	10	PASS
	total	2412	7.32	10	PASS
	Ant1	2442	3.62	10	PASS
	Ant2	2442	1.88	10	PASS
	total	2442	5.83	10	PASS
	Ant1	2472	3.17	10	PASS
	Ant2	2472	1.04	10	PASS
	total	2472	5.22	10	PASS
11N40MIMO	Ant1	2422	2.26	10	PASS
	Ant2	2422	1.12	10	PASS
	total	2422	4.62	10	PASS
	Ant1	2442	0.73	10	PASS
	Ant2	2442	-1.03	10	PASS
	total	2442	2.94	10	PASS
	Ant1	2462	-1.59	10	PASS
	Ant2	2462	-4.39	10	PASS
	total	2462	0.20	10	PASS

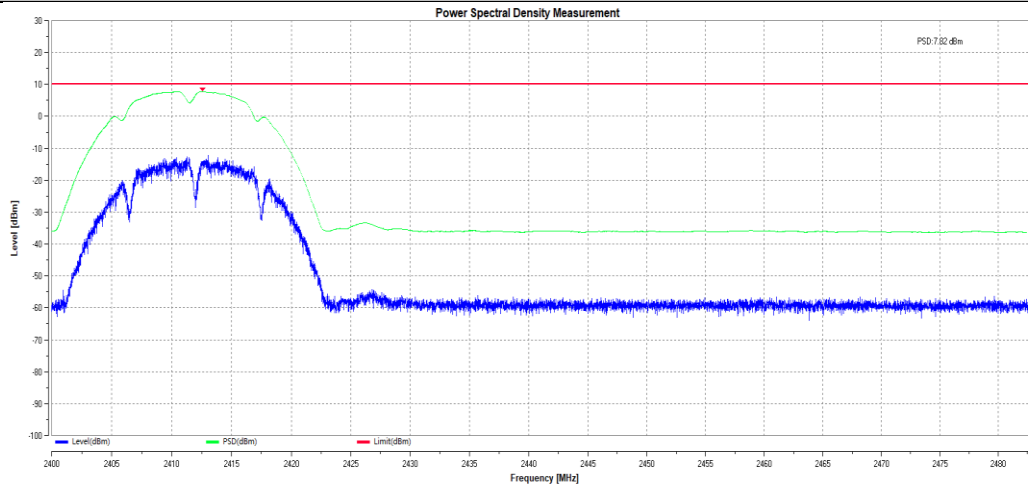
TEST REPORT N°: KSK-ESH-P24071264B-4

3.2.6 Test Graphs
WCT1DR2201D

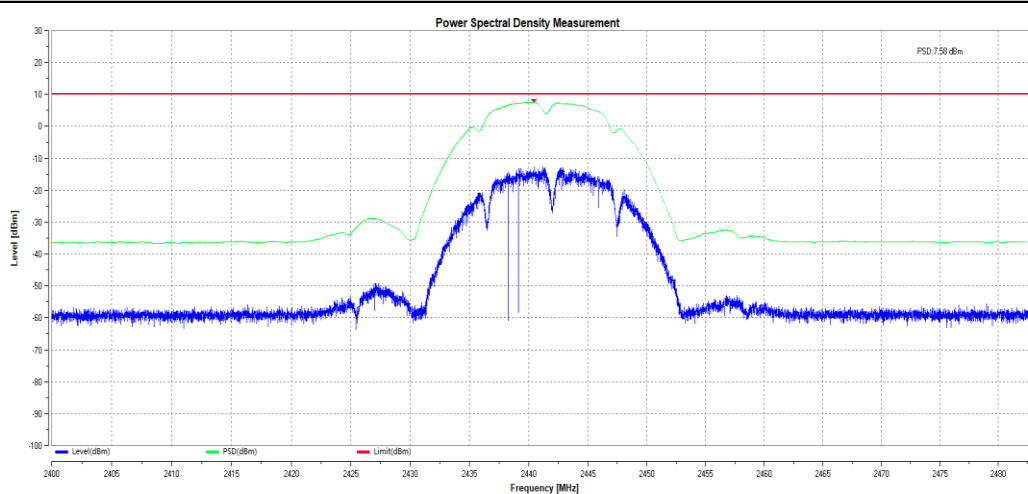
11B_Ant1_2412



11B_Ant2_2412

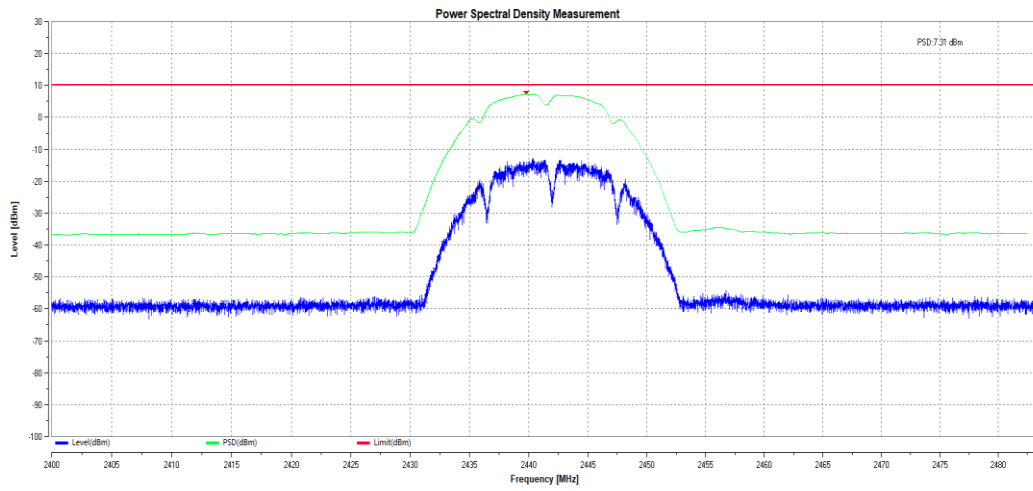


11B_Ant1_2442

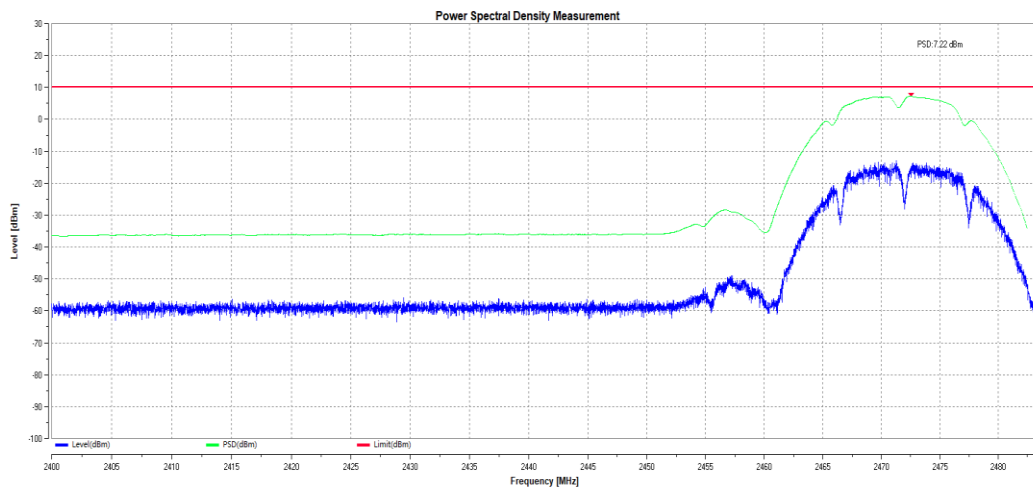


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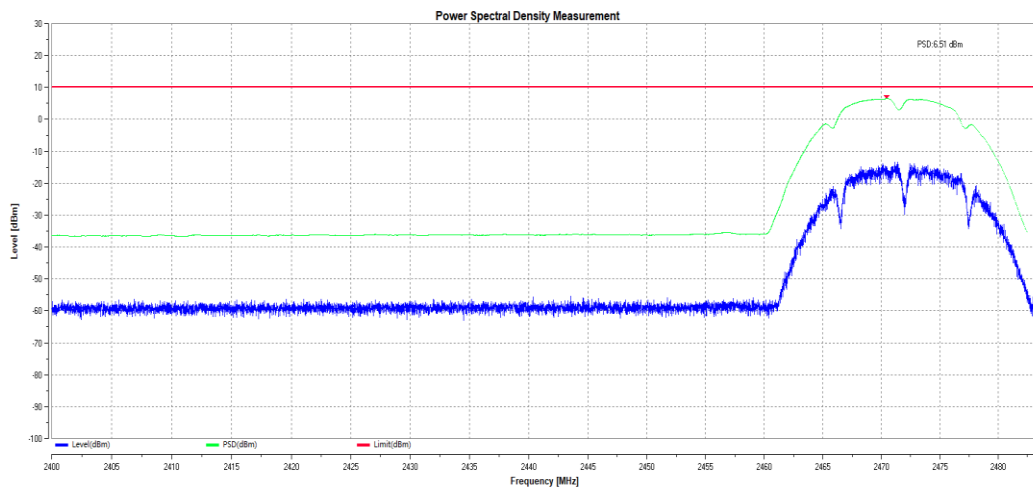
11B_Ant2_2442



11B_Ant1_2472

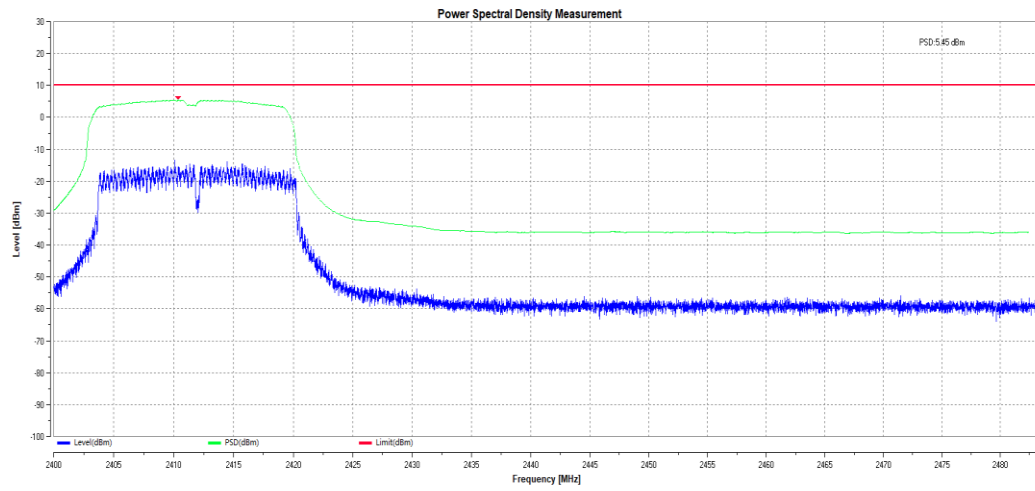


11B_Ant2_2472

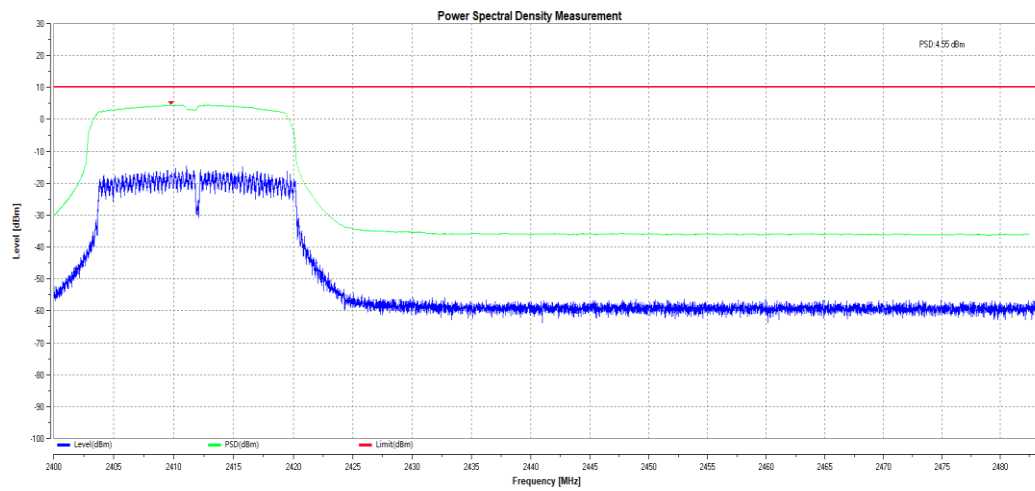


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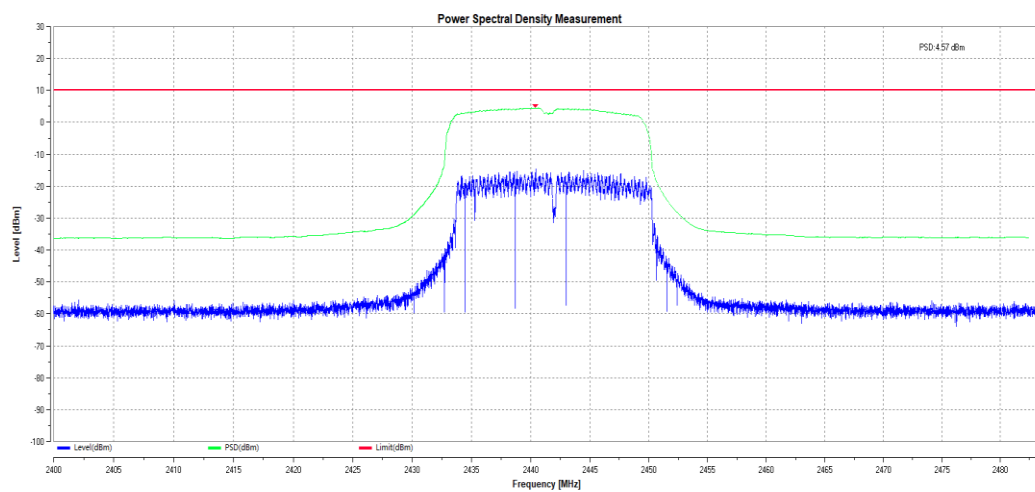
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11G_Ant2_2412

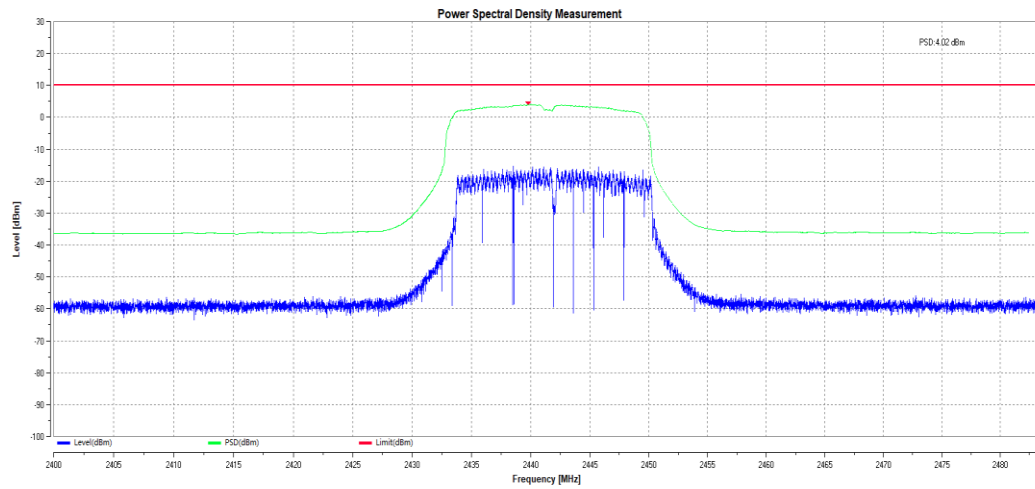


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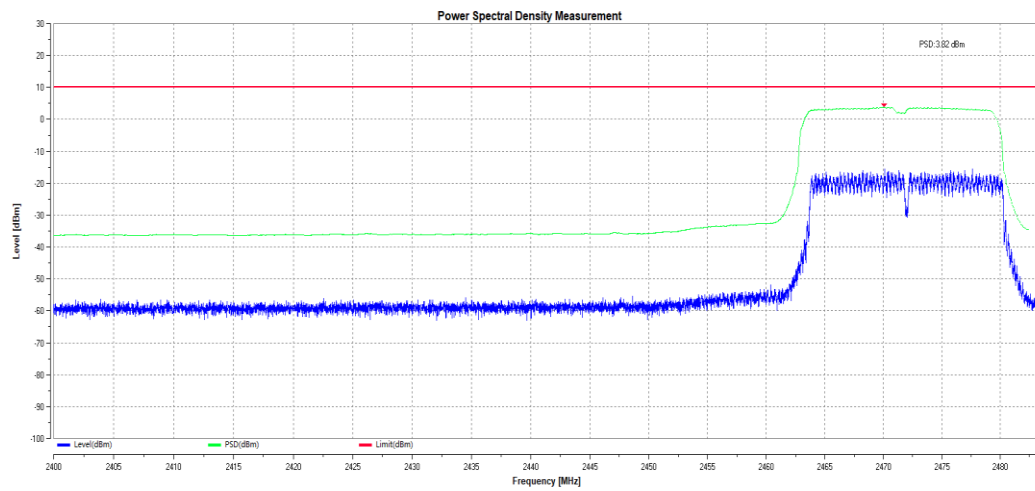


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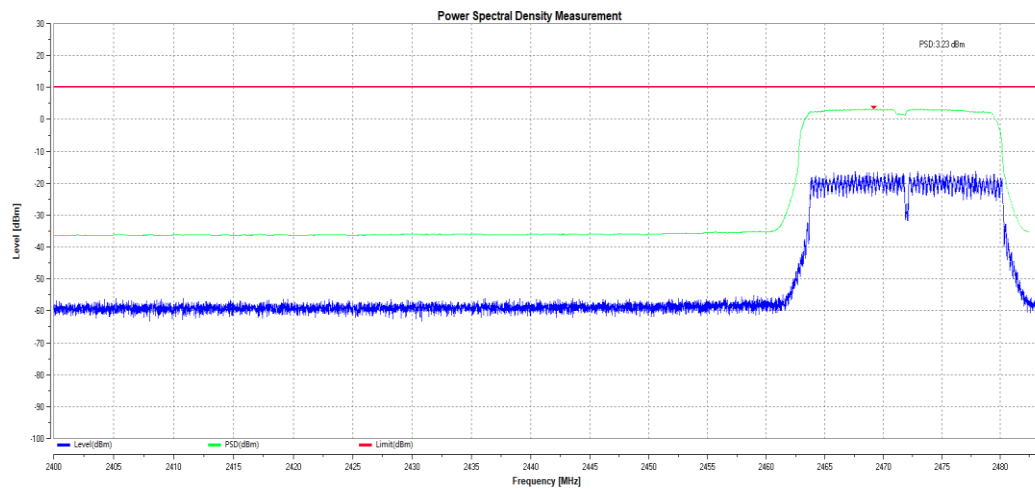
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11G_Ant1_2472

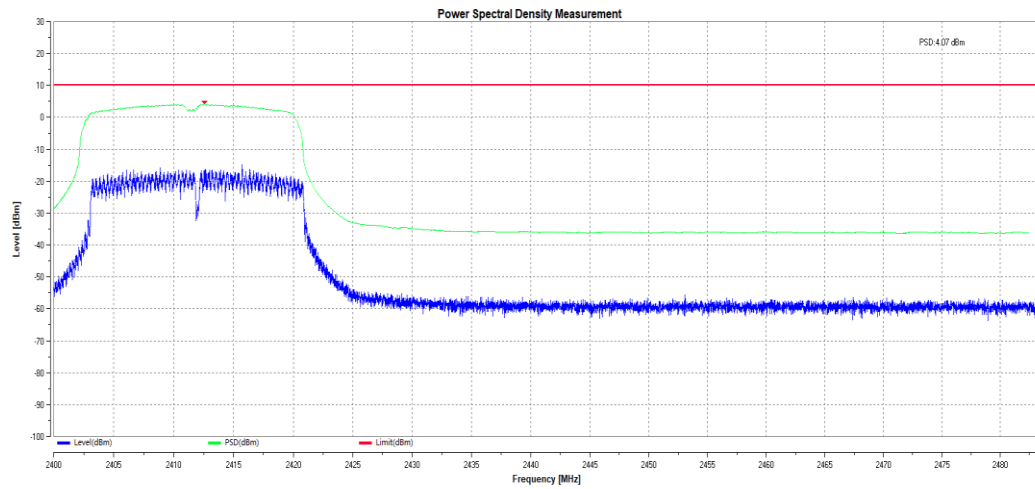


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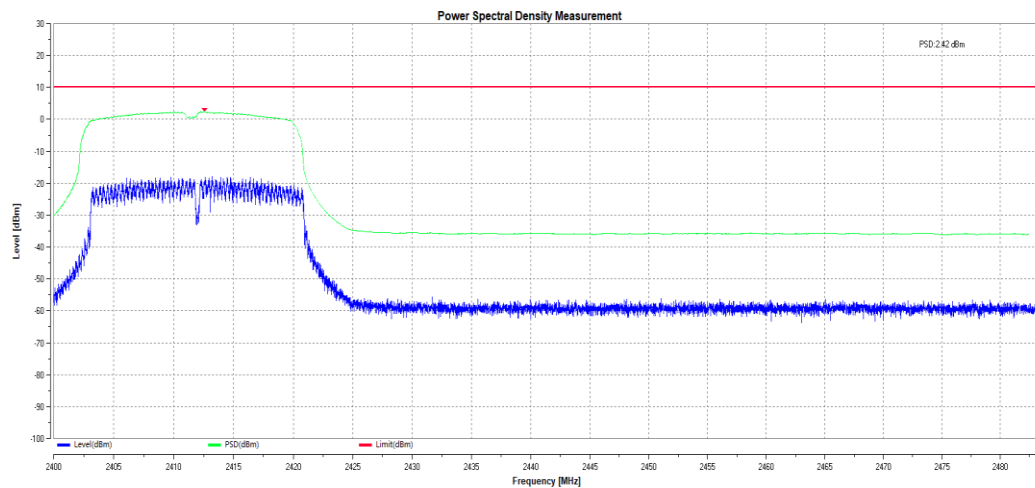


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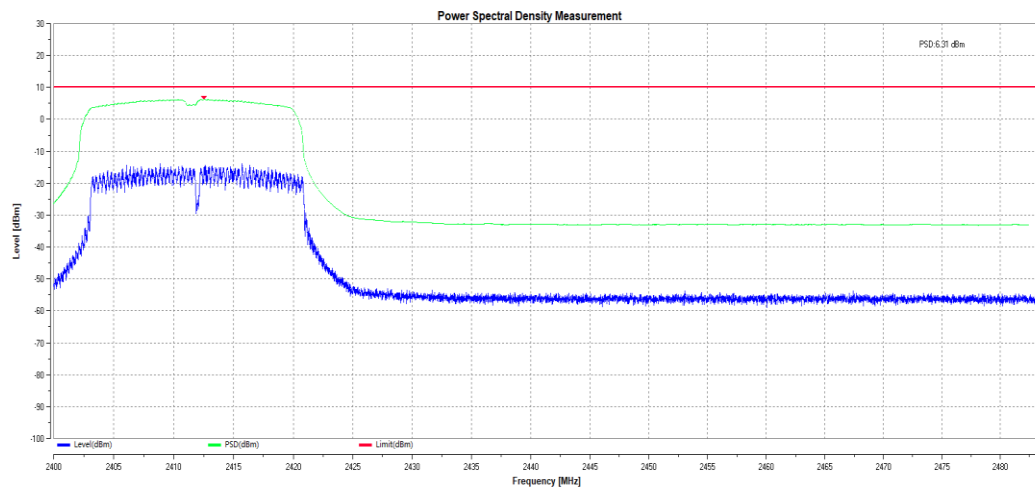
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11N20MIMO_Ant2_2412

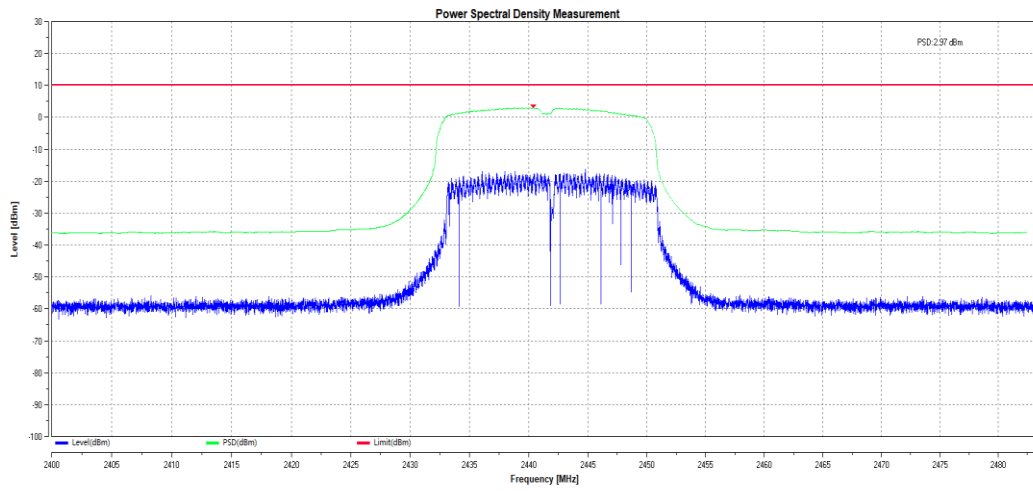


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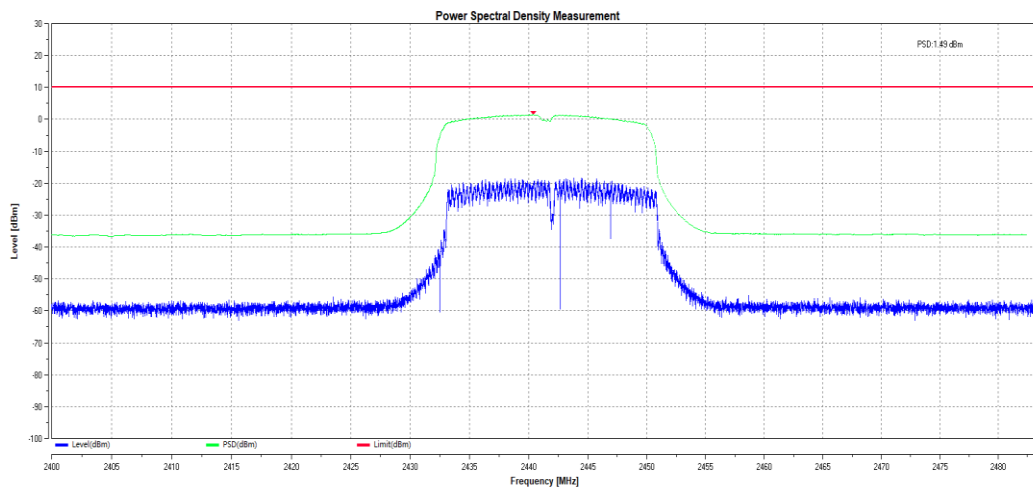


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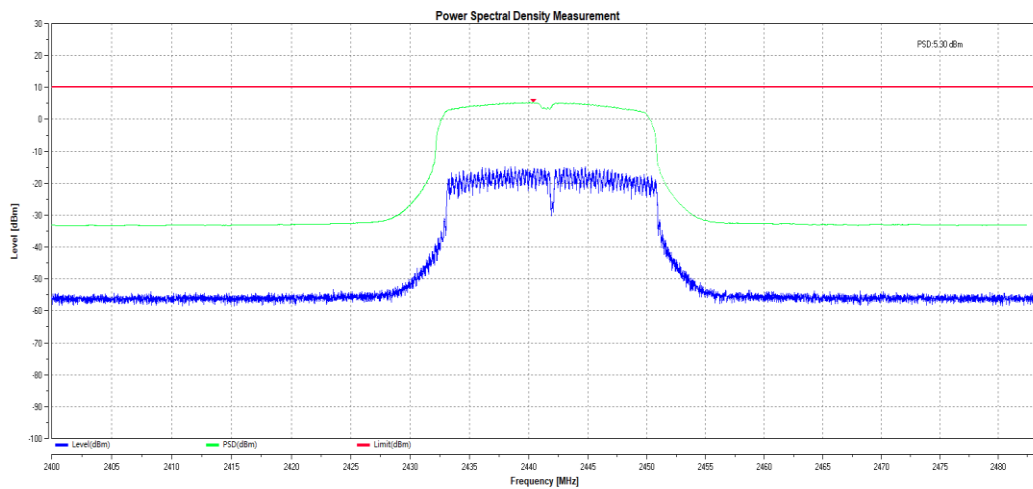
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11N20MIMO_Ant2_2442

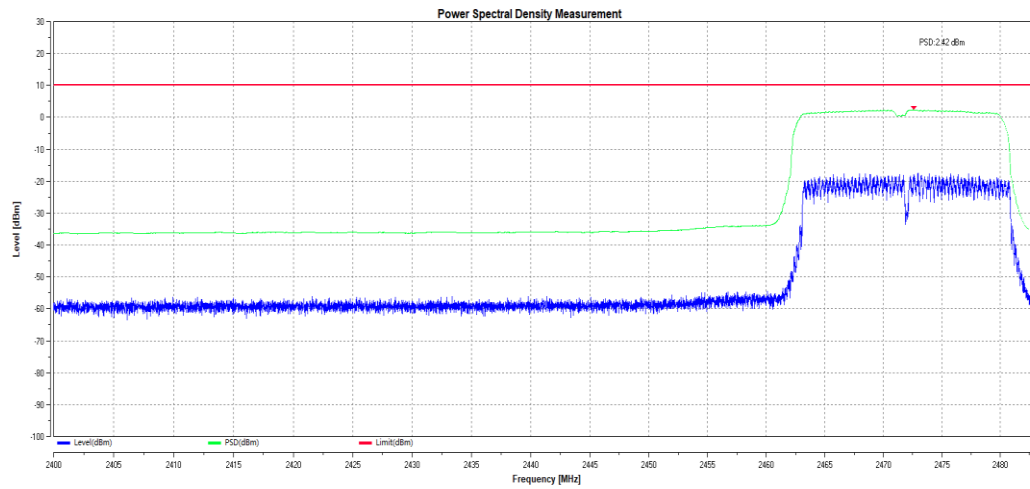


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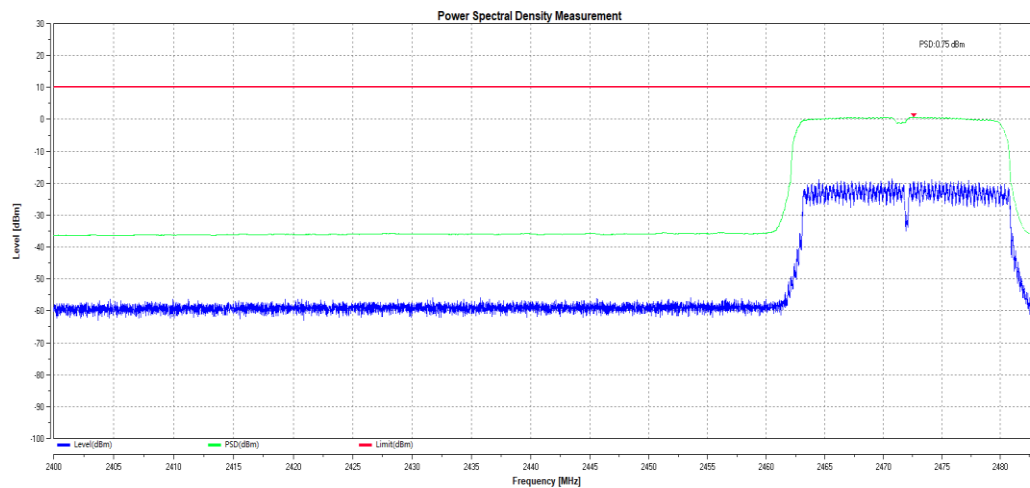


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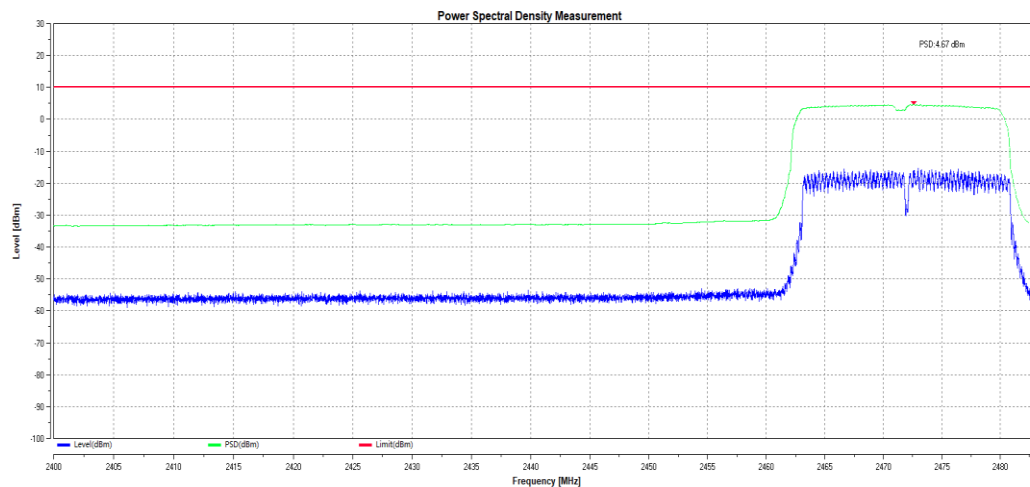
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11N20MIMO_Ant2_2472

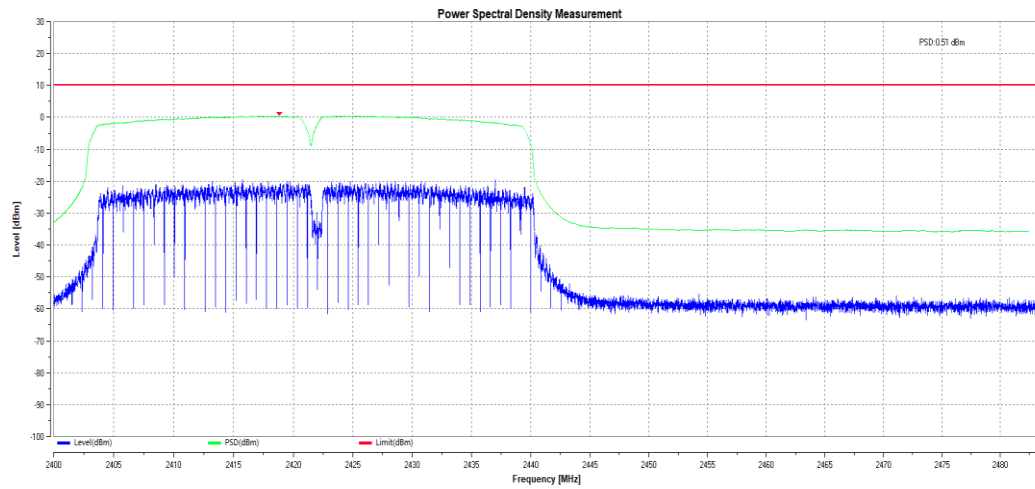


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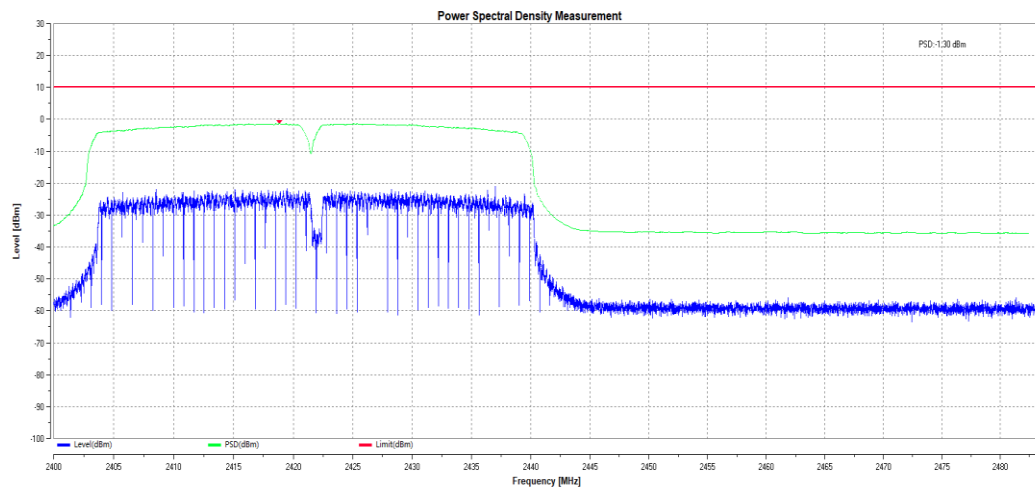


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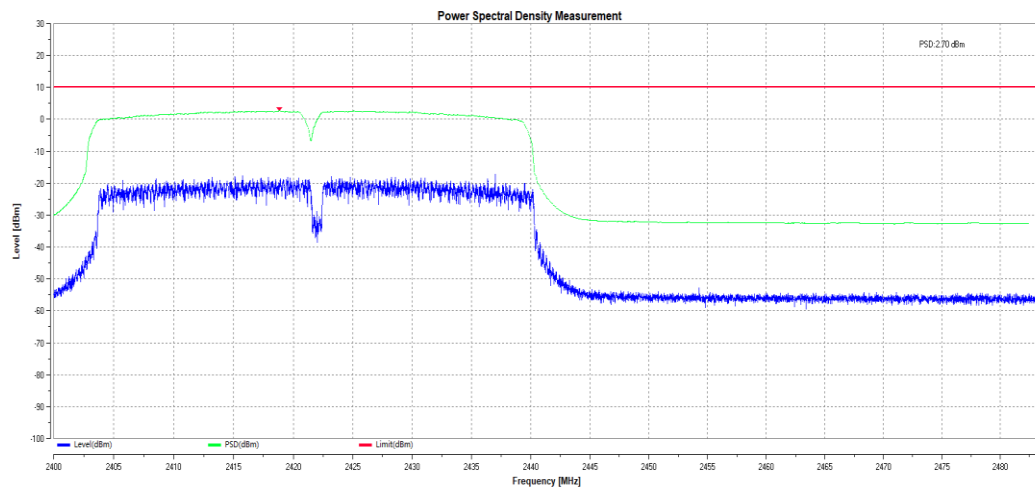
11N40MIMO_Ant1_2422



11N40MIMO_Ant2_2422

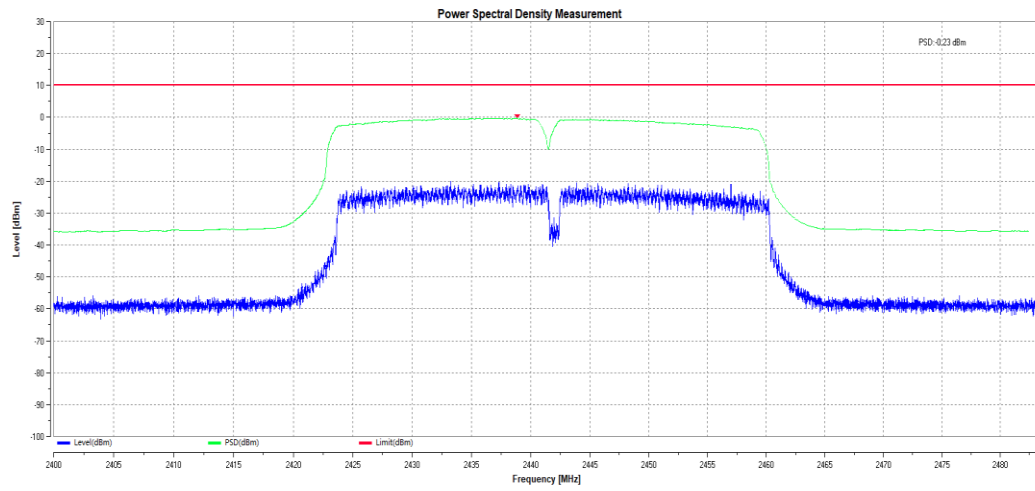


11N40MIMO_total_2422

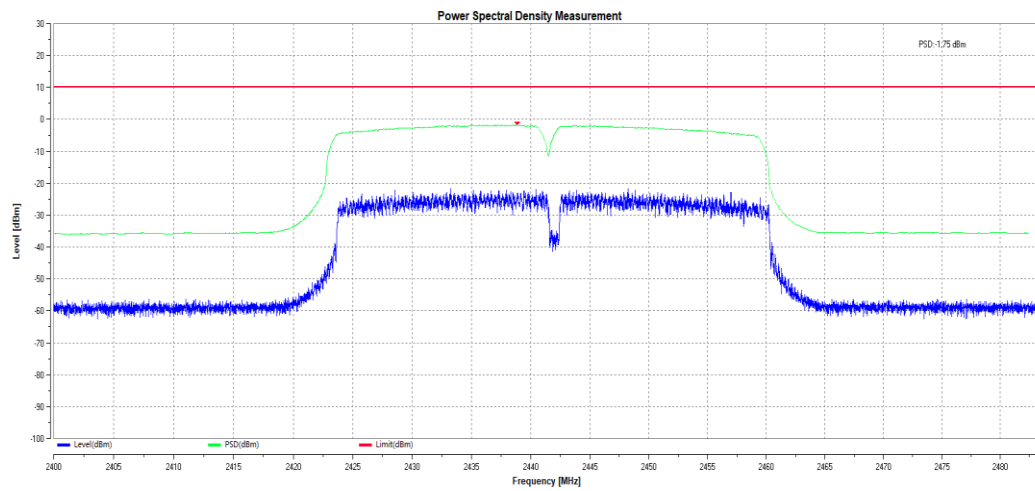


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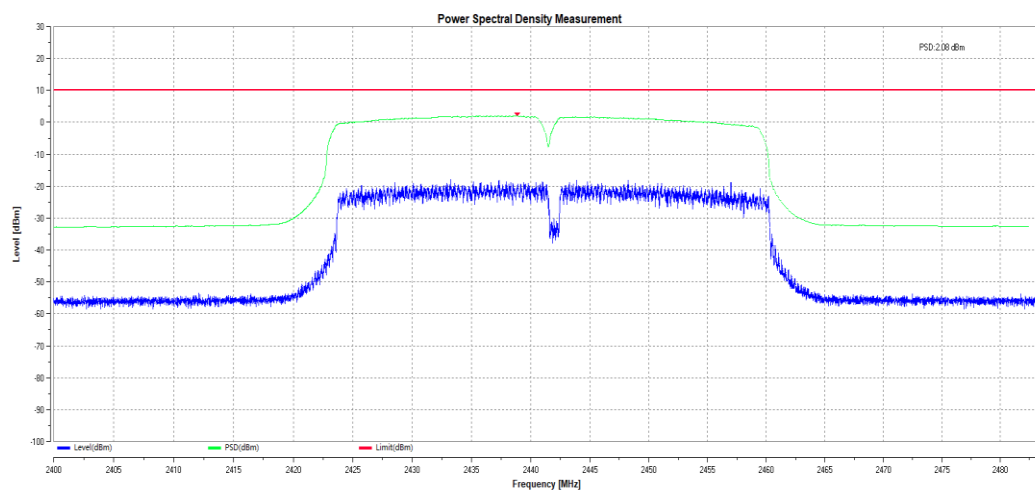
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11N40MIMO_Ant2_2442

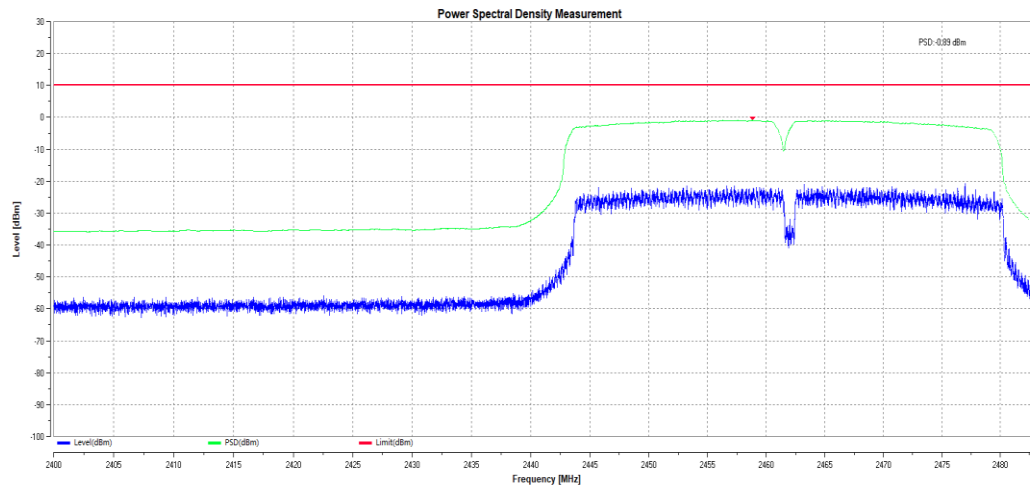


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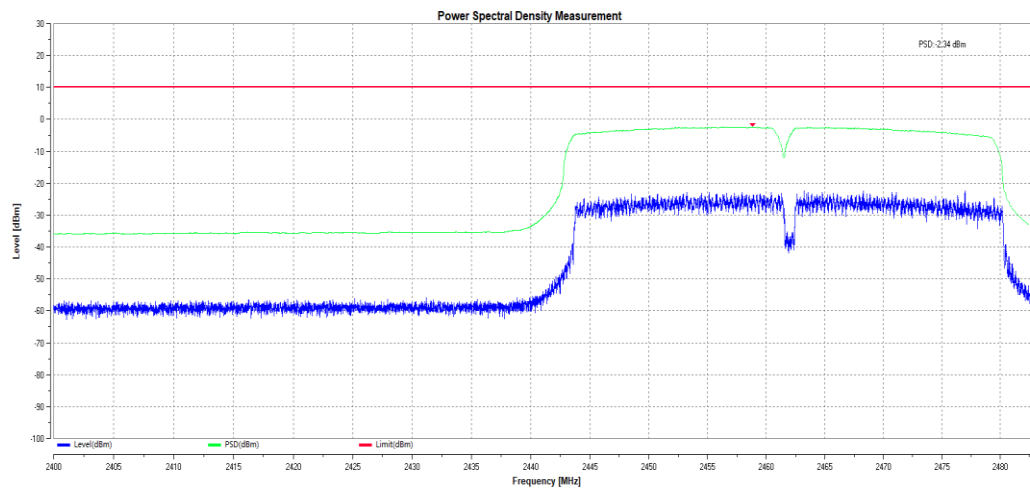


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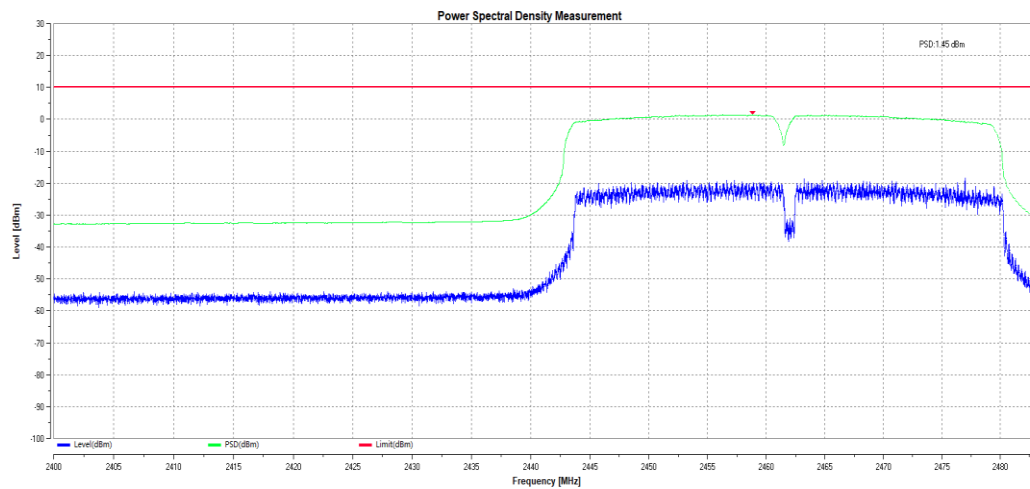
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11N40MIMO_Ant2_2462



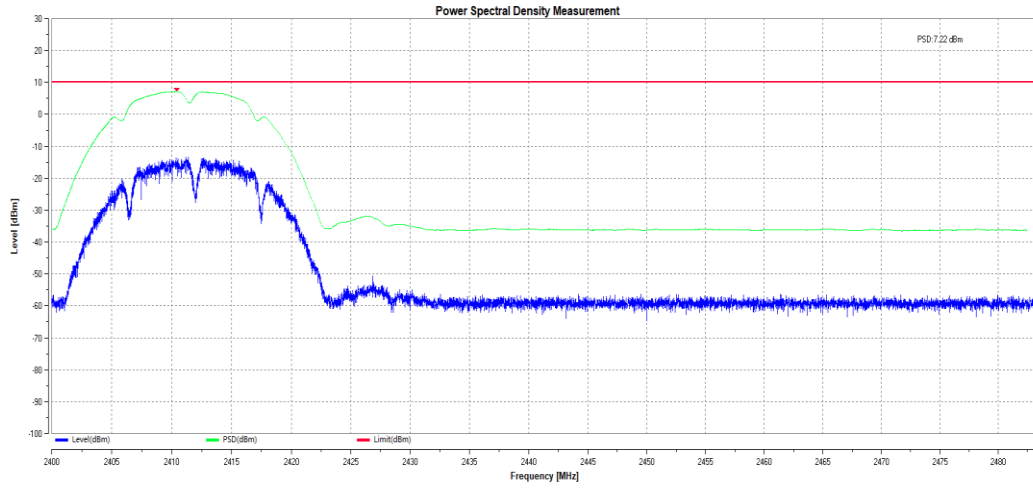
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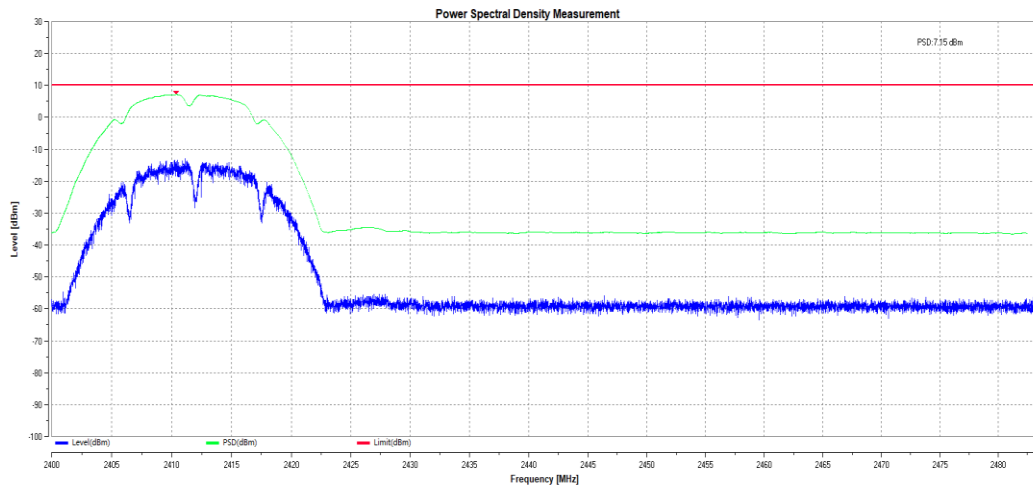
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WC0NR2201

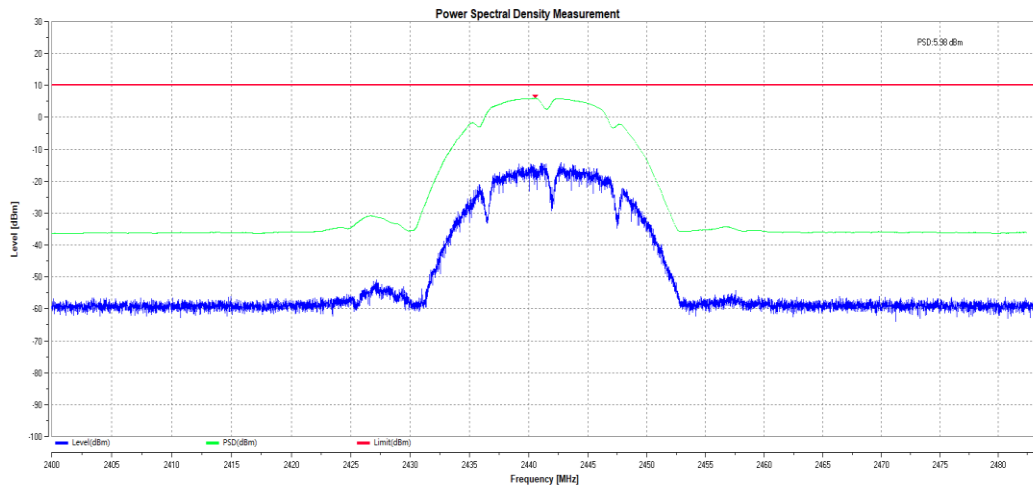
11B_Ant1_2412



11B_Ant2_2412

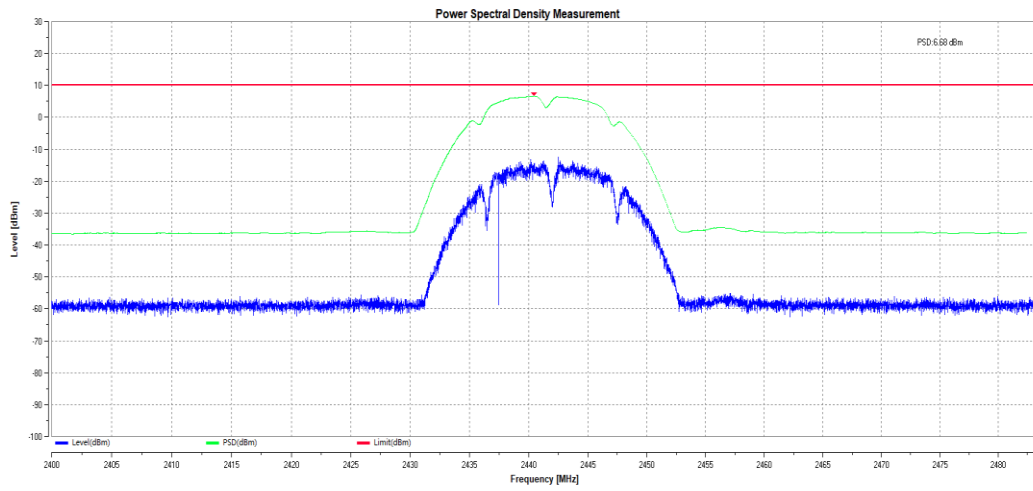


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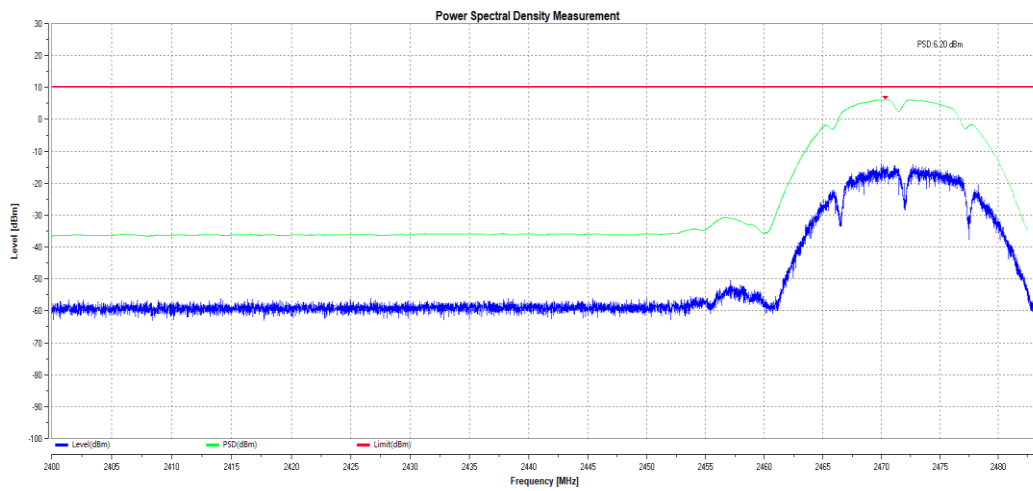


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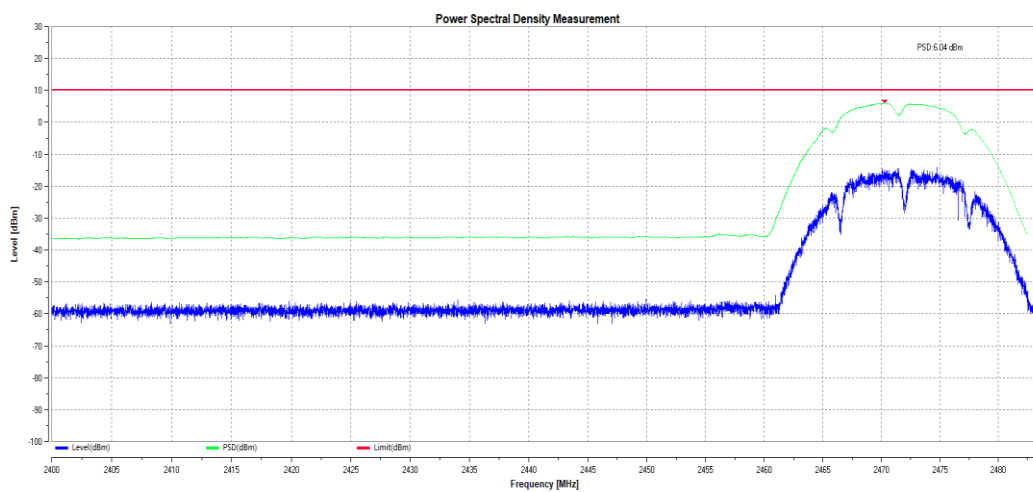
11B_Ant2_2442



11B_Ant1_2472

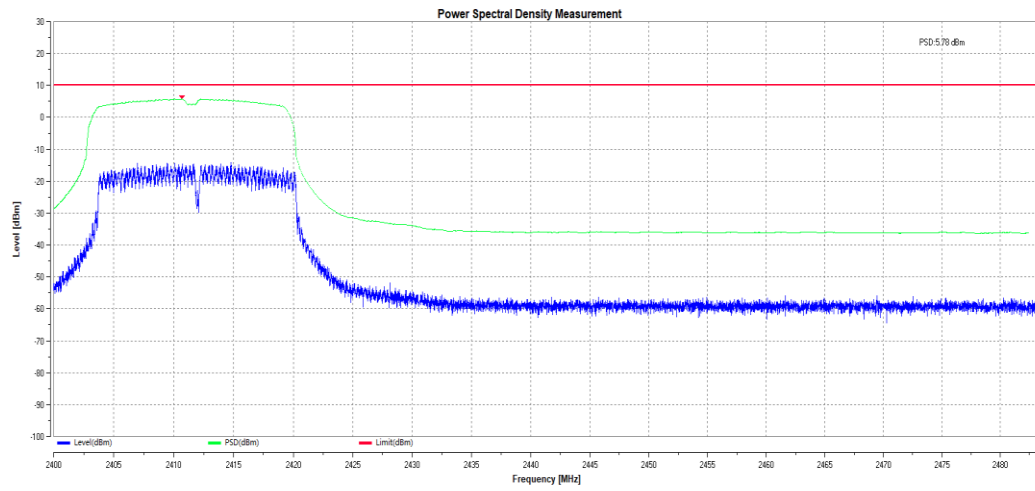


11B_Ant2_2472

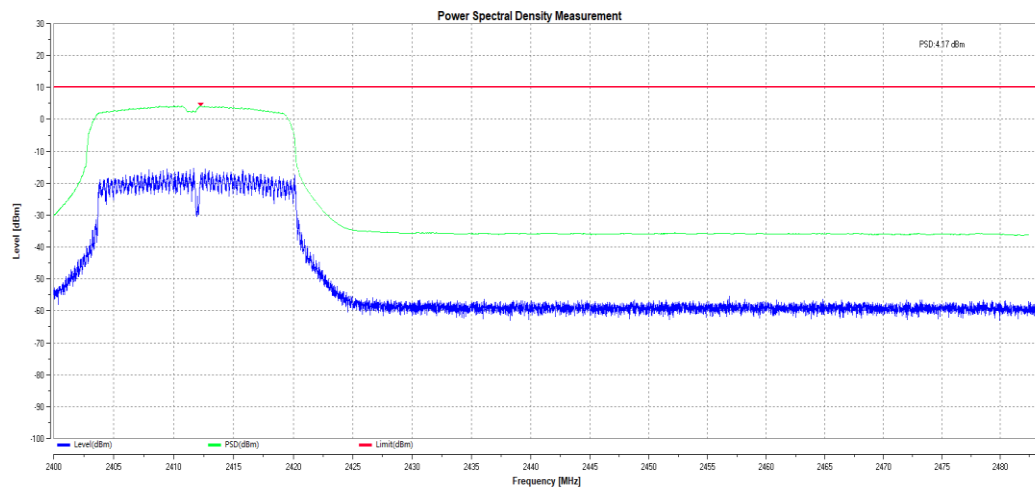


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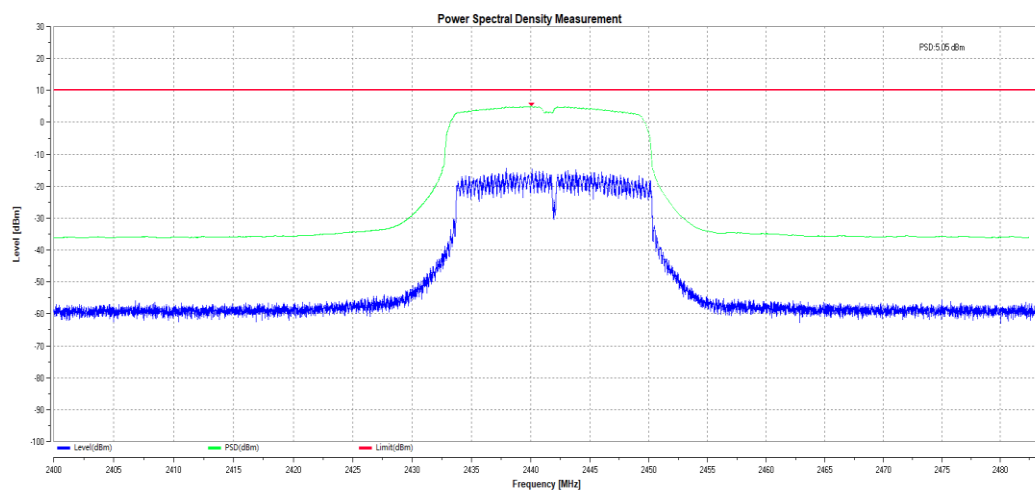
11G_Ant1_2412



11G_Ant2_2412

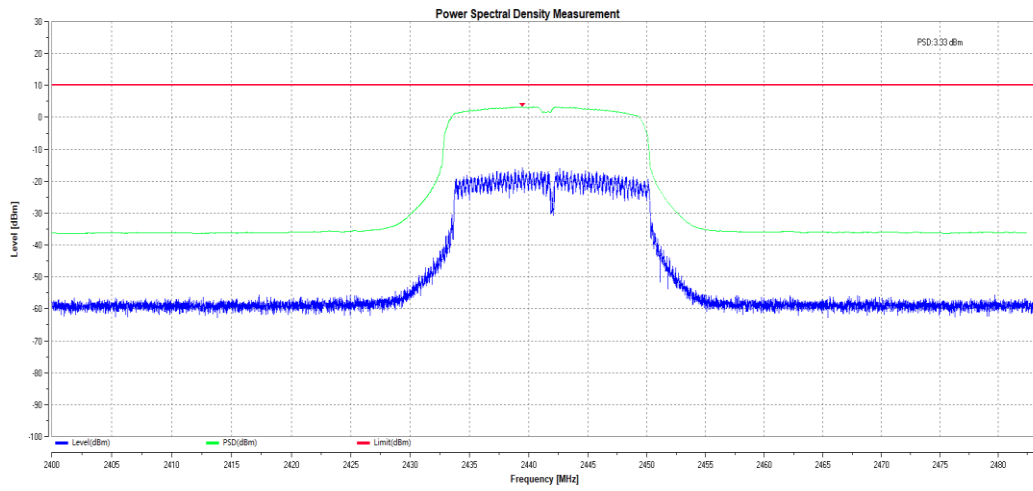


11G_Ant1_2442

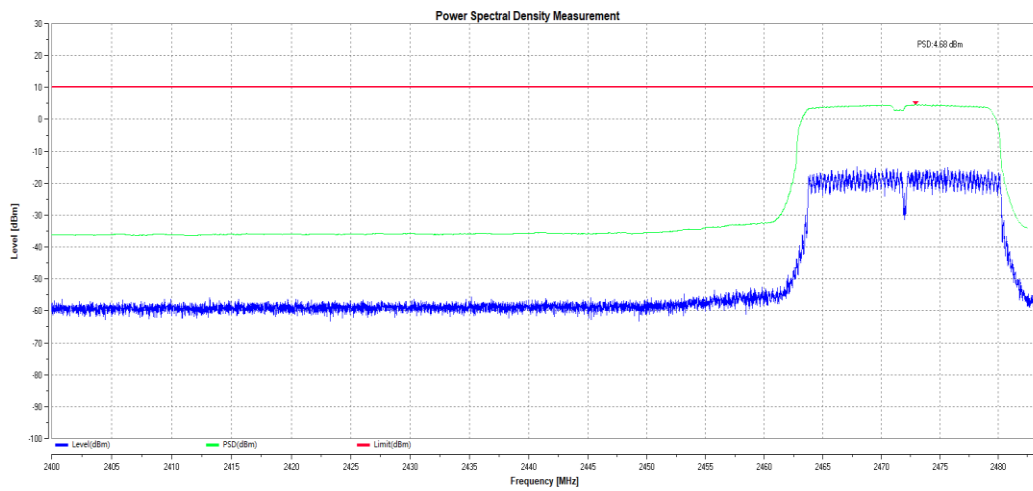


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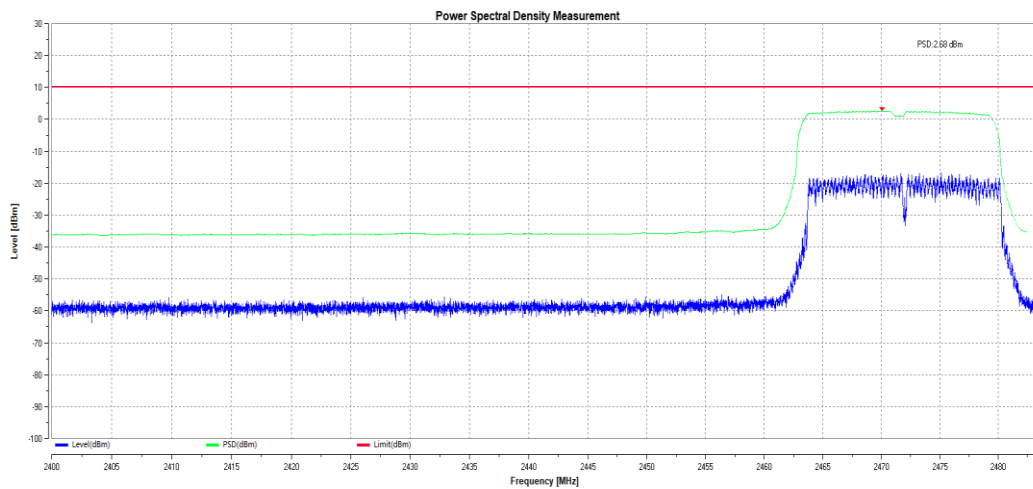
11G_Ant2_2442



11G_Ant1_2472

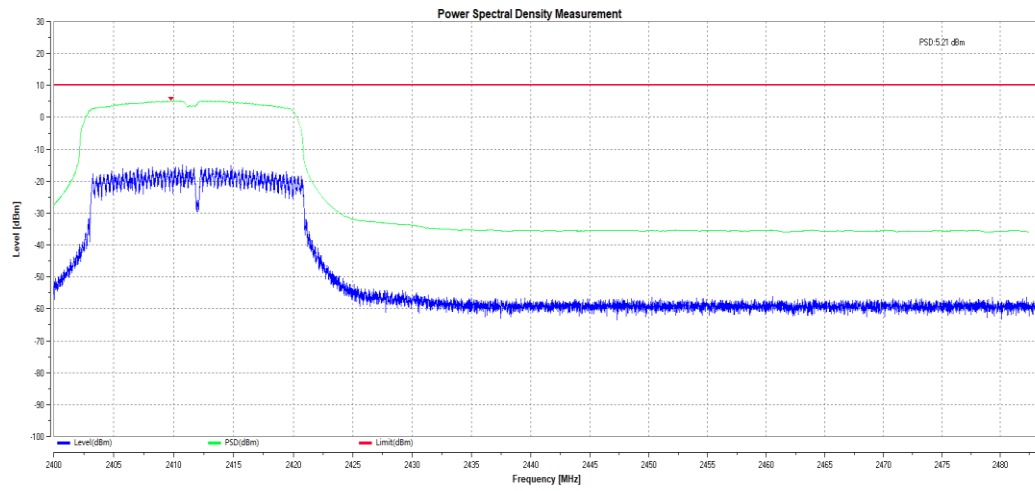


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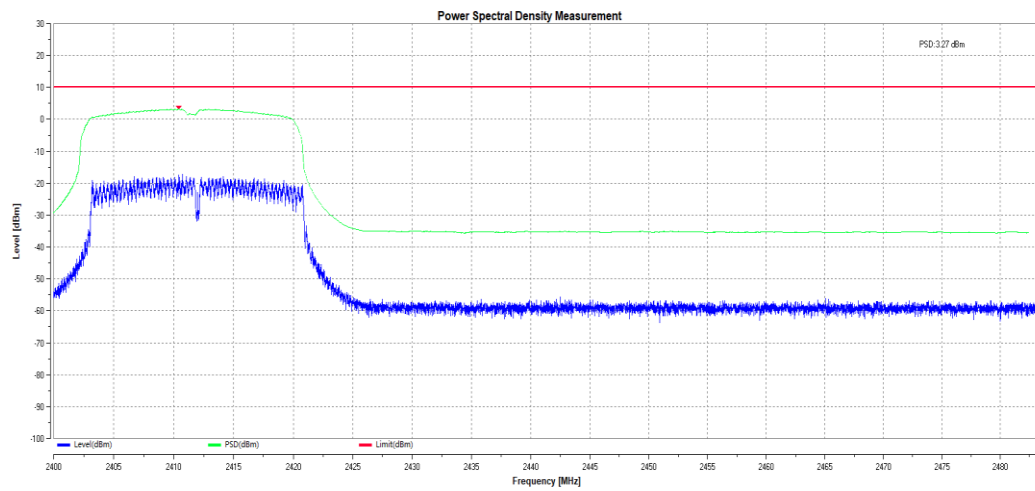


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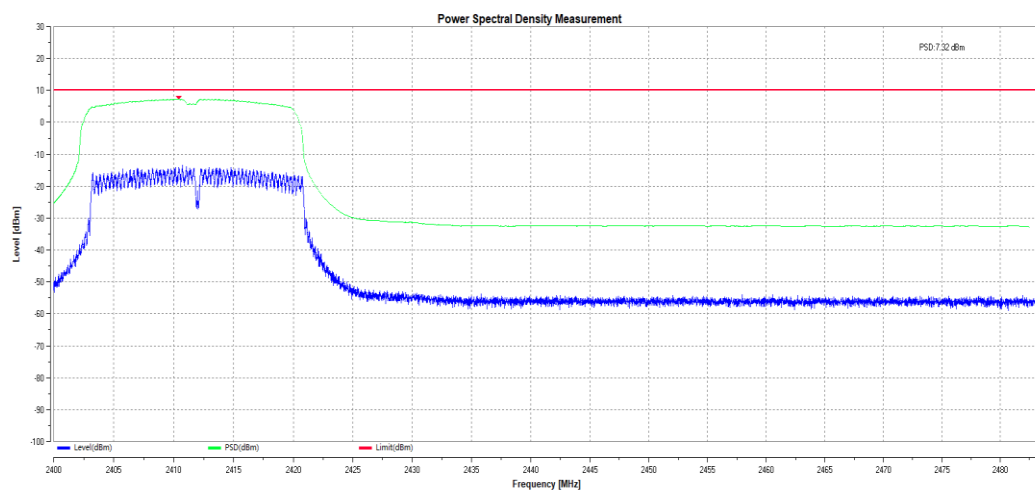
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11N20MIMO_Ant2_2412

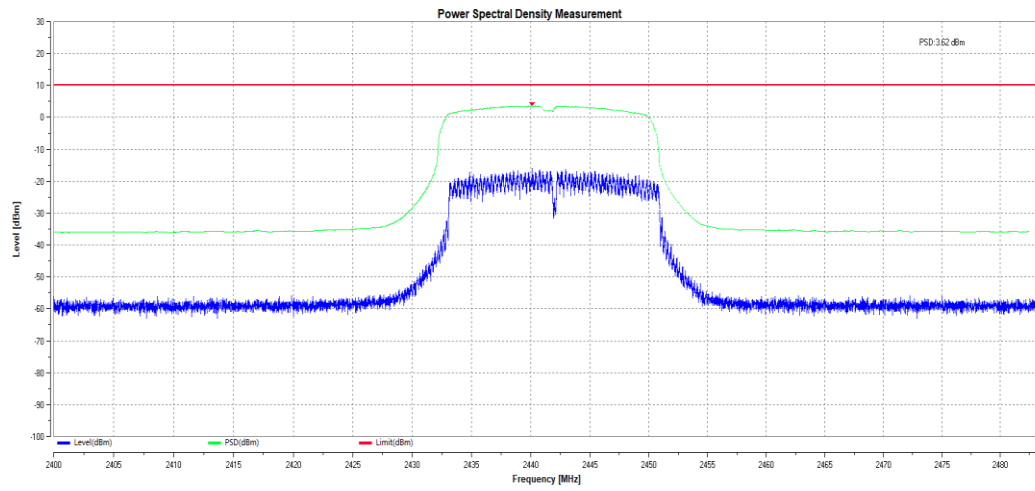


11N20MIMO_total_2412

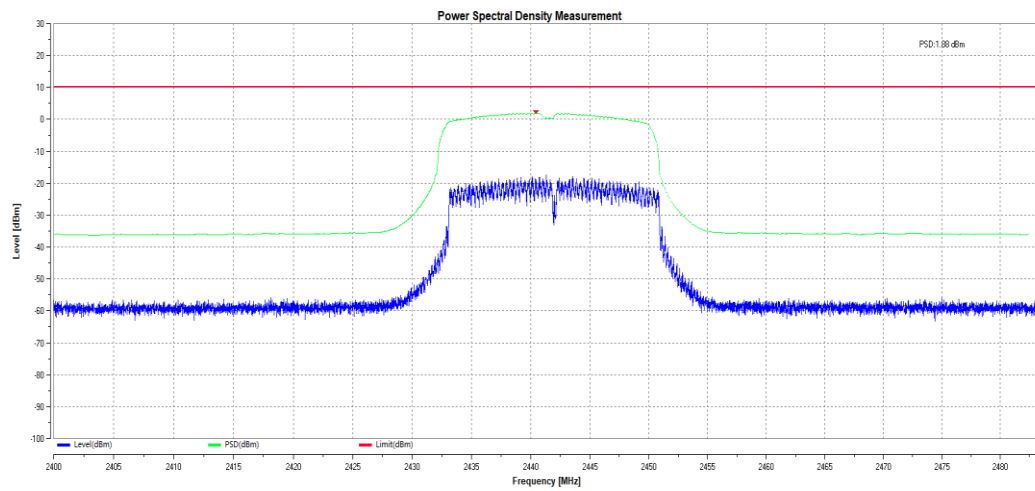


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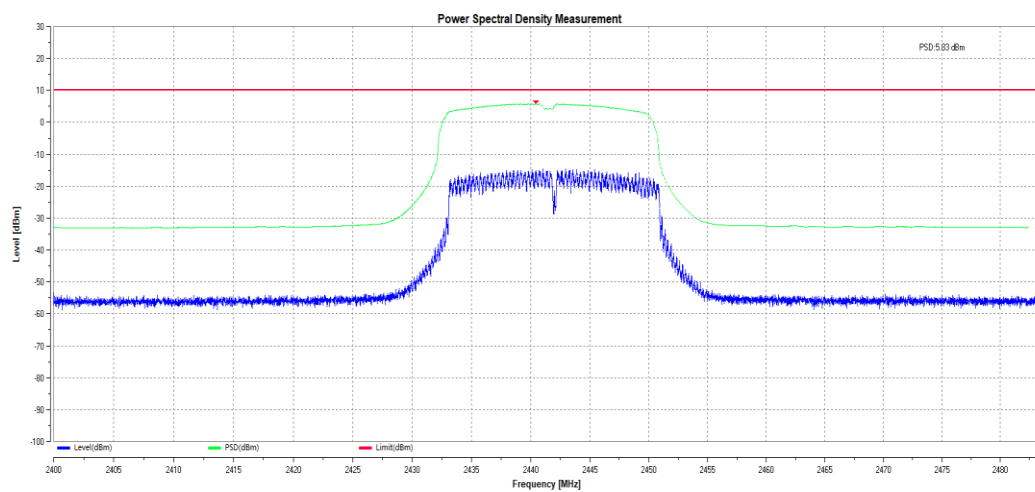
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11N20MIMO_Ant2_2442

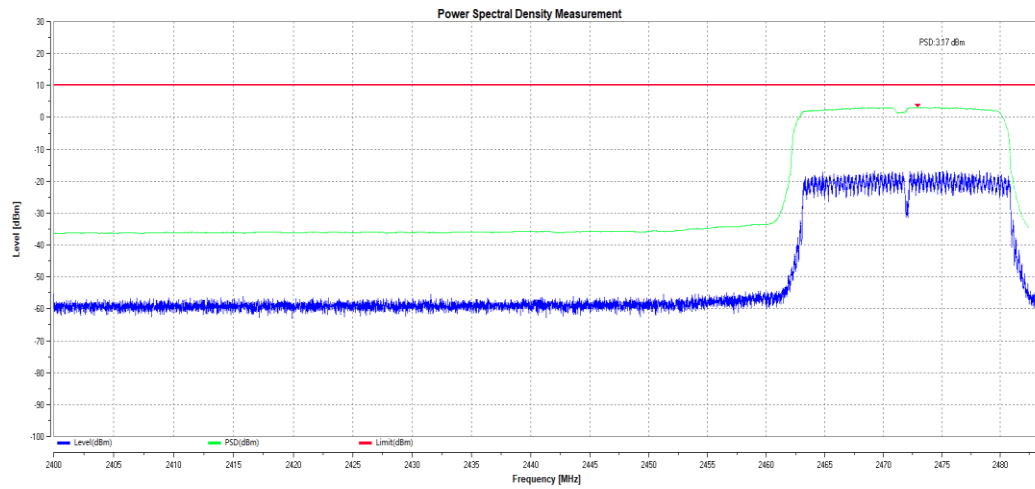


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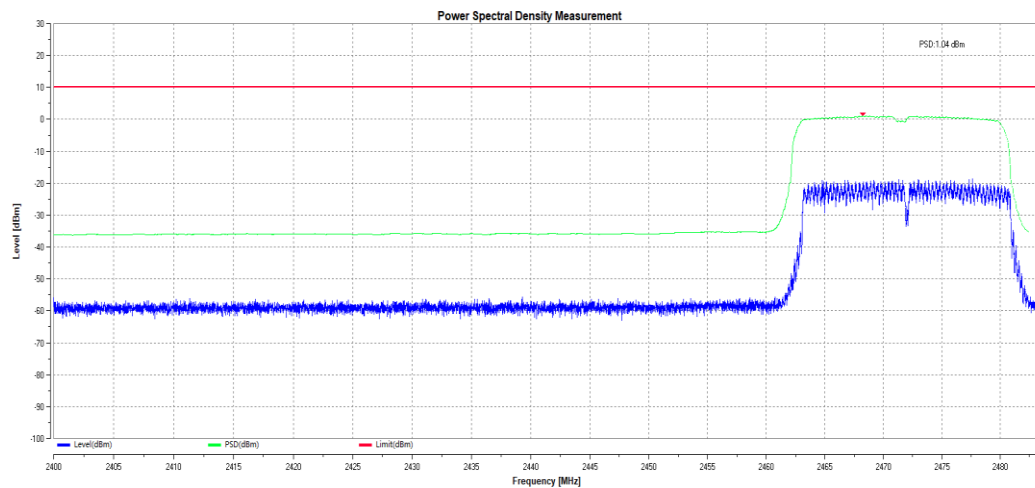


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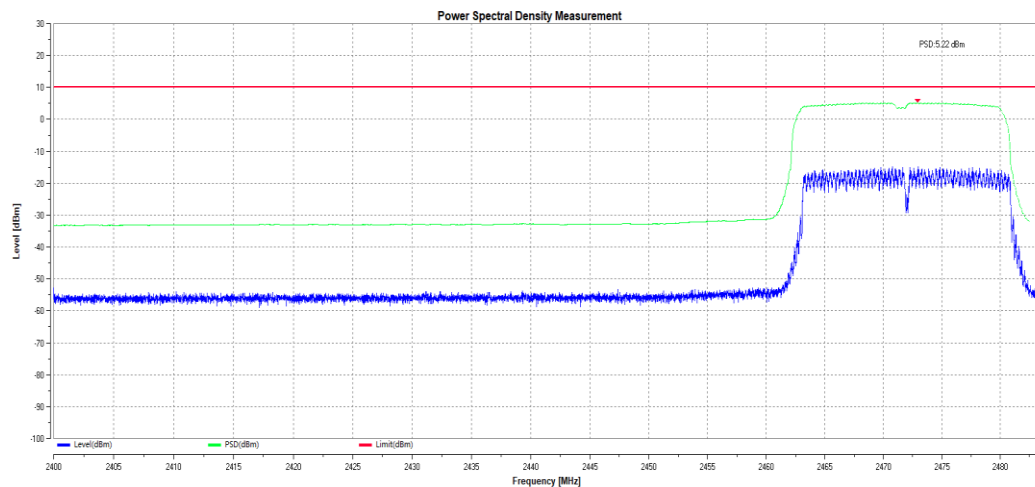
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11N20MIMO_Ant2_2472

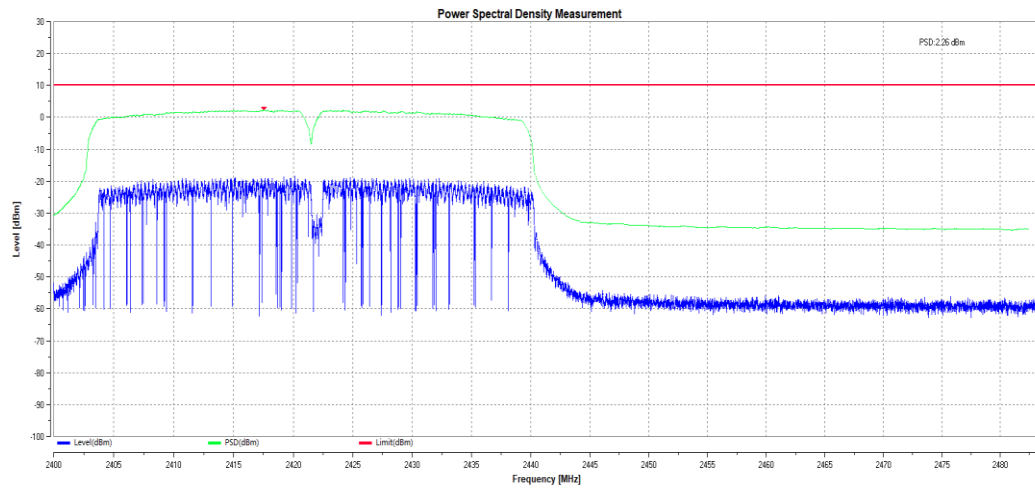


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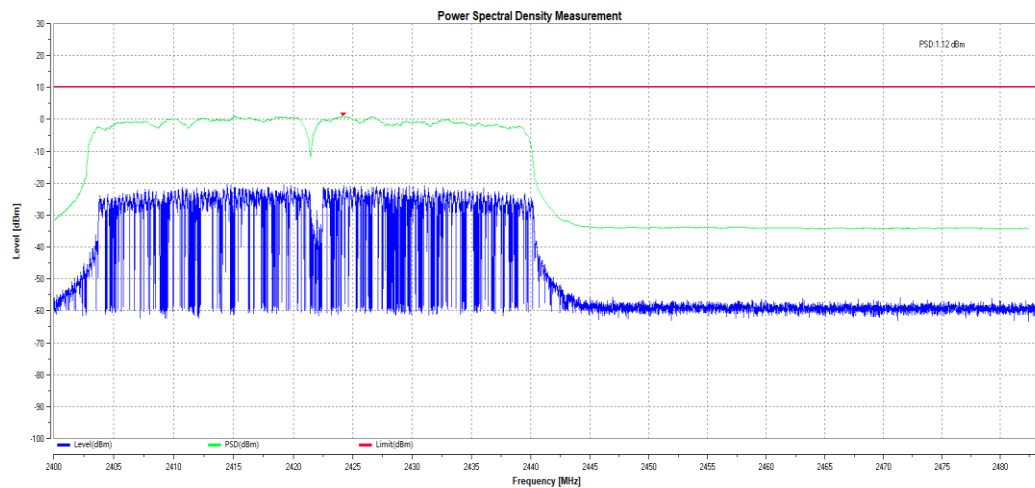


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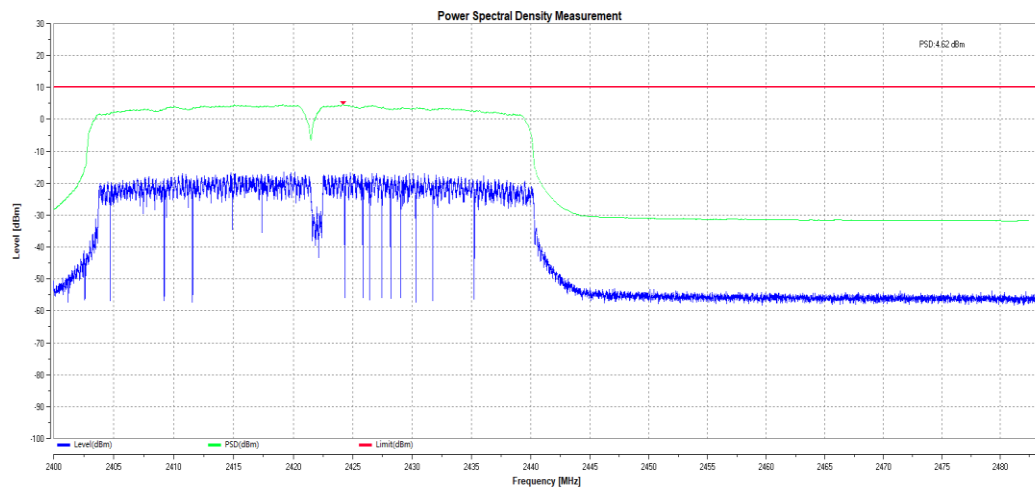
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11N40MIMO_Ant2_2422

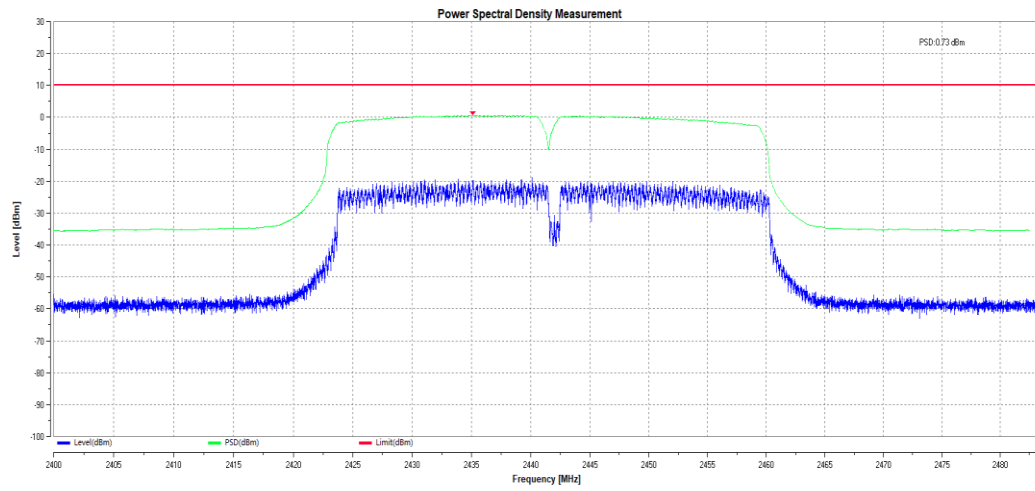


11N40MIMO_total_2422

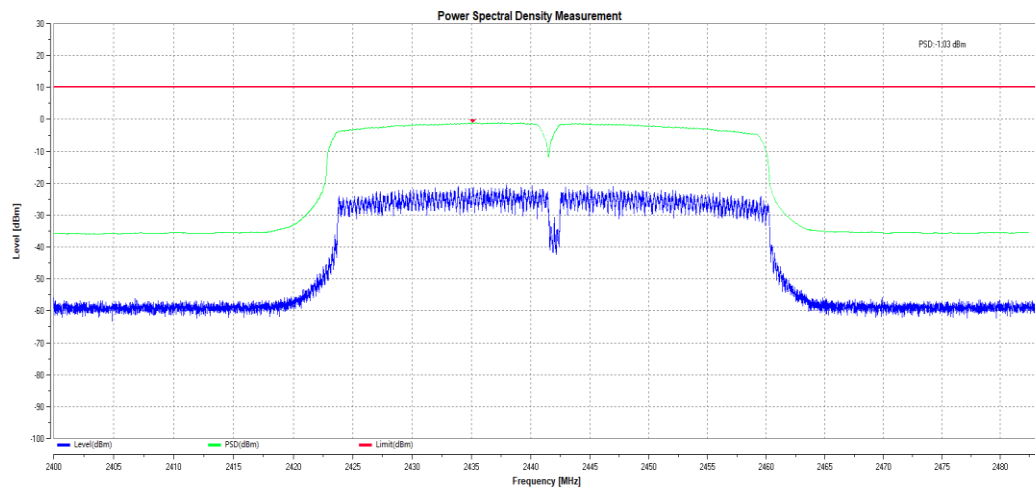


TEST REPORT N°: KSK-ESH-P24071264B-4

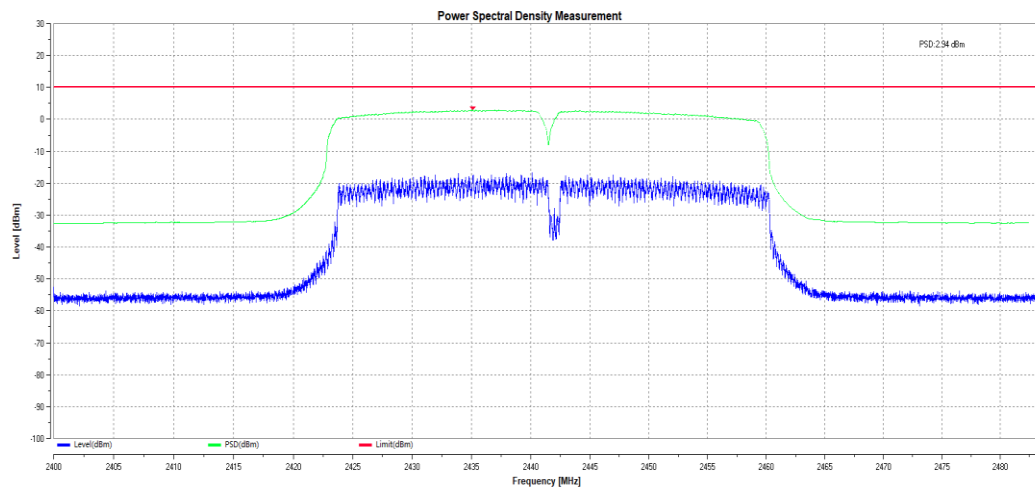
11N40MIMO_Ant1_2442



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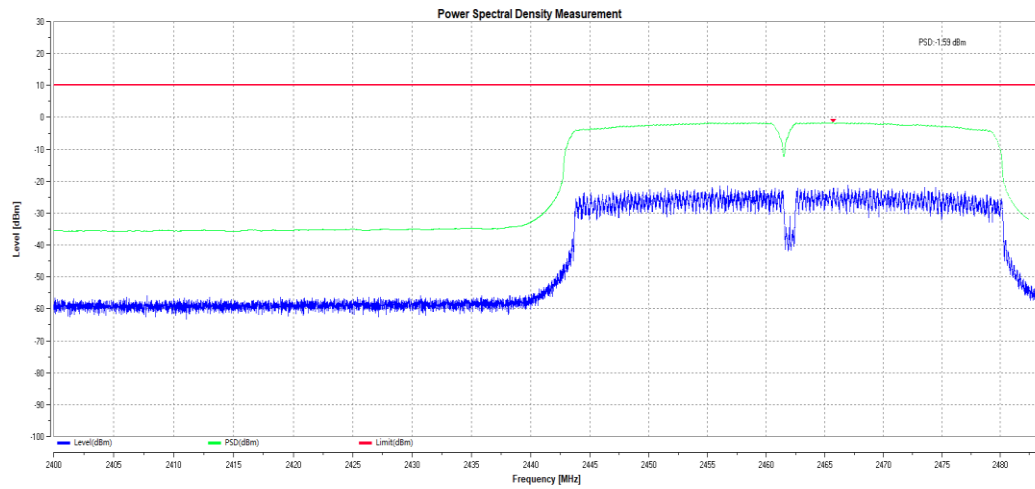


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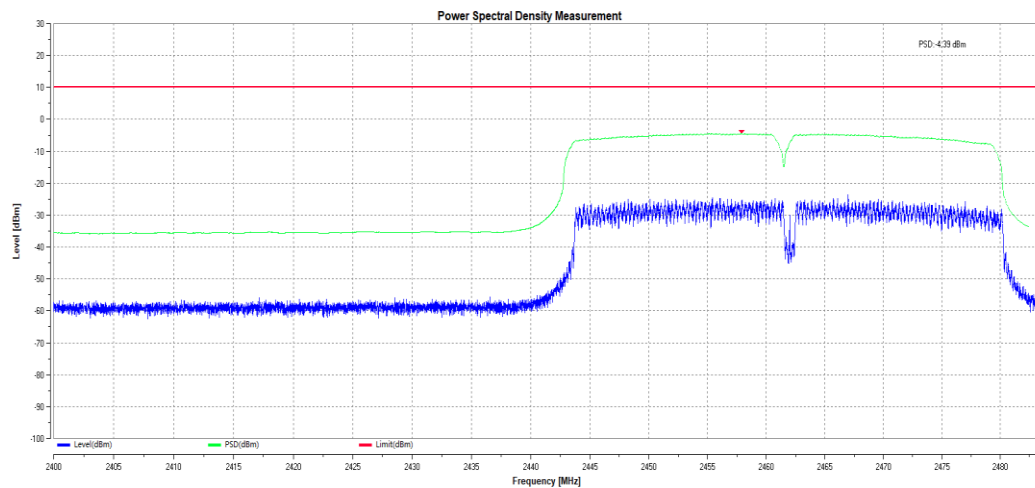


TEST REPORT N°: KSK-ESH-P24071264B-4

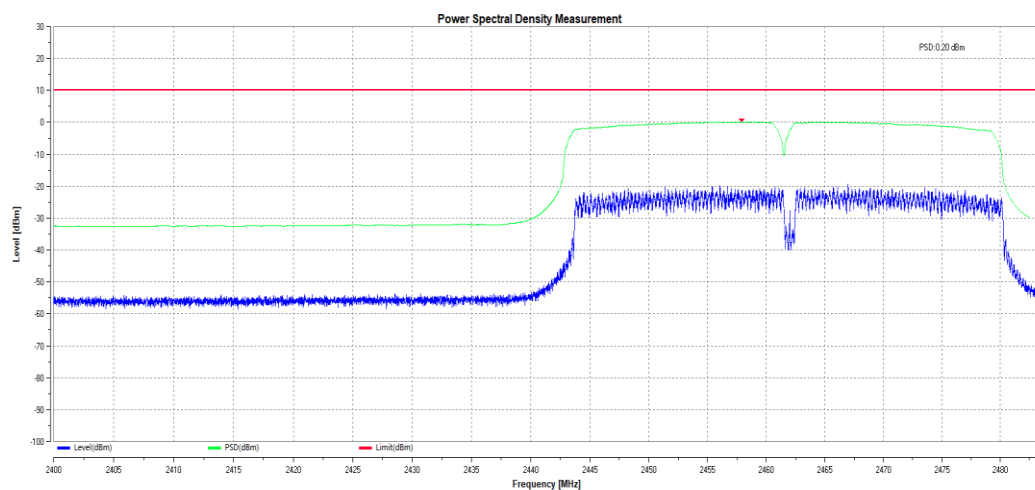
11N40MIMO_Ant1_2462



11N40MIMO_Ant2_2462



11N40MIMO_total_2462



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3.3 Adaptivity (adaptive equipment using modulations other than FHSS)

This requirement does not apply to non-adaptive equipment or adaptive equipment operating in a non-adaptive mode providing the equipment complies with the requirements and/or restrictions applicable to non-adaptive equipment.

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.

3.3.1 Limit of Adaptive

Applicability of adaptive requirements and limit for wide band modulation techniques Interference threshold level

Requirement	Operational Mode			
	Non-LBT based Detect and Avoid	LBT based Detect and Avoid		
		Frame Based Equipment	Load Based Equipment (Base on 'Spectrum Sharing' mechanisms)	Load Based Equipment (Not using any of the mechanisms referenced)
Minimum Clear Channel Assessment (CCA) Time	NA	18 us (see note 1)	(see note 2)	18 us (see note 1)
Maximum Channel Occupancy (COT) Time	40 ms	1 ms to 10 ms	(see note 2)	13ms
Minimum Idle Period	5us	5% of COT	(see note 2)	18us (see note 3)
Extended CCA check	NA	NA	(see note 2)	18us~160us
Short Control Signalling Transmissions	Maximum duty cycle of 10 % within an observation period of 50 ms (see note 4)			

NOTE 1: The CCA time used by the equipment shall be declared by the supplier.

NOTE 2: Load Based Equipment may implement an LBT based spectrum sharing mechanism based on the Clear Channel Assessment (CCA) mode using energy detect, as described in IEEE 802.11™-2012 clause 9, clause 10, clause 16, clause 17, clause 19 and clause 20, or in IEEE 802.15.4™-2011 [i.4], clause 4, clause 5 and clause 8.

NOTE 3: The Idle Period in between transmissions is considered to be the CCA or the Extended CCA check as there are no transmissions during this period.

NOTE 4: Adaptive equipment may or may not have Short Control Signalling Transmissions

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Threshold Level for Non-LBT based Detect and Avoid	
Maximum transmit power (P_H) EIRP dBm	Threshold level (TL) (see notes 1 and 2)
20	-70 dBm / MHz
NOTE 1: For a 20 dBm e.i.r.p. transmitter the detection threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G) NOTE 2: For power levels less than 20 dBm e.i.r.p., the detection threshold level may be relaxed to: $TL = -70 \text{ dBm/MHz} + 10 \times \log_{10} (100 \text{ mW} / P_{out})$; (Pout in mW e.i.r.p.)	

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

Threshold Level for LBT based Detect and Avoid (Frame Based Equipment)	
Maximum transmit power (P_H) EIRP dBm	Threshold level (TL) (see notes 1 and 2)
20	-70 dBm / MHz
NOTE 1: For a 20 dBm e.i.r.p. transmitter the CCA threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G) NOTE 2: For power levels less than 20 dBm e.i.r.p. the CCA threshold level may be relaxed to: $TL = -70 \text{ dBm/MHz} + 10 \times \log_{10} (100 \text{ mW} / P_{out})$; (Pout in mW e.i.r.p.)	

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Unwanted signal parameters for LBT based Detect and Avoid (Frame Based Equipment)		
Wanted signal mean power from companion device	Unwanted signal frequency (MHz)	Unwanted signal power (dBm)
sufficient to maintain the link (see note 2)	2 395 or 2 488,5 (see note 1)	-35 (see note 3)
NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1. NOTE 2: A typical value which can be used in most cases is -50 dBm/MHz. NOTE 3: The level specified is the level in front of the UUT antenna. In case of conducted measurements, this level has to be corrected by the actual antenna assembly gain.		

Threshold Level for LBT based Detect and Avoid (Load Based Equipment)	
Maximum transmit power (P_H) EIRP dBm	Threshold level (TL) (see notes 1 and 2)
20	-70 dBm / MHz
NOTE 1: For a 20 dBm e.i.r.p. transmitter the CCA threshold level (TL) shall be equal to or less than -70 dBm/MHz at the input to the receiver assuming a 0 dBi (receive) antenna assembly. This threshold level (TL) may be corrected for the (receive) antenna assembly gain (G) NOTE 2: For power levels less than 20 dBm e.i.r.p. the CCA threshold level may be relaxed to: $TL = -70 \text{ dBm/MHz} + 10 \times \log_{10} (100 \text{ mW} / P_{out}) ; (P_{out} \text{ in mW e.i.r.p.})$	

Unwanted signal parameters for LBT based Detect and Avoid (Load Based Equipment)		
Wanted signal mean power from companion device	Unwanted signal frequency (MHz)	Unwanted signal power (dBm)
sufficient to maintain the link (see note 2)	2 395 or 2 488,5 (see note 1)	-35 (see note 3)
NOTE 1: The highest frequency shall be used for testing operating channels within the range 2 400 MHz to 2 442 MHz, while the lowest frequency shall be used for testing operating channels within the range 2 442 MHz to 2 483,5 MHz. See clause 5.4.6.1. NOTE 2: A typical value which can be used in most cases is -50 dBm/MHz. NOTE 3: The level specified is the level in front of the UUT antenna. In case of conducted measurements, this level has to be corrected by the actual antenna assembly gain.		

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3.3.2 Test Procedure

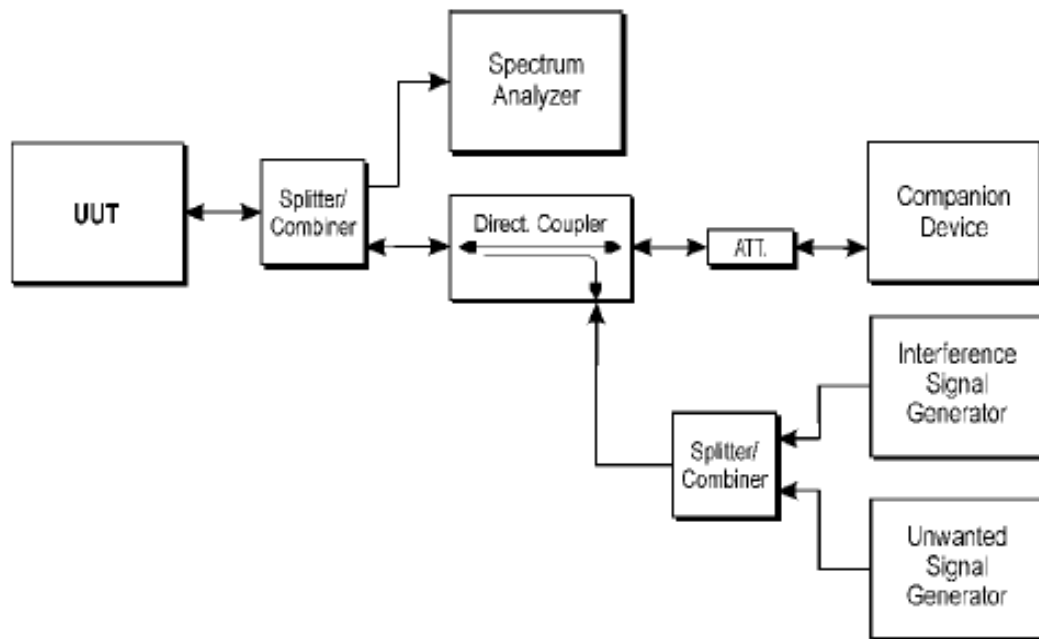
Refer to chapter 5.4.6.2 of EN 300 328 V2.2.2.

Measurement Method	
☒ Conducted measurement	☐ Radiated measurement

3.3.3 Deviation from Test Standard

No deviation.

3.3.4 Test Setup Configuration





TEST REPORT N°: KSK-ESH-P24071264B-4

3.3.5 List of Measurements

WCT1DR2201D

Clause	Test Parameter	Remarks	Pass/Fail
4.3.2.6.3.2.3	Adaptive (Load Based Equipment)	Applicable	Pass
4.3.2.6.4	Short Control Signalling Transmissions	Applicable	Pass

WC0NR2201

Clause	Test Parameter	Remarks	Pass/Fail
4.3.2.6.3.2.2	Adaptive (Frame Based Equipment)	Applicable	Pass
4.3.2.6.4	Short Control Signalling Transmissions	Applicable	Pass

3.3.6 Test Result

3.3.6.1 Adaptive Result

Operating Frequency Bands and Mode of EUT

WCT1DR2201D

Operational Mode	Operating Frequency (Low Channel, MHz)	Operating Frequency (High Channel, MHz)	Test Result
11B	2412	2472	Pass
11G	2412	2472	Pass
11N20MIMO	2412	2472	Pass
11N40MIMO	2422	2462	Pass

WC0NR2201

Operational Mode	Operating Frequency (Low Channel, MHz)	Operating Frequency (High Channel, MHz)	Test Result
11B	2412	2472	Pass
11G	2412	2472	Pass
11N20MIMO	2412	2472	Pass
11N40MIMO	2422	2462	Pass



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3.3.6.2 The Channel Occupancy Time Result

Operating Frequency Bands and Mode of EUT

WCT1DR2201D

Test Mode	Antenna	Channel [MHz]	Max.COT [ms]	Limit[ms]	Min.Idel Time[ms]	Limit[ms]	Verdict
11B	Ant1	2412	6.404	13	0.111	0.018	PASS
		2472	1.326	13	0.284	0.018	PASS
11G	Ant1	2412	12.614	13	0.071	0.018	PASS
		2472	1.326	13	0.463	0.018	PASS
11N20MIMO	Ant1	2412	12.614	13	0.171	0.018	PASS
		2472	0.282	13	0.047	0.018	PASS
11N40MIMO	Ant1	2422	1.274	13	0.216	0.018	PASS
		2462	2.098	13	0.047	0.018	PASS

WCT1DR2201D

Test Mode	Antenna	Channel [MHz]	Max.COT [ms]	Limit[ms]	Min.Idel Time[ms]	Limit[ms]	Verdict
11B	Ant1	2412	0.170	13	0.090	0.018	PASS
		2472	0.033	13	0.197	0.018	PASS
11G	Ant1	2412	1.813	13	0.073	0.018	PASS
		2472	0.029	13	0.477	0.018	PASS
11N20MIMO	Ant1	2412	0.046	13	0.509	0.018	PASS
		2472	0.033	13	0.395	0.018	PASS
11N40MIMO	Ant1	2422	0.046	13	0.347	0.018	PASS
		2462	1.813	13	0.047	0.018	PASS

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3.3.6.3 Short Control Signalling Transmissions Result
WCT1DR2201D

Test Mode	Antenna	Channel [MHz]	Add Signal Type	Add Signal Time[ms]	Add Signal Level[dbm]	Max. Short Time [%]	Limit [%]	Verdict
11B	Ant1	2412	AWGN	3000	-59.05	5.00	10	PASS
			CW	63000	-32.20	0.80	10	PASS
		2472	AWGN	3000	-63.63	2.20	10	PASS
			CW	63000	-32.20	0.00	10	PASS
11G	Ant1	2412	AWGN	3000	-63.91	3.80	10	PASS
			CW	63000	-32.20	0.80	10	PASS
		2472	AWGN	3000	-62.59	1.00	10	PASS
			CW	63000	-32.20	0.00	10	PASS
11N20MIMO	Ant1	2412	AWGN	3000	-62.69	3.60	10	PASS
			CW	63000	-32.20	4.00	10	PASS
		2472	AWGN	3000	-61.39	4.00	10	PASS
			CW	63000	-32.20	1.00	10	PASS
11N40MIMO	Ant1	2422	AWGN	3000	-62.23	4.60	10	PASS
			CW	63000	-32.20	0.80	10	PASS
		2462	AWGN	3000	-60.96	2.00	10	PASS
			CW	63000	-32.20	0.80	10	PASS

WC0NR2201

Test Mode	Antenna	Channel [MHz]	Add Signal Type	Add Signal Time[ms]	Add Signal Level[dbm]	Max. Short Time [%]	Limit [%]	Verdict
11B	Ant1	2412	AWGN	3000	-63.56	3.80	10	PASS
			CW	63000	-32.20	0.00	10	PASS
		2472	AWGN	3000	-62.58	4.00	10	PASS
			CW	63000	-32.20	0.00	10	PASS
11G	Ant1	2412	AWGN	3000	-64.18	4.00	10	PASS
			CW	63000	-32.20	0.00	10	PASS
		2472	AWGN	3000	-63.42	4.00	10	PASS
			CW	63000	-32.20	0.00	10	PASS
11N20MIMO	Ant1	2412	AWGN	3000	-63.89	0.00	10	PASS
			CW	63000	-32.20	0.00	10	PASS
		2472	AWGN	3000	-62.27	4.00	10	PASS
			CW	63000	-32.20	0.00	10	PASS
11N40MIMO	Ant1	2422	AWGN	3000	-63.95	4.00	10	PASS
			CW	63000	-32.20	0.00	10	PASS
		2462	AWGN	3000	-60.27	0.00	10	PASS
			CW	63000	-32.20	0.00	10	PASS

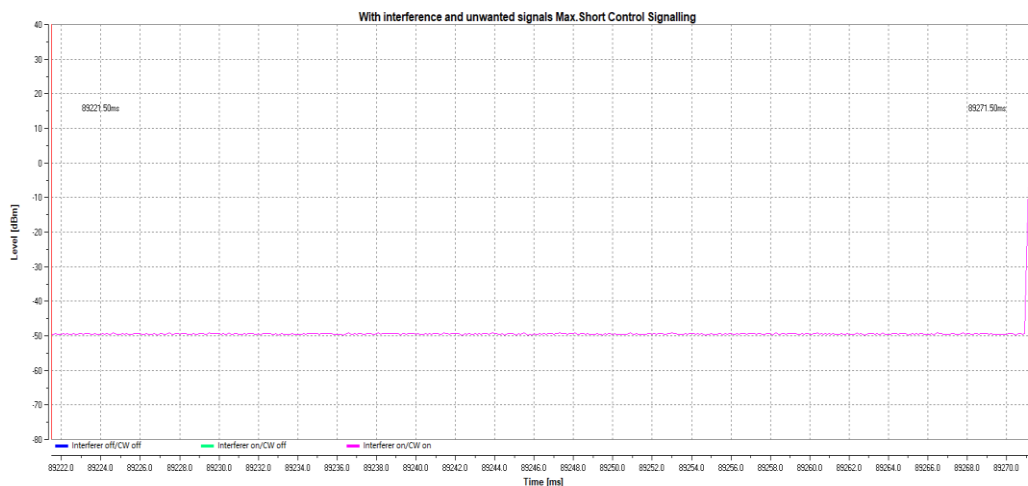
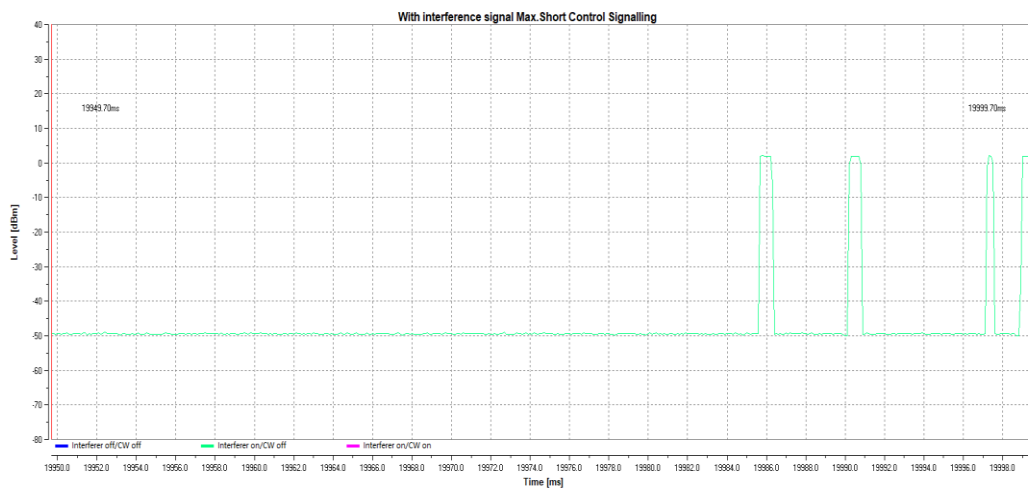
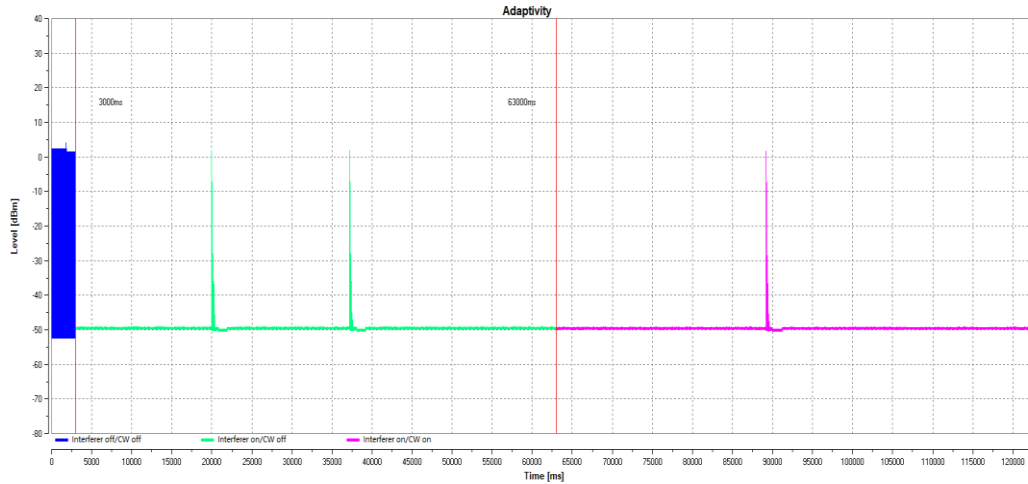
Note: 1. Transmission stopped after interference added and the short control signaling less than 5ms. The UUT did not resume any normal transmissions when adding the blocking signal

2. The short control signaling shall have a maximum TxOn / (TxOn + TxOff) ratio of 10 % within any observation period of 50 ms.

TEST REPORT N°: KSK-ESH-P24071264B-4

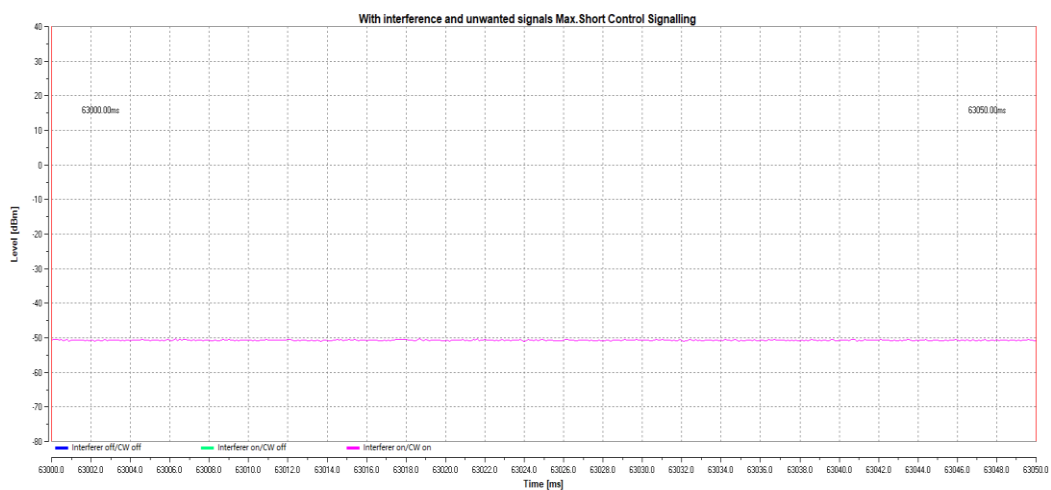
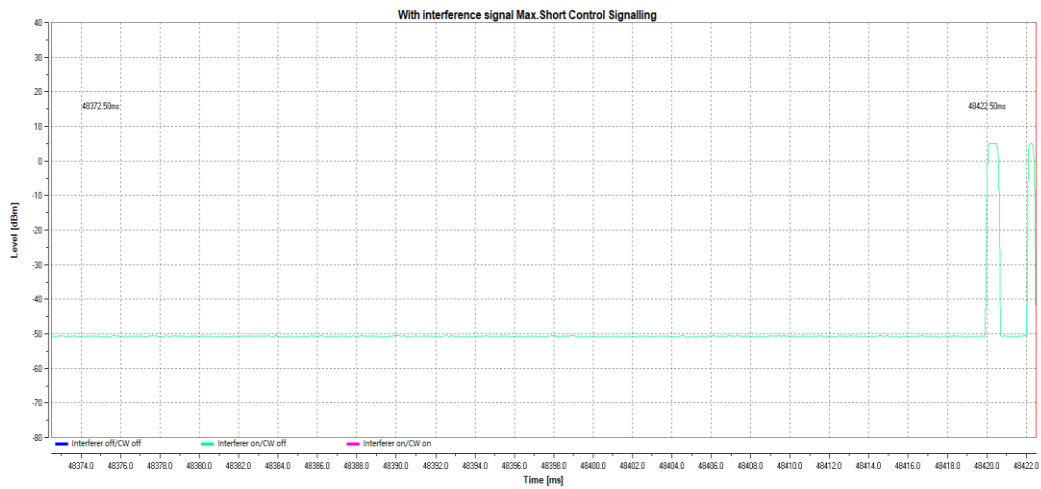
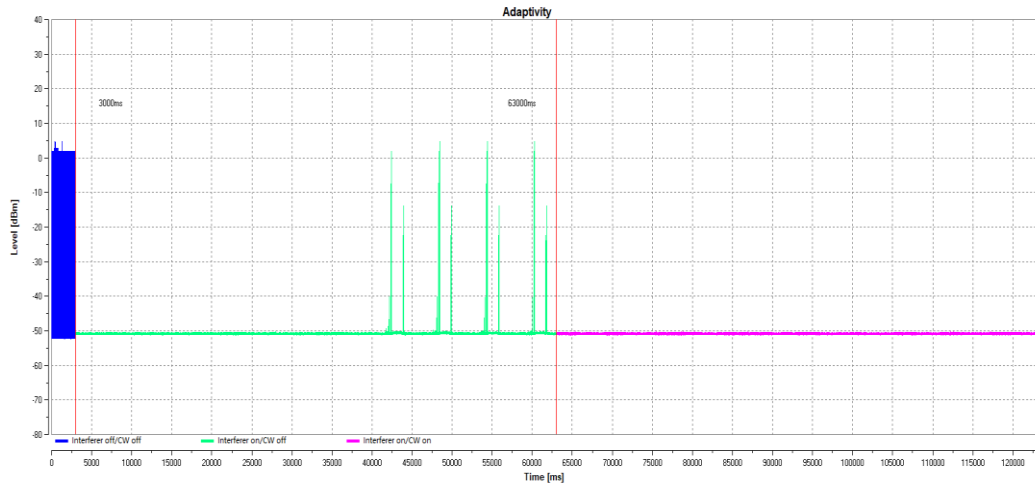
3.3.7 Test Graphs
WCT1DR2201D

11B_Ant1_2412



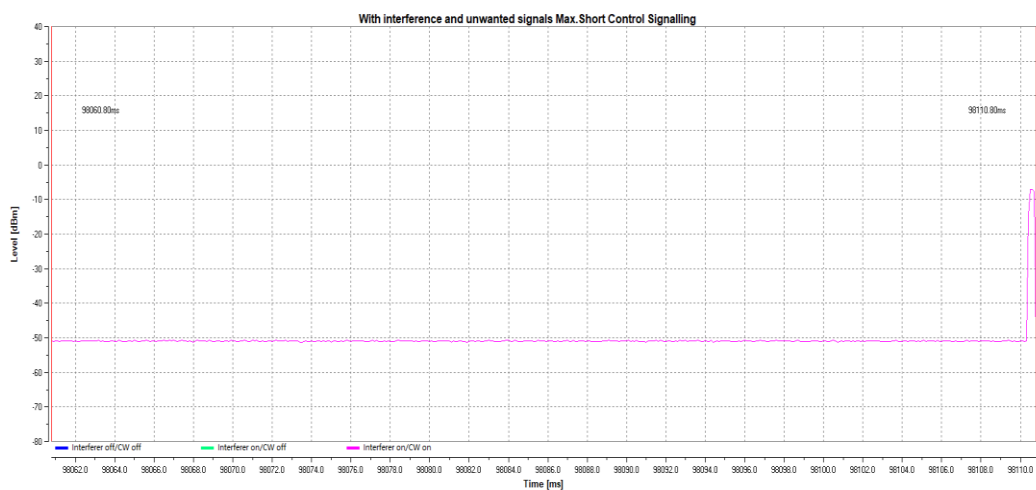
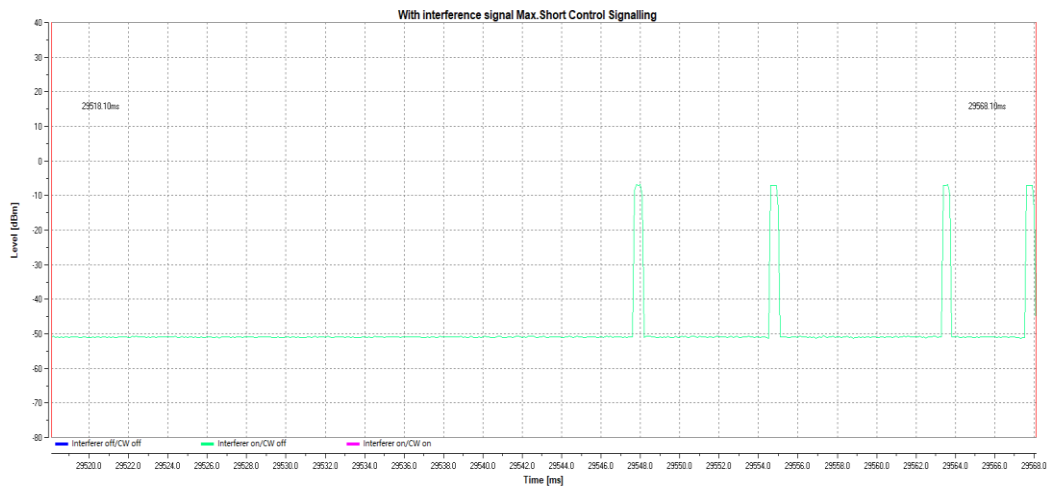
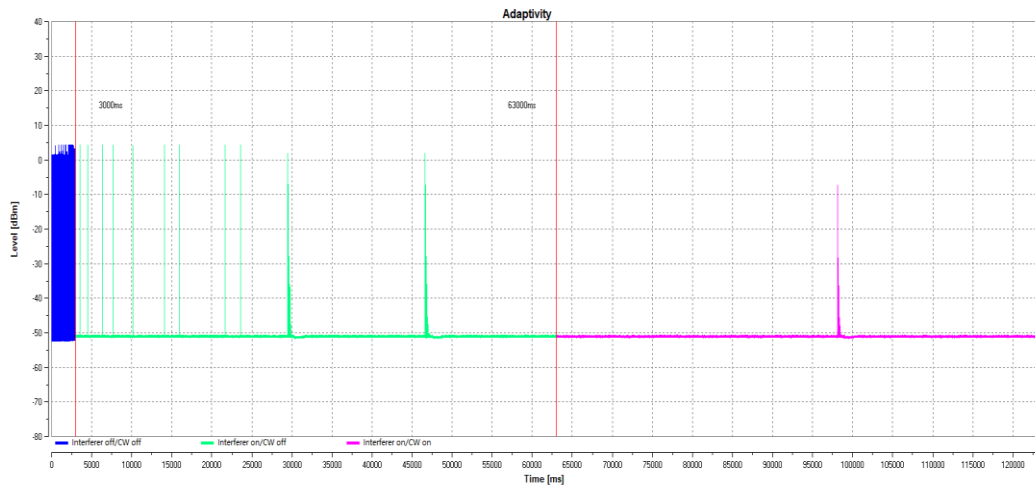
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11B_Ant1_2472



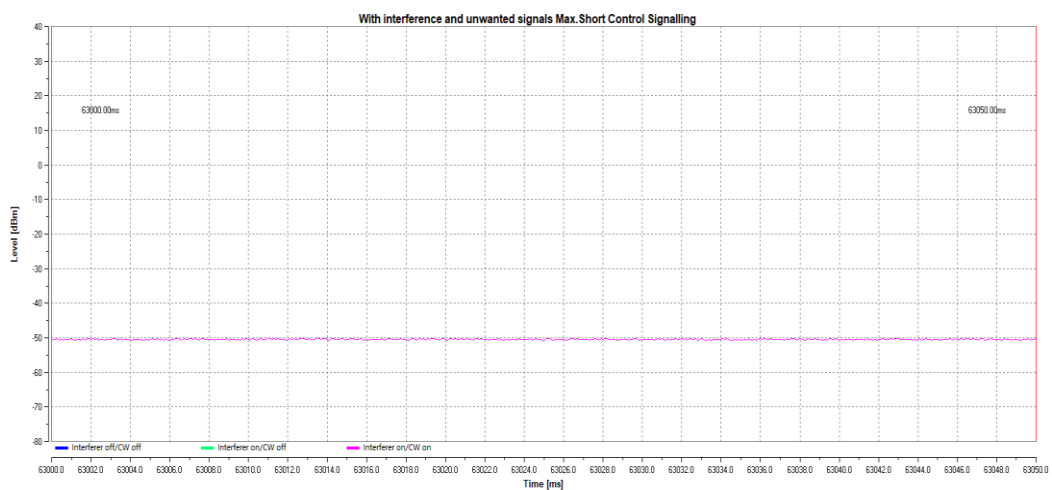
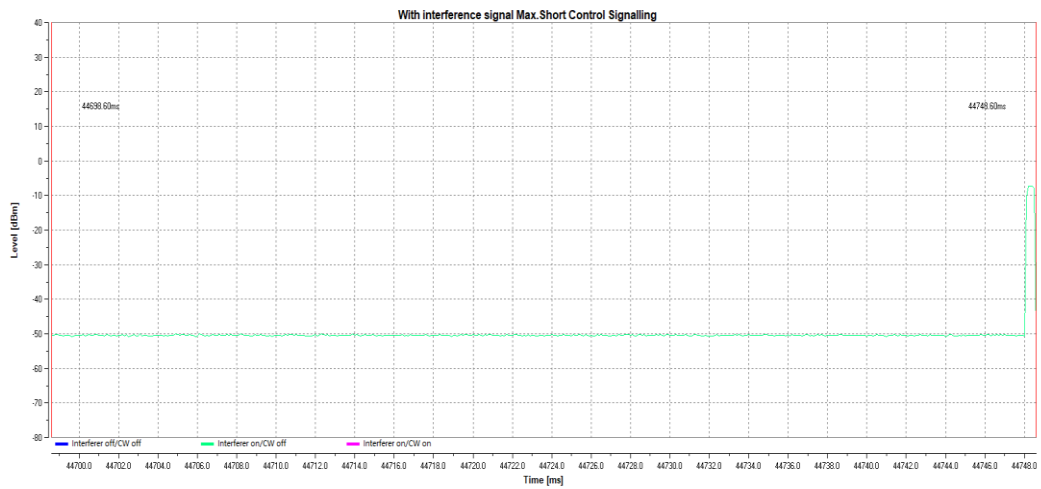
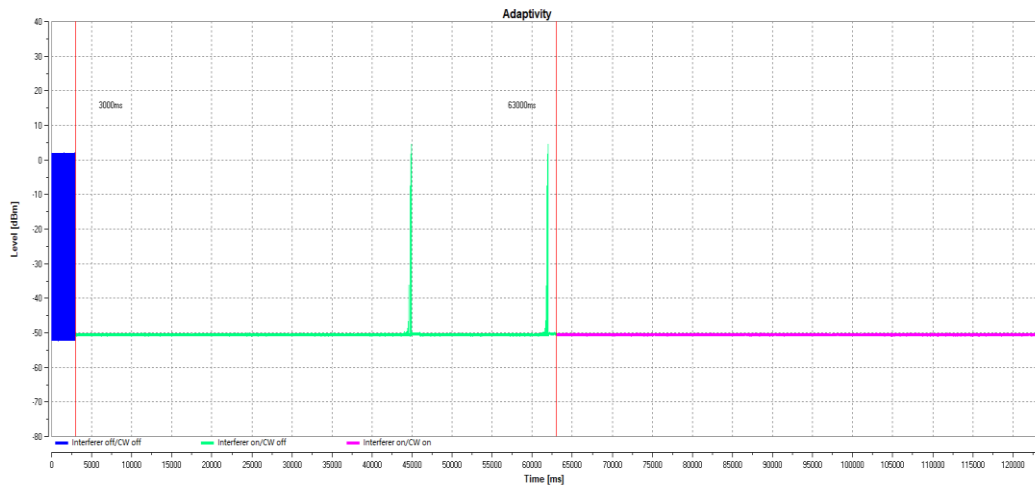
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11G_Ant1_2412



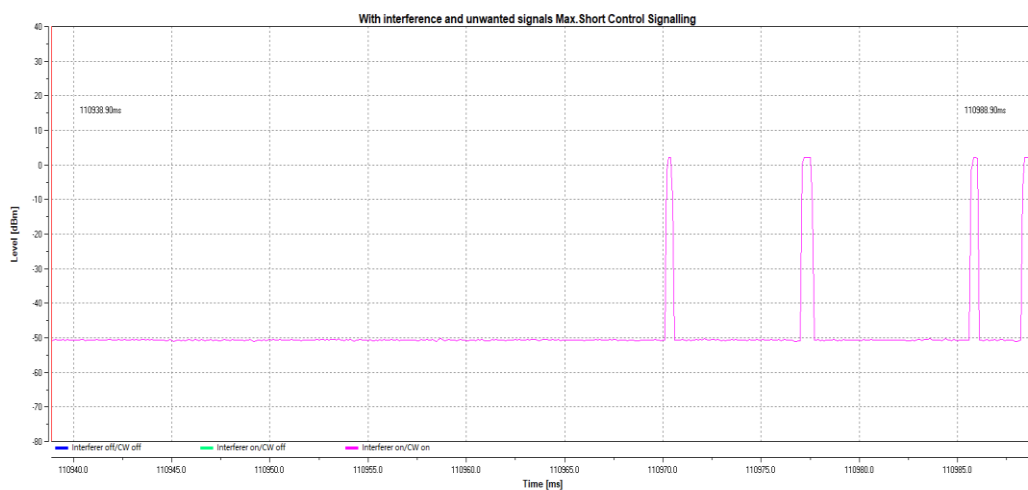
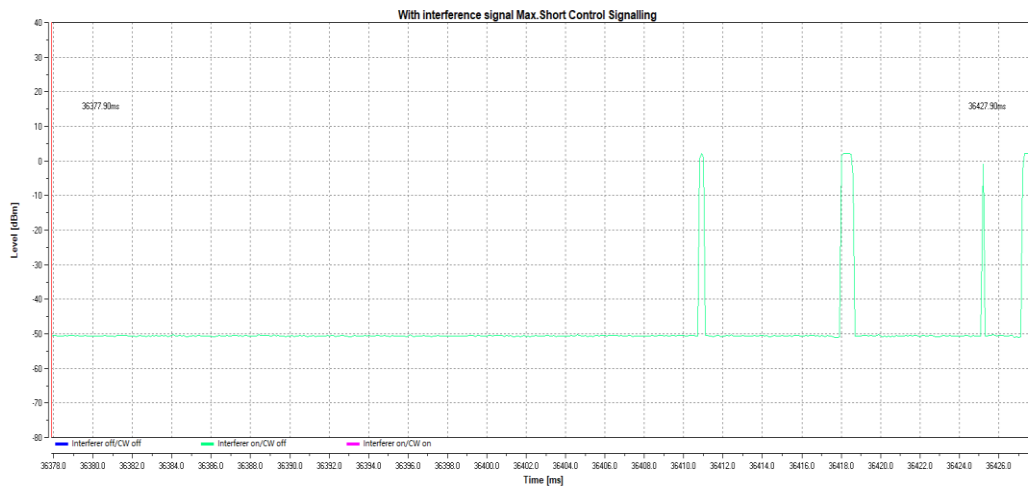
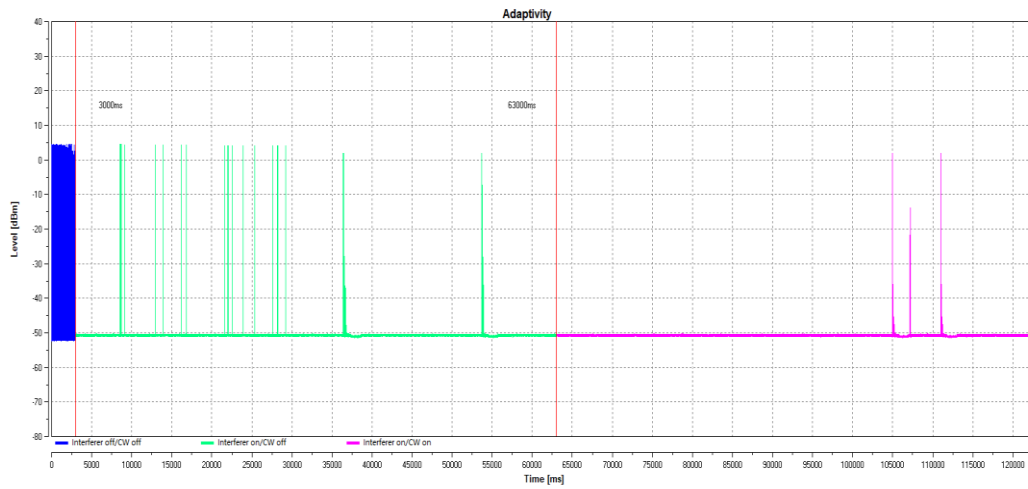
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11G_Ant1_2472



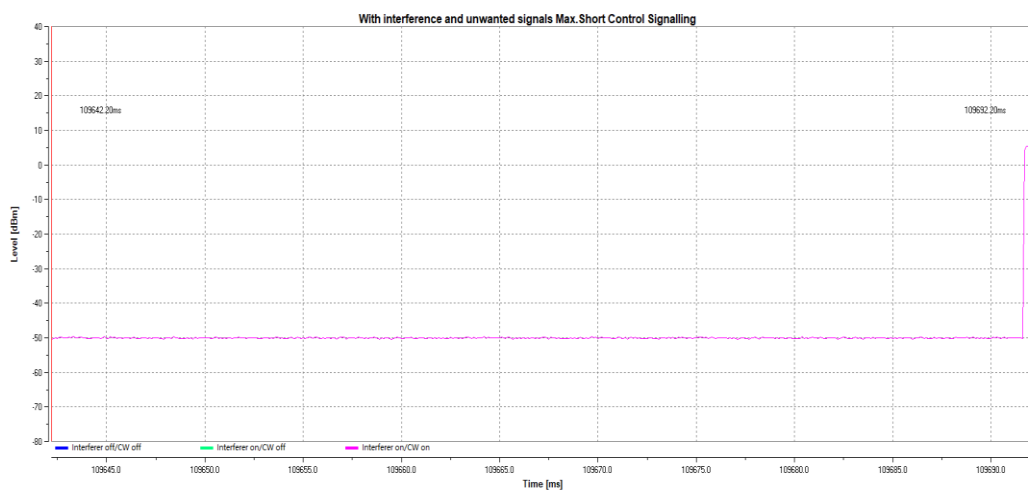
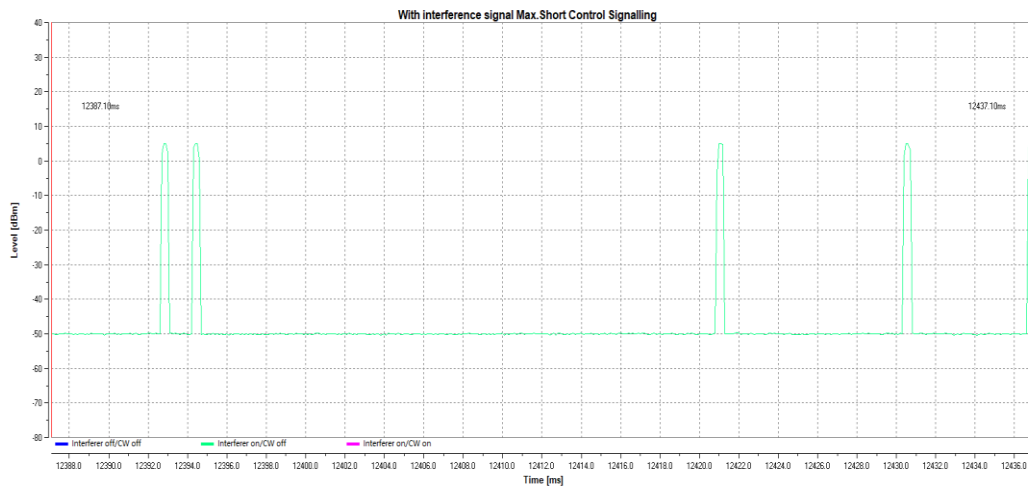
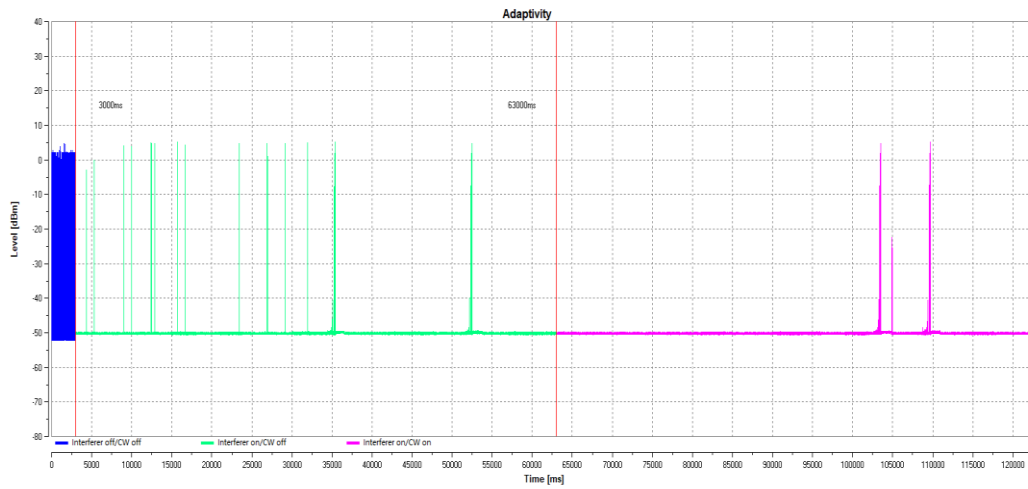
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11N20MIMO_Ant1_2412



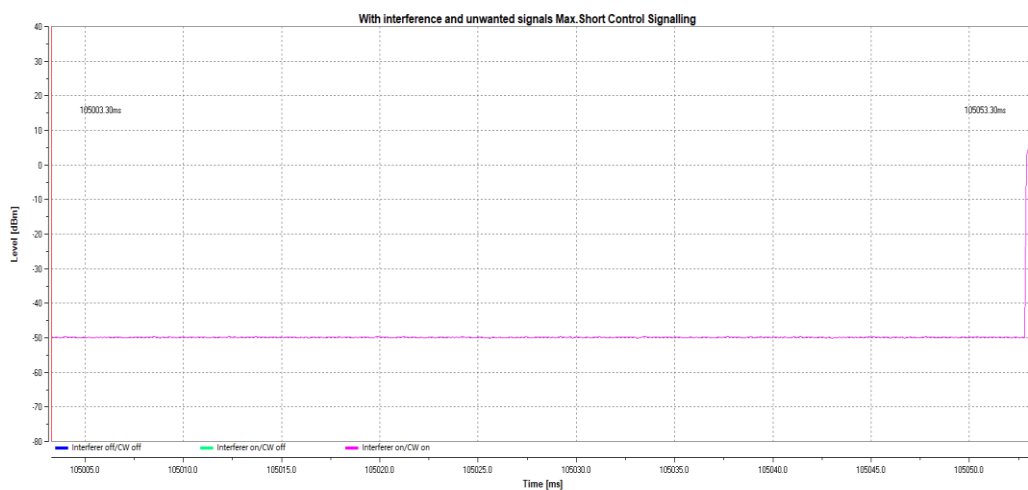
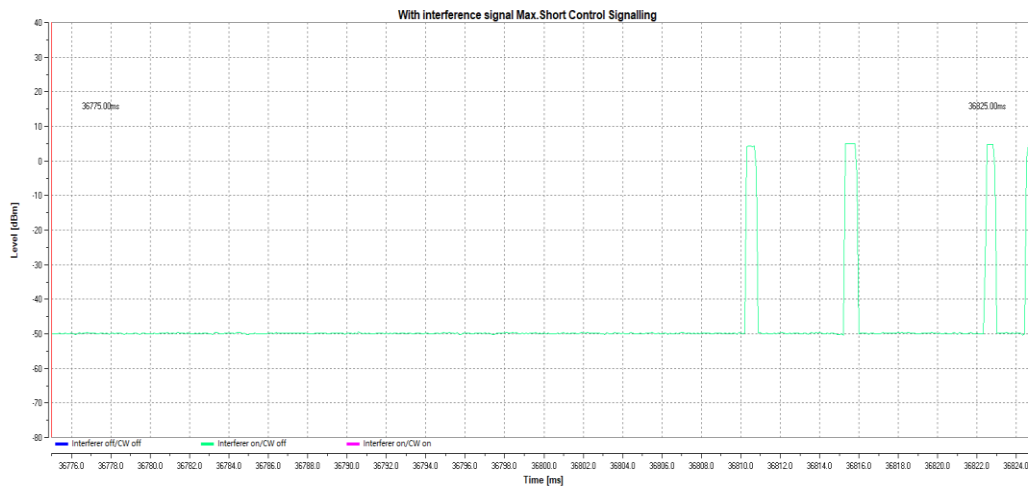
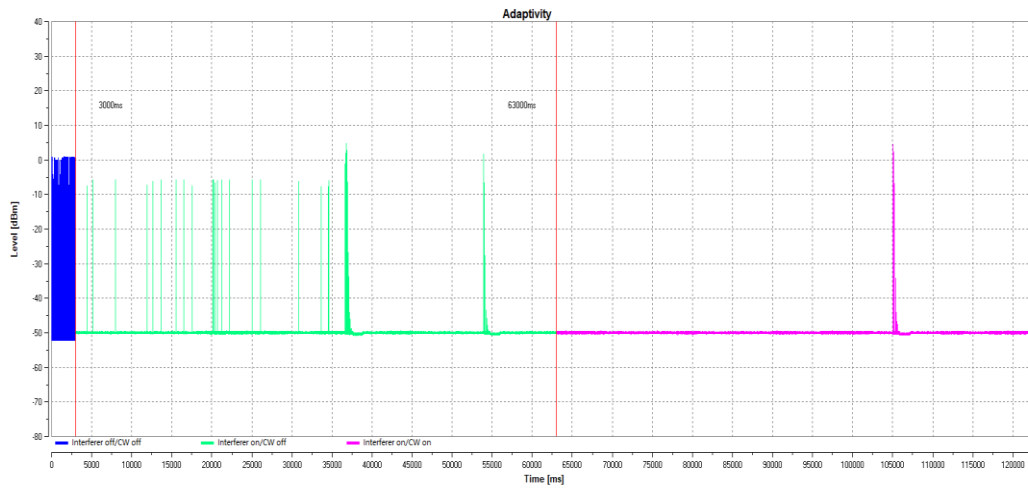
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11N20MIMO_Ant1_2472



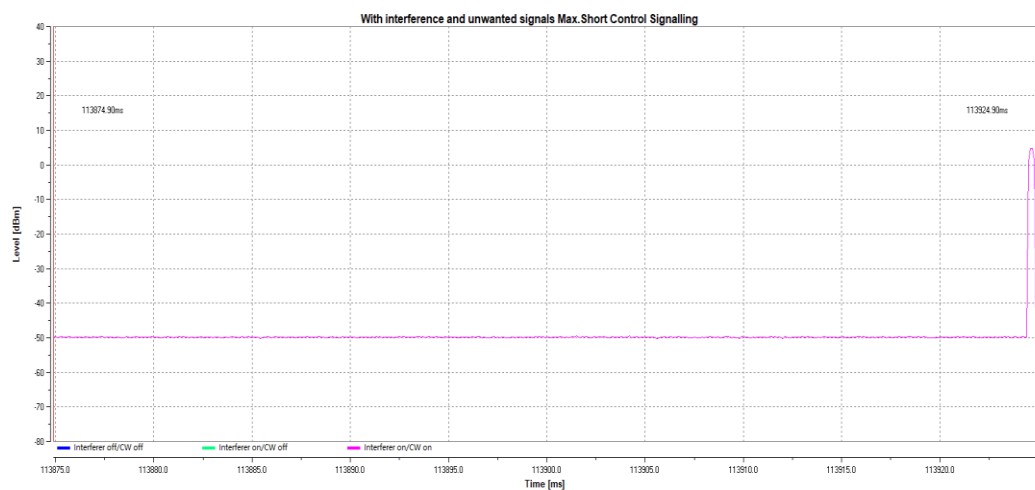
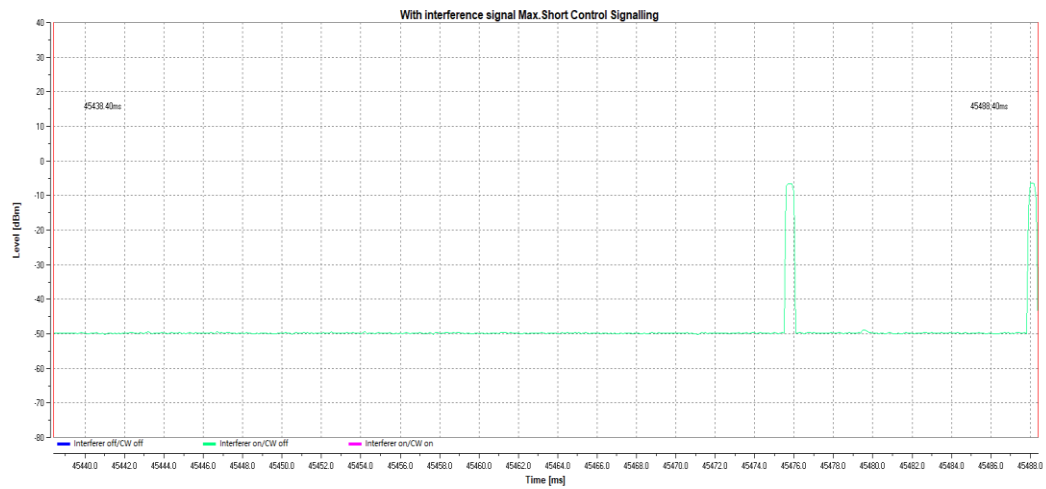
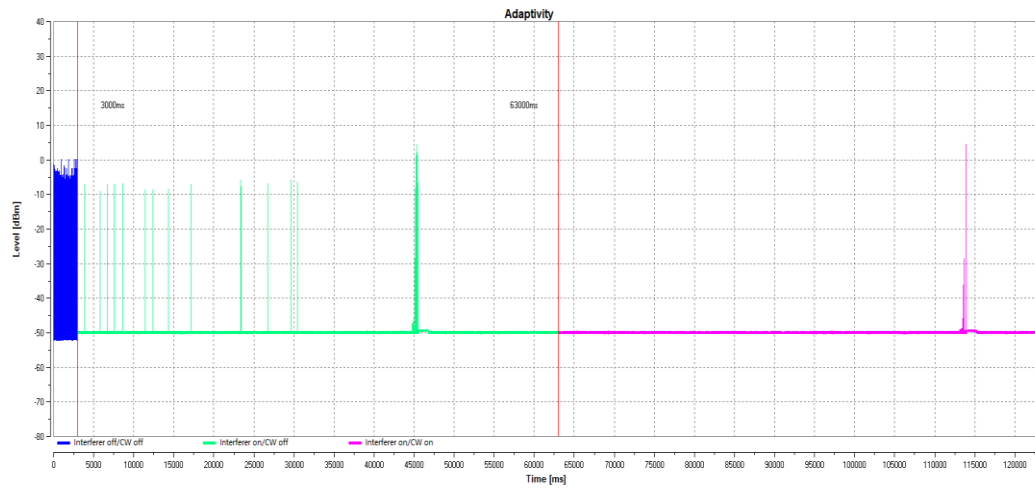
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11N40MIMO_Ant1_2422



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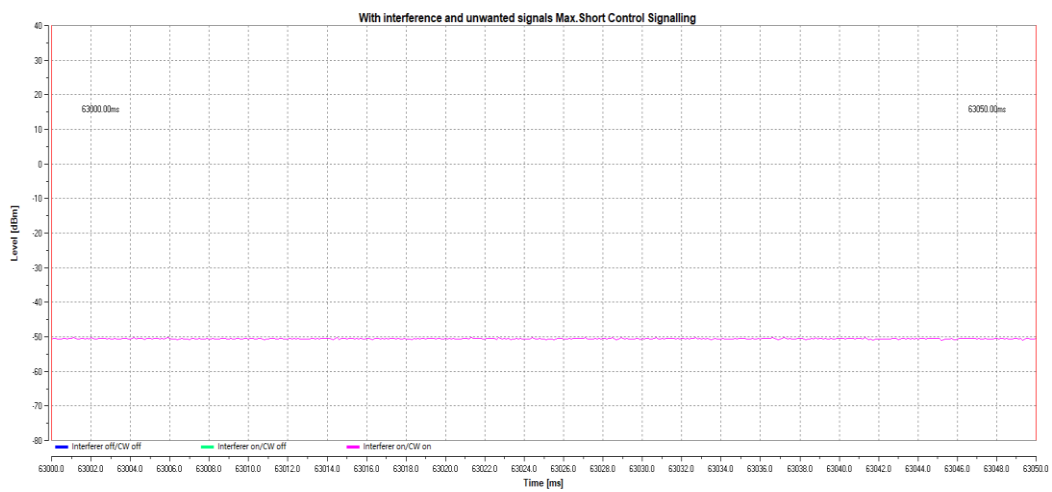
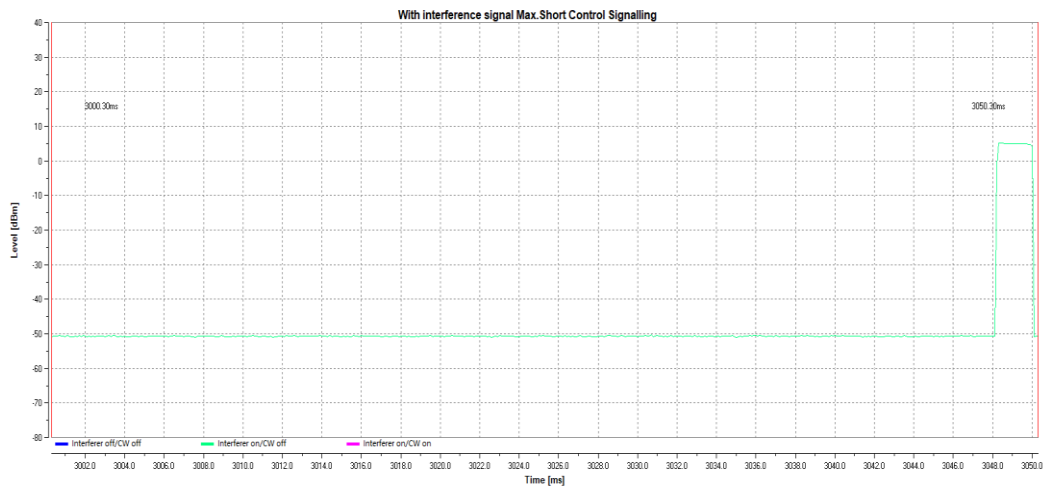
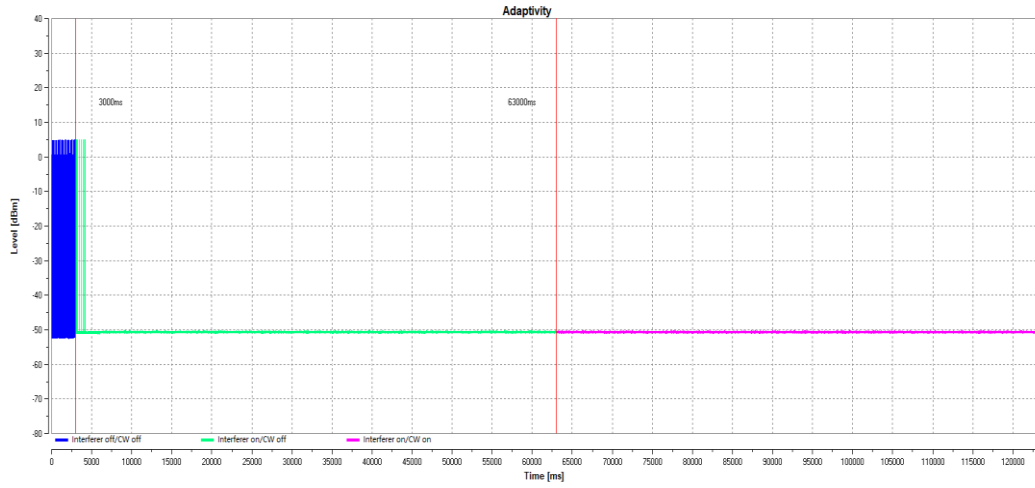
11N40MIMO_Ant1_2462



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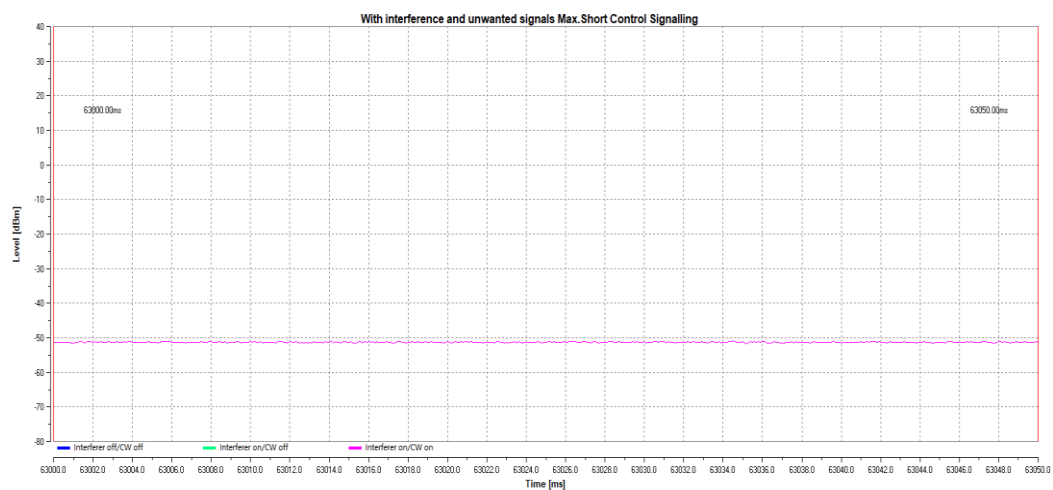
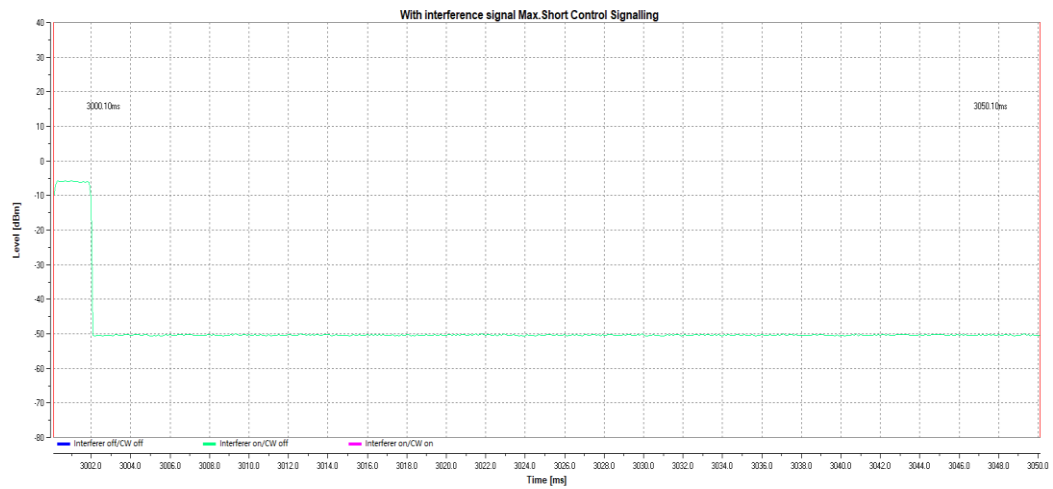
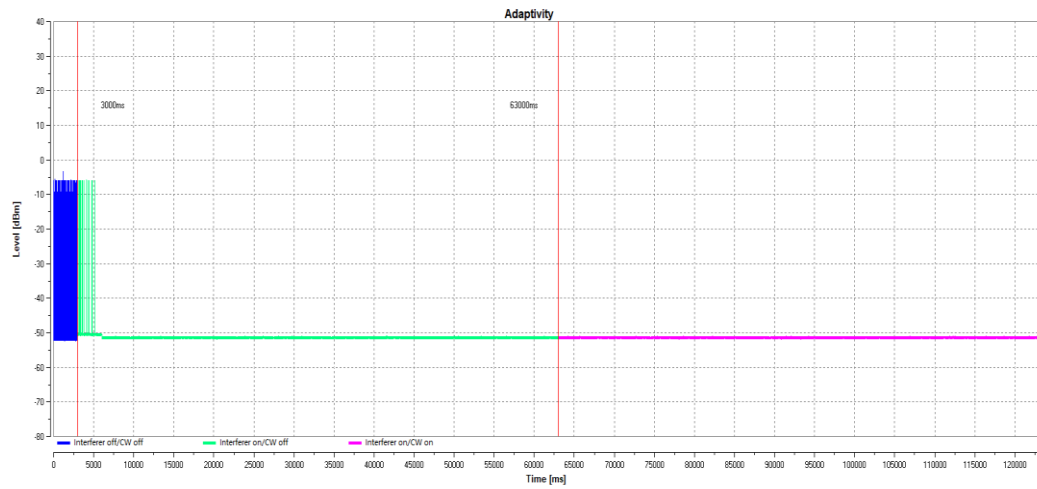
WC0NR2201

11B_Ant1_2412



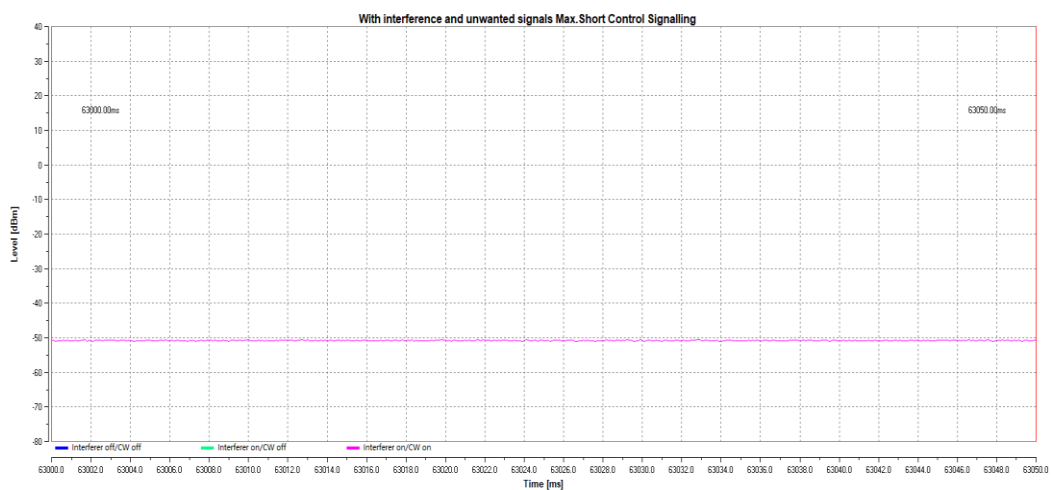
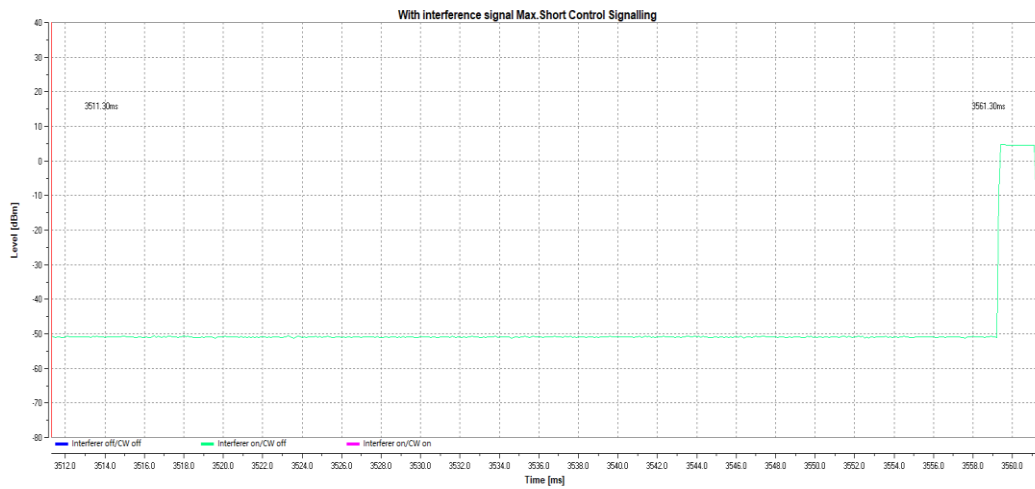
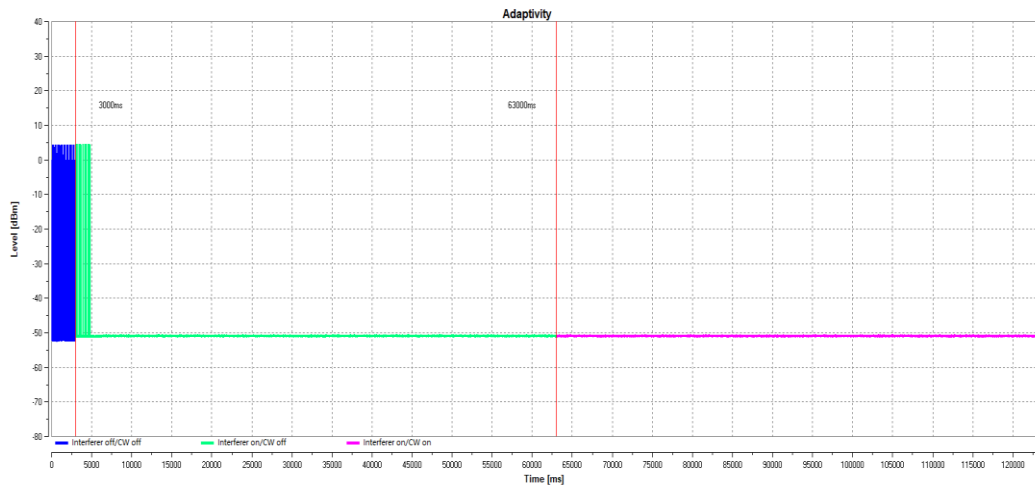
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11B_Ant1_2472



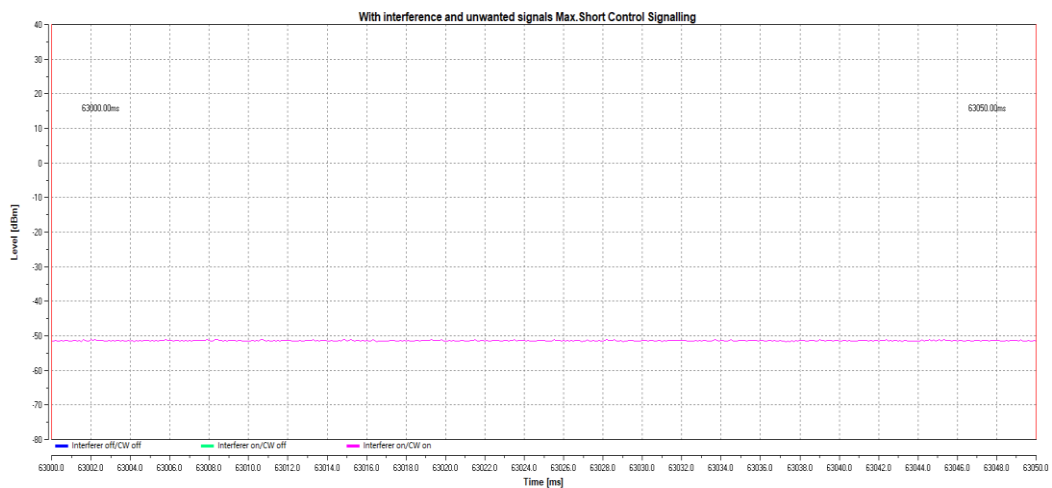
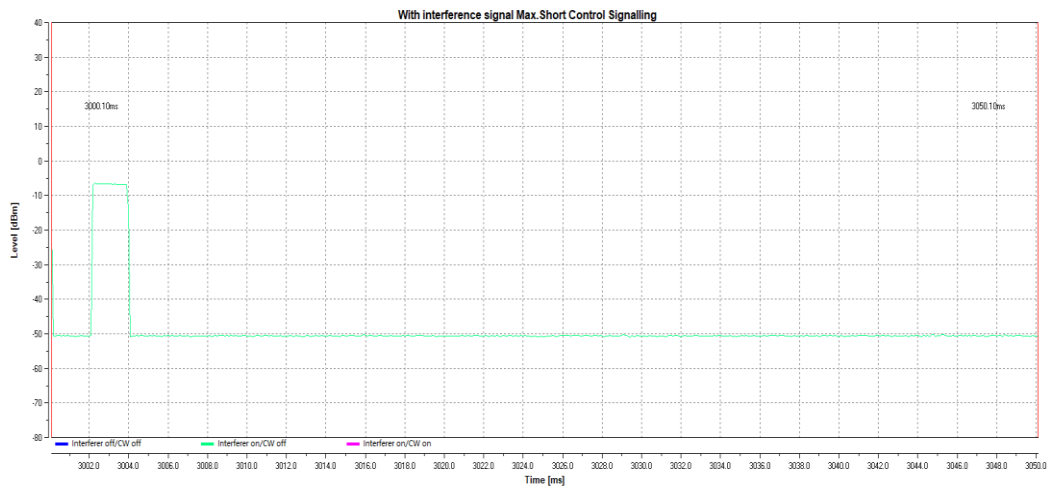
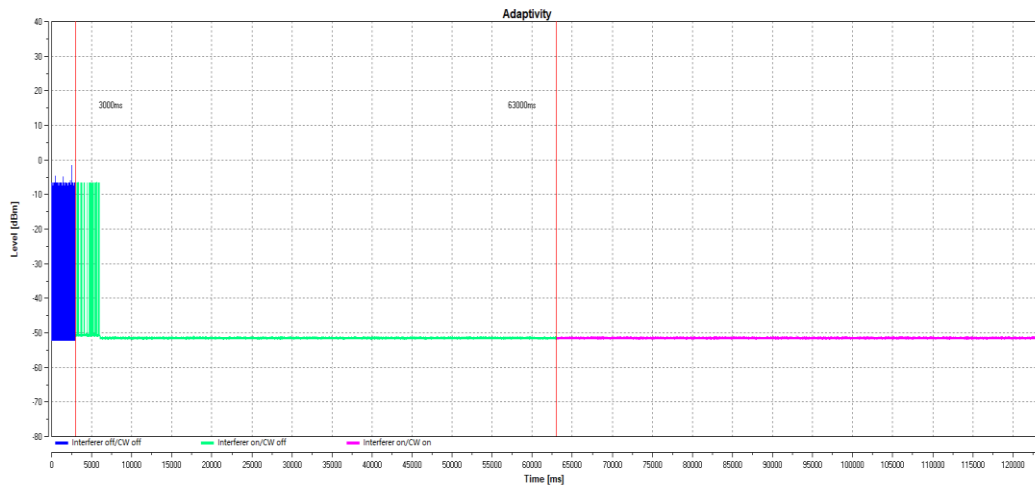
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11G_Ant1_2412



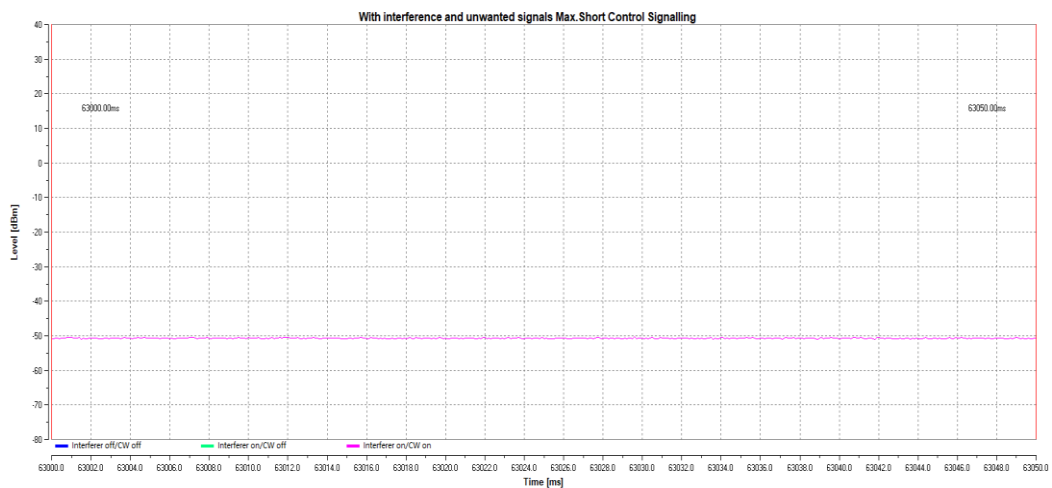
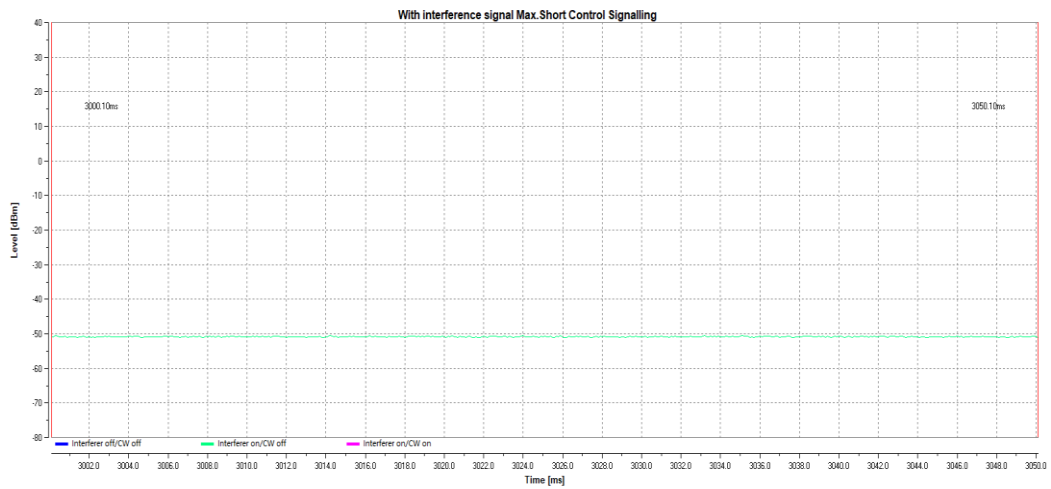
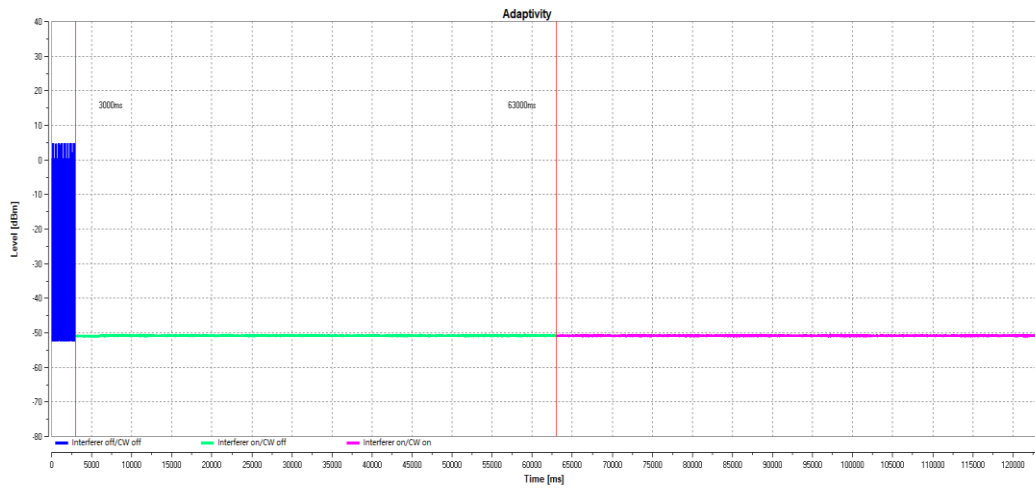
TEST REPORT N°: KSK-ESH-P24071264B-4

11G_Ant1_2472



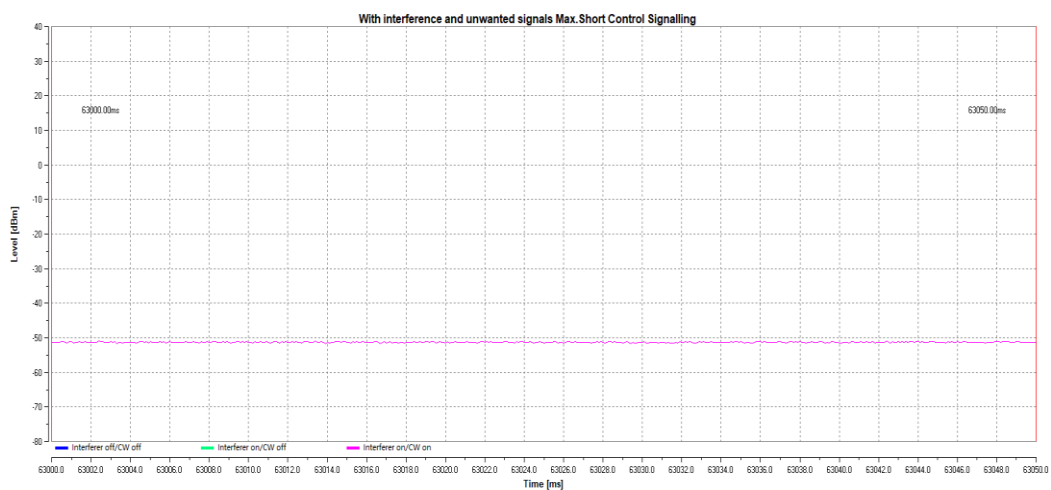
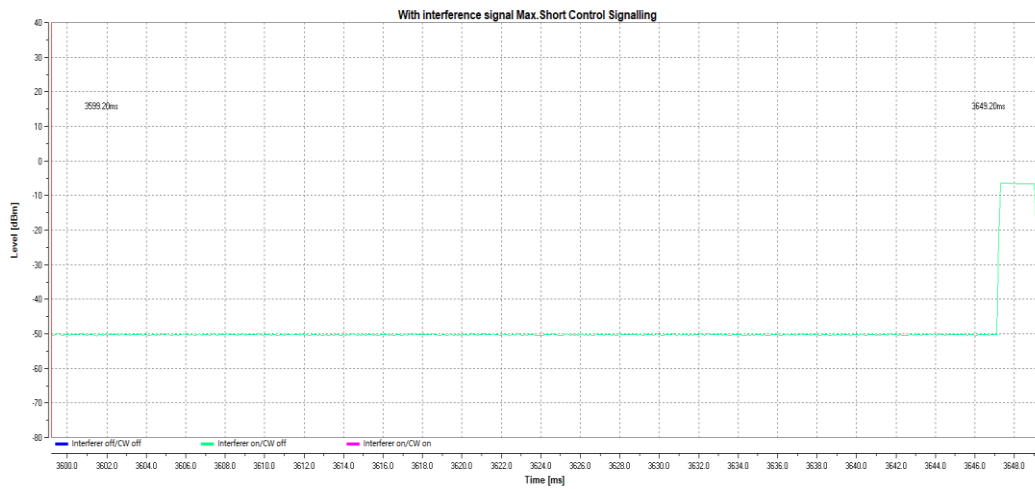
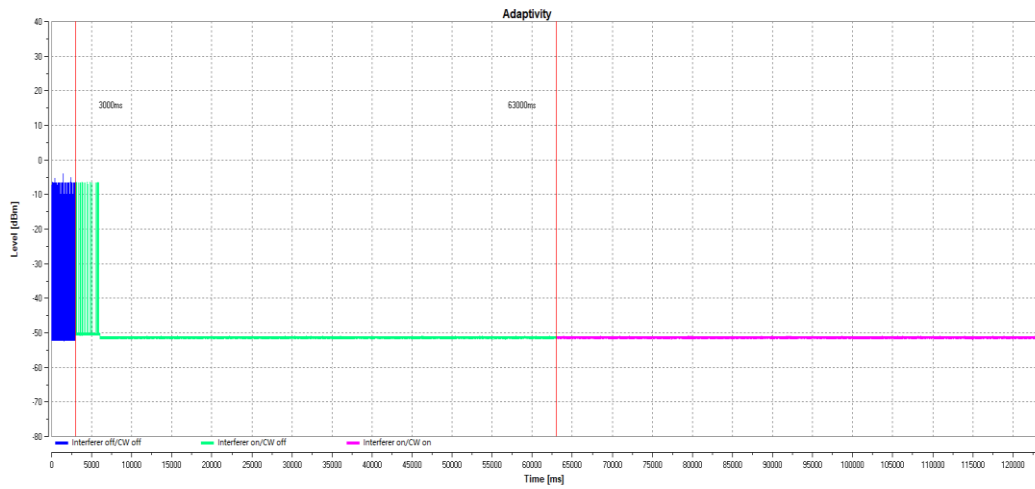
TEST REPORT N°: KSK-ESH-P24071264B-4

11N20MIMO_Ant1_2412



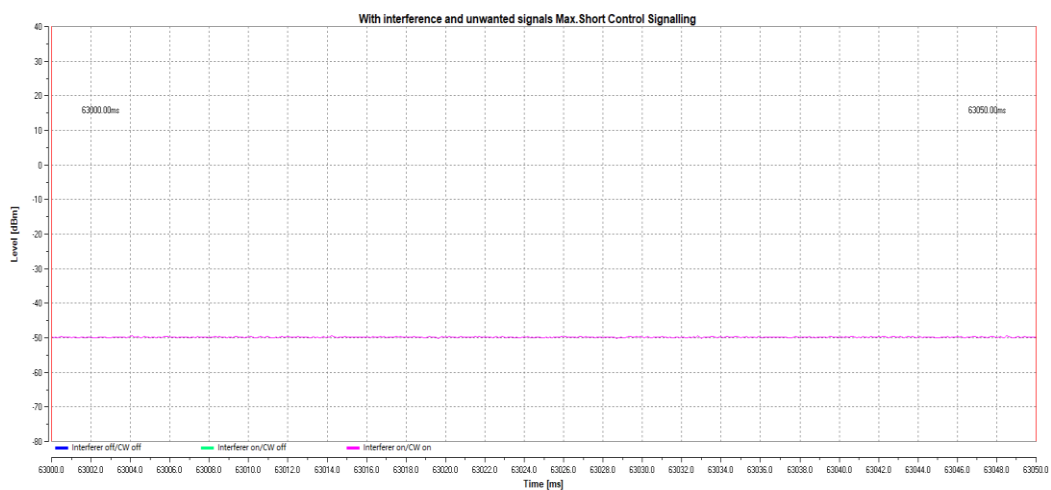
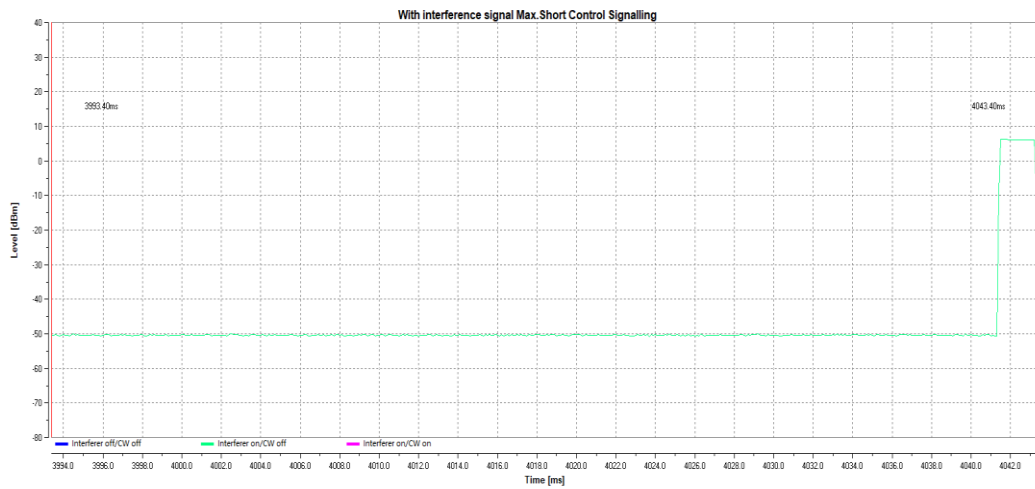
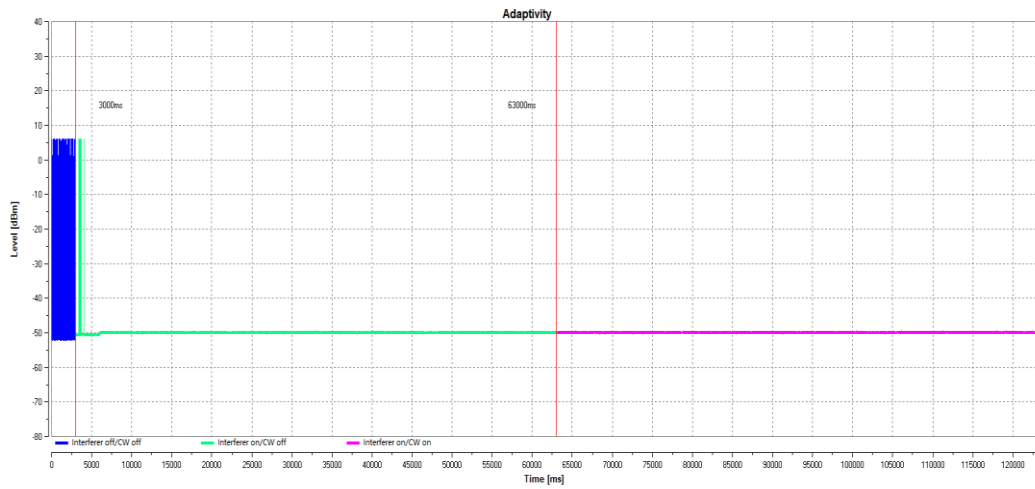
TEST REPORT N°: KSK-ESH-P24071264B-4

11N20MIMO_Ant1_2472



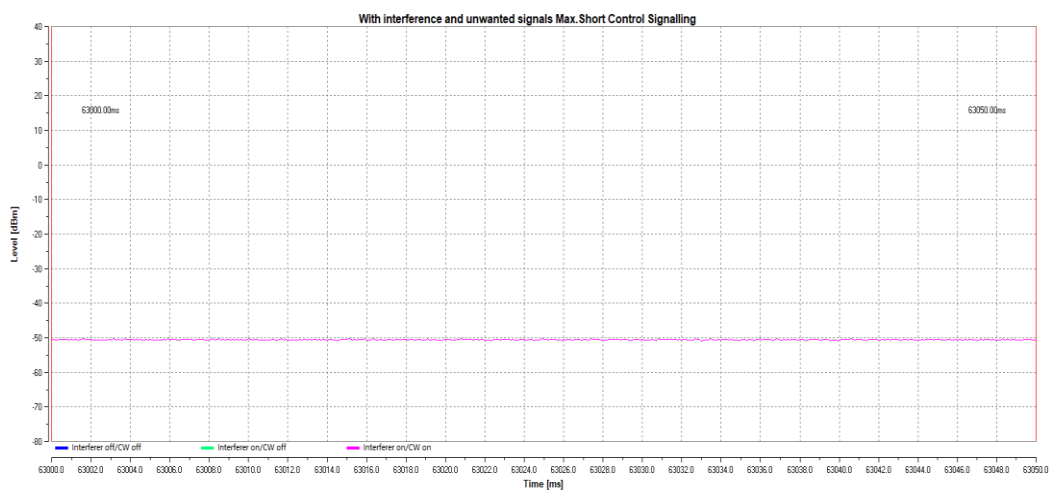
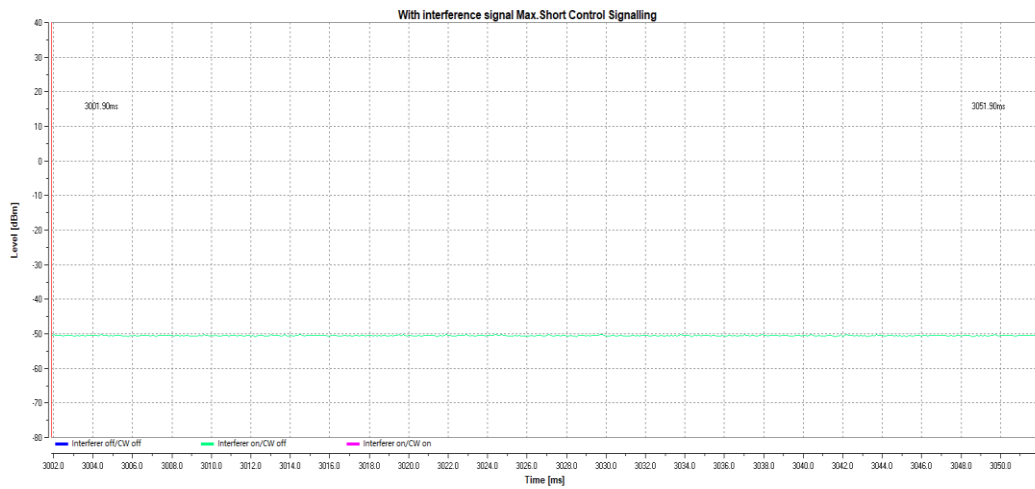
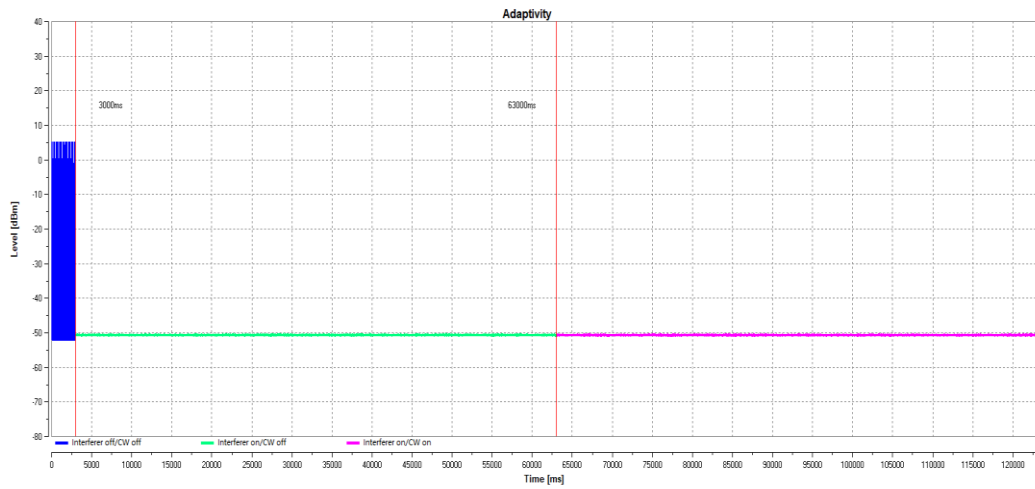
TEST REPORT N°: KSK-ESH-P24071264B-4

11N40MIMO_Ant1_2422



TEST REPORT N°: KSK-ESH-P24071264B-4

11N40MIMO_Ant1_2462



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3.4 Occupied Channel Bandwidth

3.4.1 Limit of Occupied Channel Bandwidth

Condition		Limit
All types of equipment		Shall fall completely within the band 2400 to 2483.5 MHz.
Additional requirement	For non-adaptive using wide band modulations other than FHSS system and e.i.r.p > 10dBm.	Less than 20MHz
	For non-adaptive Frequency Hopping system and e.i.r.p > 10dBm.	Less than 5MHz

3.4.2 Test Procedure

1. Refer to chapter 5.4.7.2 of EN 300 328 V2.2.2.
2. The measurement shall be performed only on the lowest and the highest frequency within the stated frequency range.
3. The test procedure shall be as follows:

Step 1:

Connect the EUT to the spectrum analyzer and use the following settings:

Center Frequency	: Channel under test
Resolution BW	: 1 % of the span
Video BW	: 3 × RBW
Frequency Span	: 2 × Nominal Channel Bandwidth
Detector	: RMS
Trace Mode	: Max Hold
Sweep Time	: 1 s

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:

Use the 99 % bandwidth function of the spectrum analyzer to measure the Occupied Channel Bandwidth of the EUT.

Measurement	
☒ Conducted measurement	☐ Radiated measurement

3.4.3 Deviation from Test Standard

No deviation.

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3.4.4 Test Setup

These measurements only were performed at normal test conditions. The measurement shall be performed only on the lowest and the highest frequency within the stated frequency range. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator.



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3.4.5 Test Results
WCT1DR2201D

Test Mode	Antenna	Channel [MHz]	OCB[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	14.749	2404.6216	2419.3706	2400 to 2483.5	PASS
	Ant2	2412	14.600	2404.6916	2419.2916	2400 to 2483.5	PASS
	Ant1	2442	14.696	2434.5825	2449.2785	2400 to 2483.5	PASS
	Ant2	2442	14.609	2434.6570	2449.2660	2400 to 2483.5	PASS
	Ant1	2472	14.712	2464.6201	2479.3321	2400 to 2483.5	PASS
	Ant2	2472	14.593	2464.6724	2479.2654	2400 to 2483.5	PASS
11G	Ant1	2412	16.481	2403.7460	2420.2270	2400 to 2483.5	PASS
	Ant2	2412	16.480	2403.7458	2420.2258	2400 to 2483.5	PASS
	Ant1	2442	16.476	2433.7299	2450.2059	2400 to 2483.5	PASS
	Ant2	2442	16.473	2433.7420	2450.2150	2400 to 2483.5	PASS
	Ant1	2472	16.498	2463.7363	2480.2343	2400 to 2483.5	PASS
	Ant2	2472	16.496	2463.7352	2480.2312	2400 to 2483.5	PASS
11N20MIMO	Ant1	2412	17.673	2403.1525	2420.8255	2400 to 2483.5	PASS
	Ant2	2412	17.672	2403.1482	2420.8202	2400 to 2483.5	PASS
	Ant1	2442	17.670	2433.1329	2450.8029	2400 to 2483.5	PASS
	Ant2	2442	17.666	2433.1422	2450.8082	2400 to 2483.5	PASS
	Ant1	2472	17.703	2463.1343	2480.8373	2400 to 2483.5	PASS
	Ant2	2472	17.700	2463.1301	2480.8301	2400 to 2483.5	PASS
11N40MIMO	Ant1	2422	36.094	2403.9181	2440.0121	2400 to 2483.5	PASS
	Ant2	2422	36.120	2403.9105	2440.0305	2400 to 2483.5	PASS
	Ant1	2442	36.119	2423.8695	2459.9885	2400 to 2483.5	PASS
	Ant2	2442	36.103	2423.8966	2459.9996	2400 to 2483.5	PASS
	Ant1	2462	36.161	2443.8739	2480.0349	2400 to 2483.5	PASS
	Ant2	2462	36.133	2443.8781	2480.0111	2400 to 2483.5	PASS

Note: F_L is the lowest frequency of the 99% occupied bandwidth of power envelope.

F_H is the highest frequency of the 99% occupied bandwidth of power envelope.



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WC0NR2201

Test Mode	Antenna	Channel [MHz]	OCB[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	14.686	2404.6416	2419.3276	2400 to 2483.5	PASS
	Ant2	2412	14.628	2404.7010	2419.3290	2400 to 2483.5	PASS
	Ant1	2442	14.655	2434.6064	2449.2614	2400 to 2483.5	PASS
	Ant2	2442	14.616	2434.6561	2449.2721	2400 to 2483.5	PASS
	Ant1	2472	14.650	2464.6705	2479.3205	2400 to 2483.5	PASS
	Ant2	2472	14.596	2464.6733	2479.2693	2400 to 2483.5	PASS
11G	Ant1	2412	16.471	2403.7474	2420.2184	2400 to 2483.5	PASS
	Ant2	2412	16.482	2403.7424	2420.2244	2400 to 2483.5	PASS
	Ant1	2442	16.472	2433.7334	2450.2054	2400 to 2483.5	PASS
	Ant2	2442	16.479	2433.7328	2450.2118	2400 to 2483.5	PASS
	Ant1	2472	16.490	2463.7451	2480.2351	2400 to 2483.5	PASS
	Ant2	2472	16.497	2463.7317	2480.2287	2400 to 2483.5	PASS
11N20MIMO	Ant1	2412	17.663	2403.1643	2420.8273	2400 to 2483.5	PASS
	Ant2	2412	17.661	2403.1758	2420.8368	2400 to 2483.5	PASS
	Ant1	2442	17.672	2433.1481	2450.8201	2400 to 2483.5	PASS
	Ant2	2442	17.662	2433.1535	2450.8155	2400 to 2483.5	PASS
	Ant1	2472	17.697	2463.1581	2480.8551	2400 to 2483.5	PASS
	Ant2	2472	17.696	2463.1473	2480.8433	2400 to 2483.5	PASS
11N40MIMO	Ant1	2422	36.114	2403.9078	2440.0218	2400 to 2483.5	PASS
	Ant2	2422	36.123	2403.9200	2440.0430	2400 to 2483.5	PASS
	Ant1	2442	36.150	2423.8821	2460.0321	2400 to 2483.5	PASS
	Ant2	2442	36.108	2423.8988	2460.0068	2400 to 2483.5	PASS
	Ant1	2462	36.170	2443.8957	2480.0657	2400 to 2483.5	PASS
	Ant2	2462	36.151	2443.8701	2480.0211	2400 to 2483.5	PASS

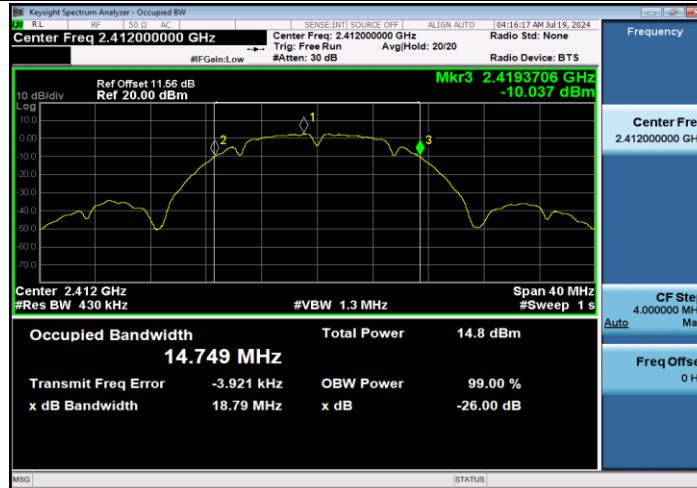
Note: F_L is the lowest frequency of the 99% occupied bandwidth of power envelope.

F_H is the highest frequency of the 99% occupied bandwidth of power envelope.

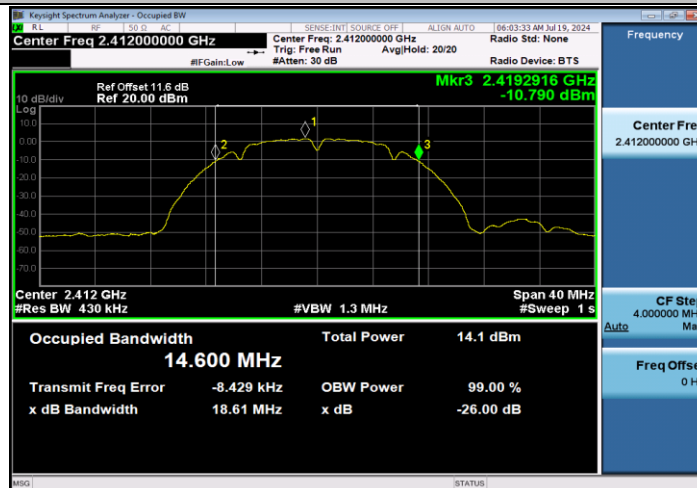
TEST REPORT N°: KSK-ESH-P24071264B-4

3.4.6 Test Graphs
WCT1DR2201D

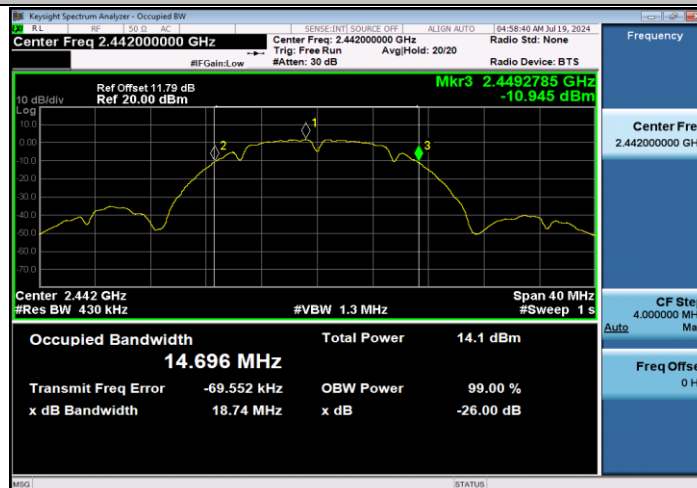
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11B_Ant2_2412



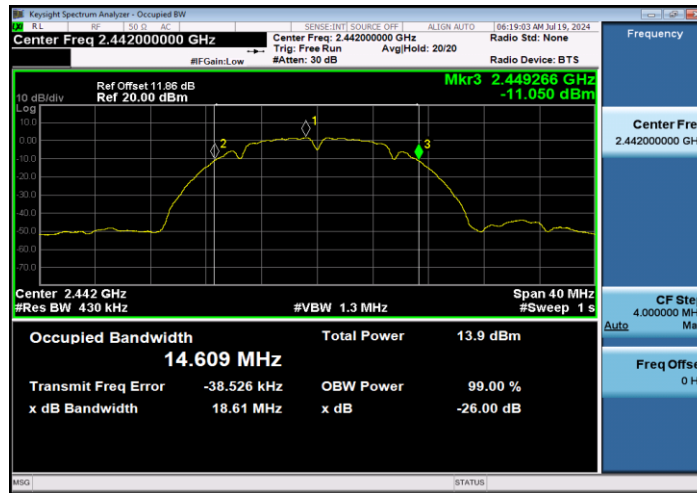
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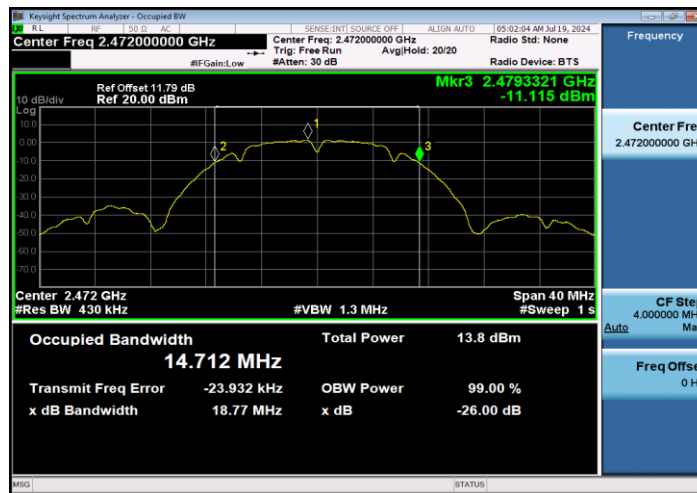


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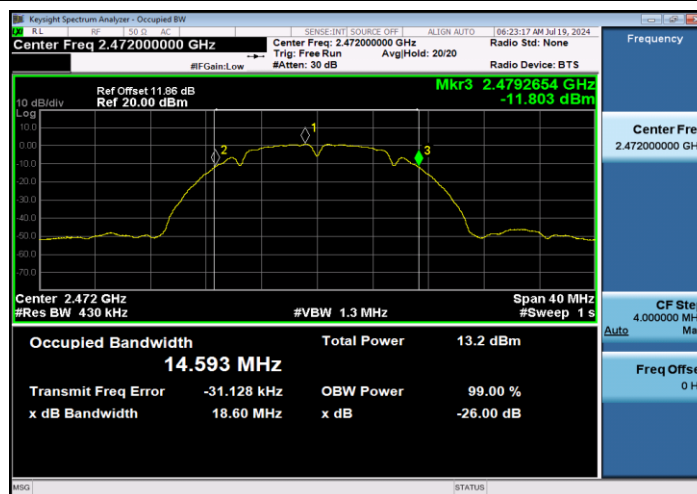
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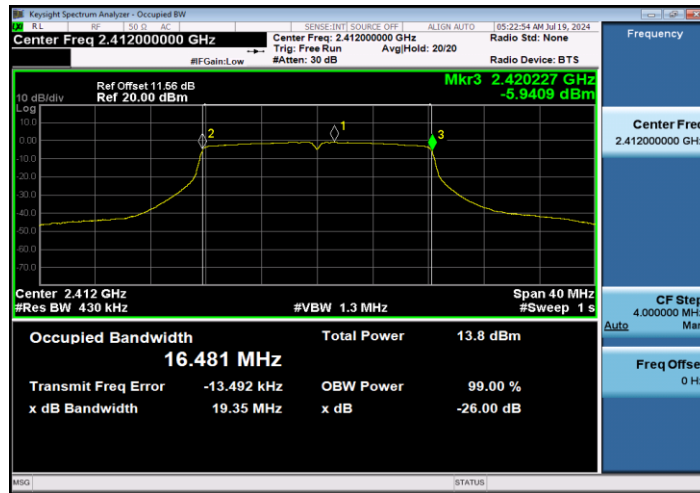


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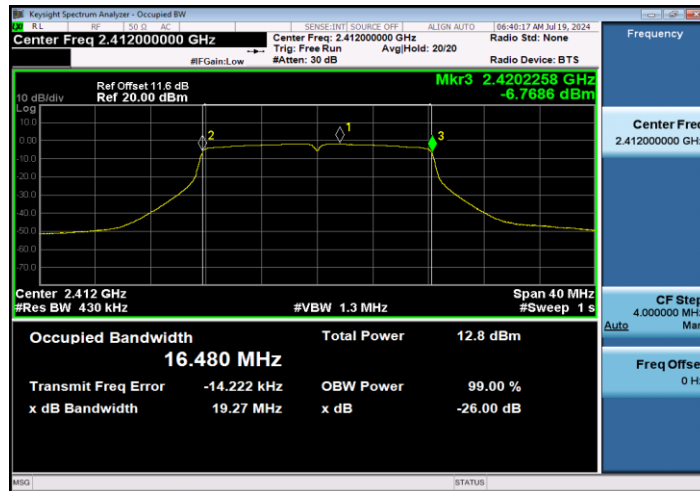


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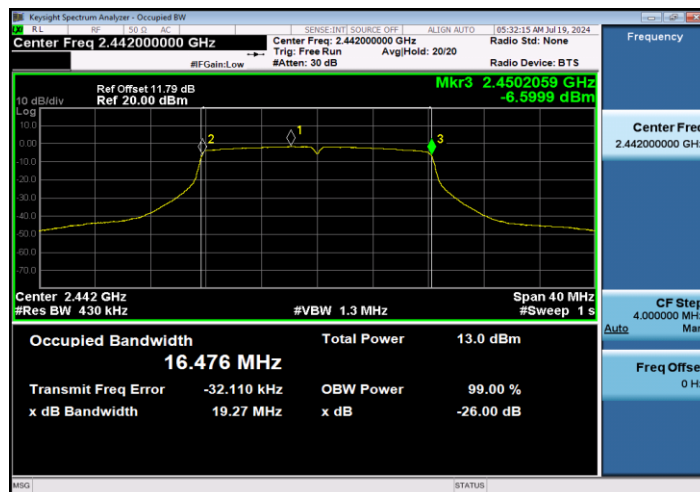
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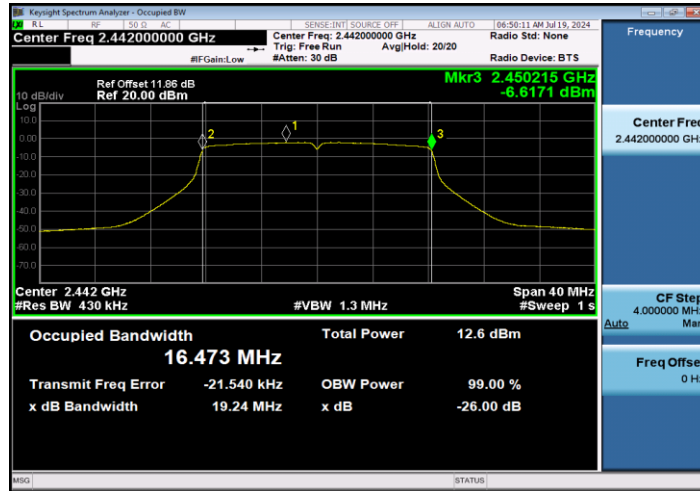
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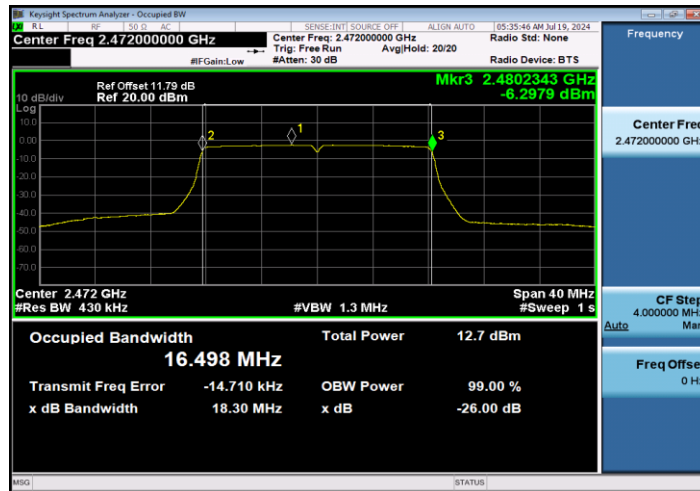


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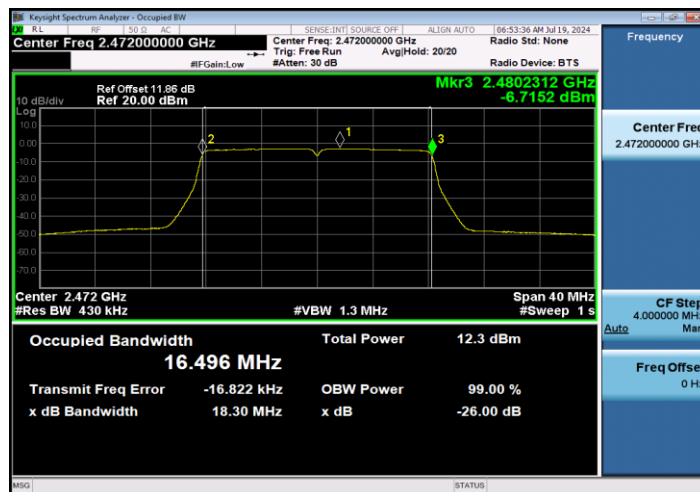
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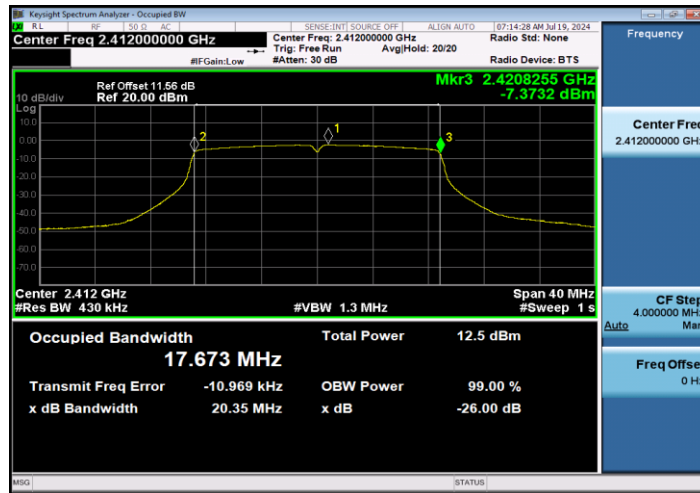


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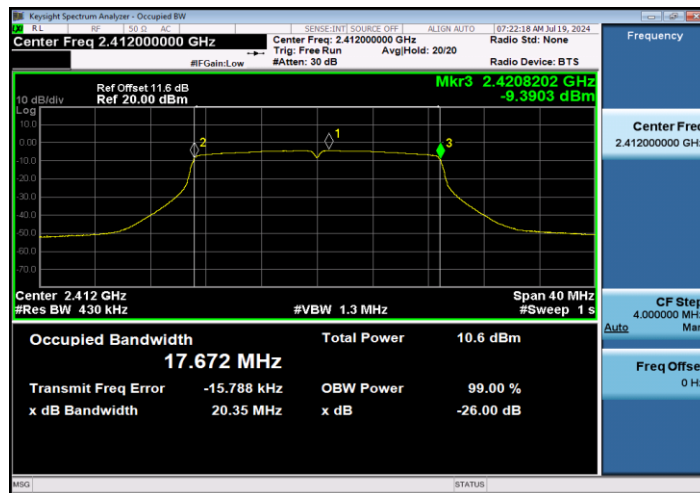


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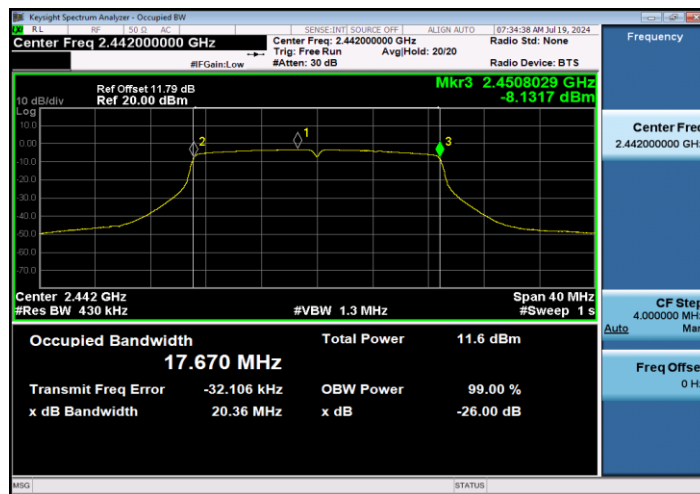
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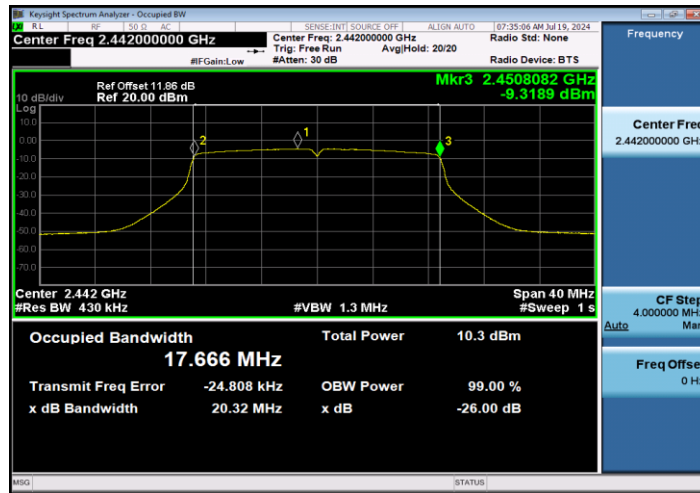


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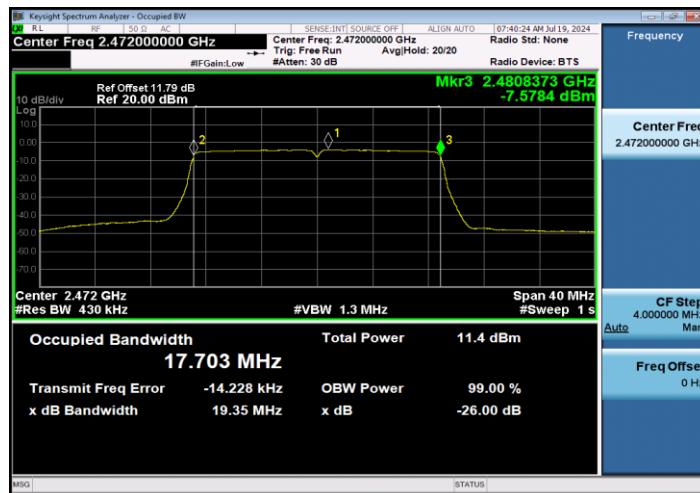


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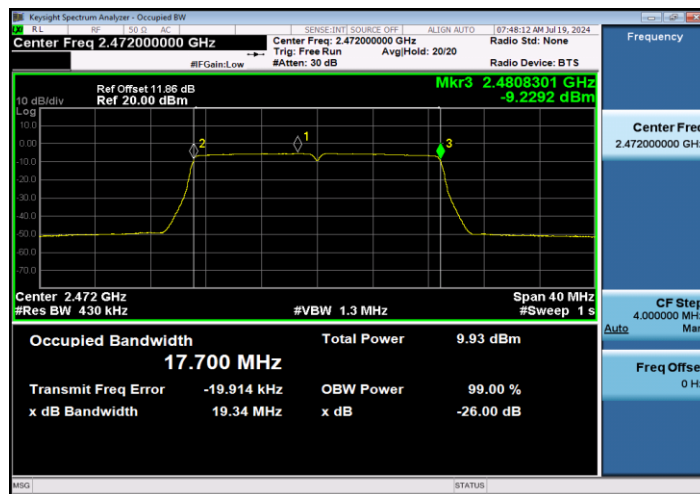
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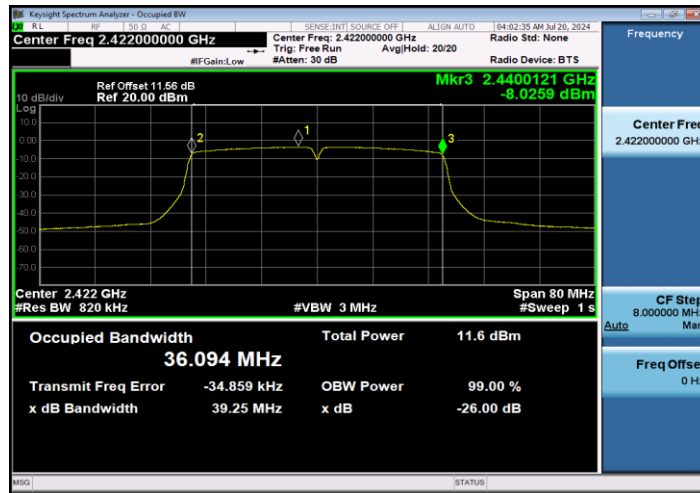


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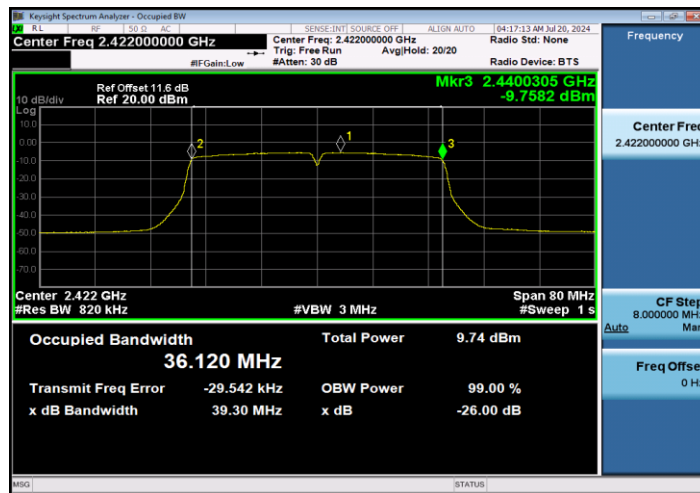


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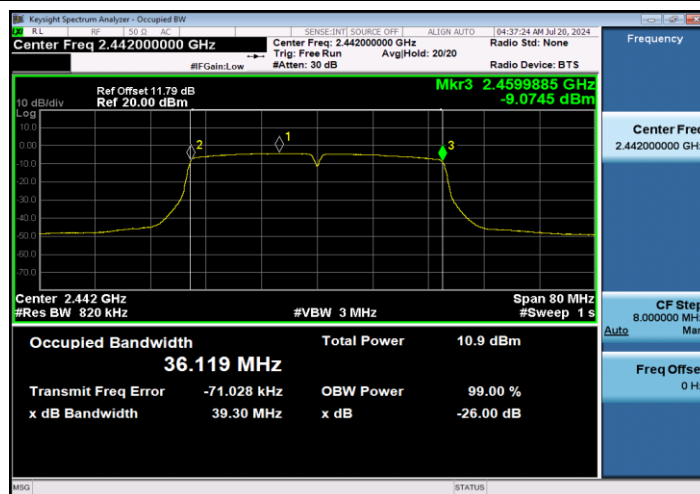
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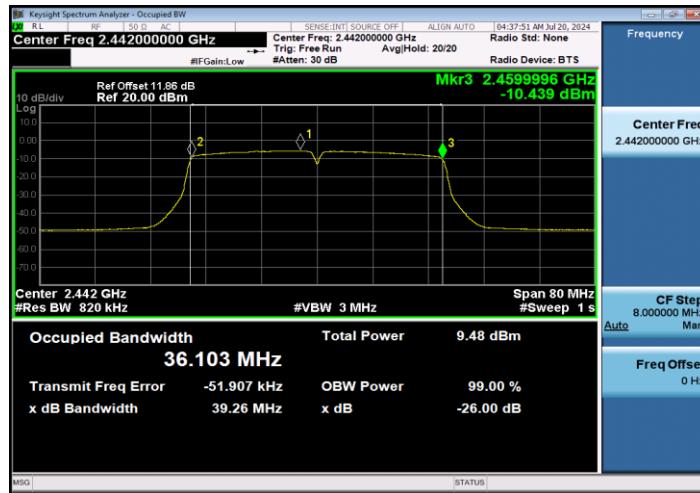


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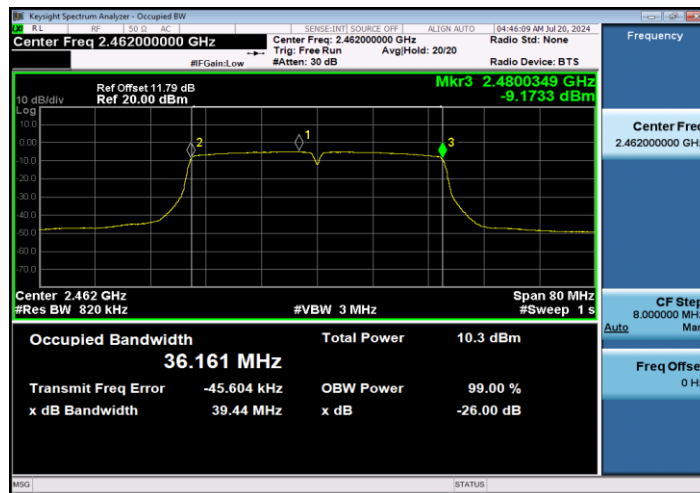


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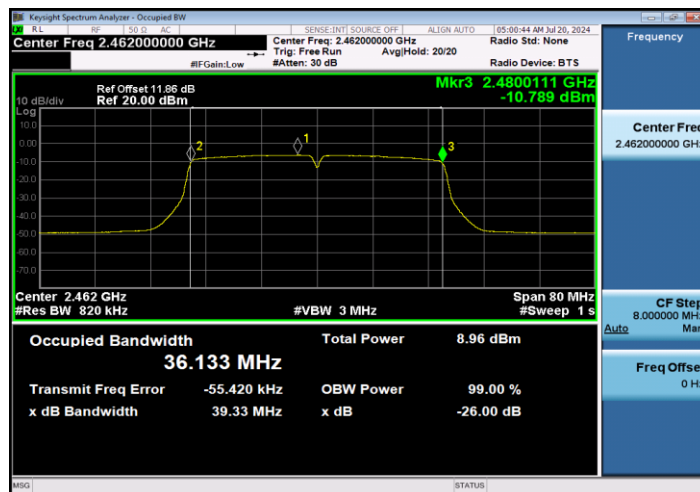
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11N40MIMO_Ant1_2462



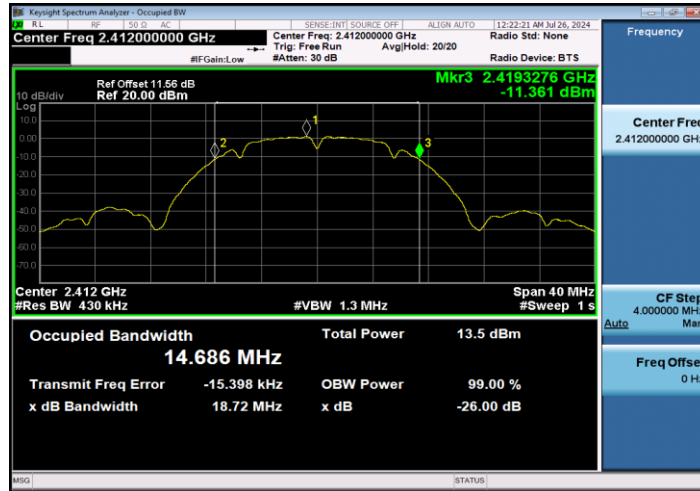
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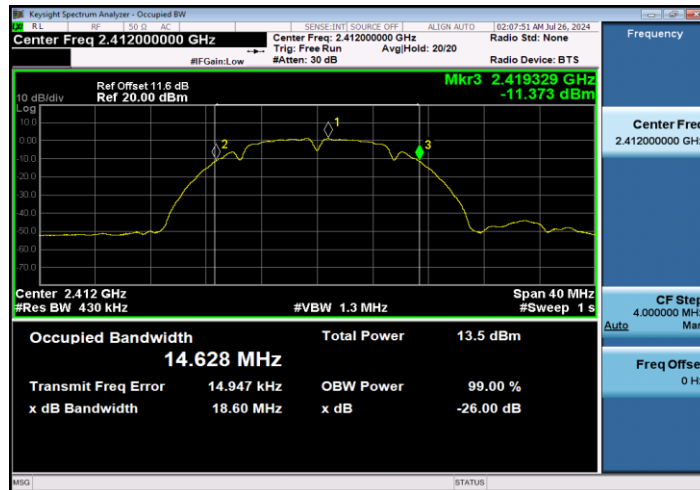
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WC0NR2201

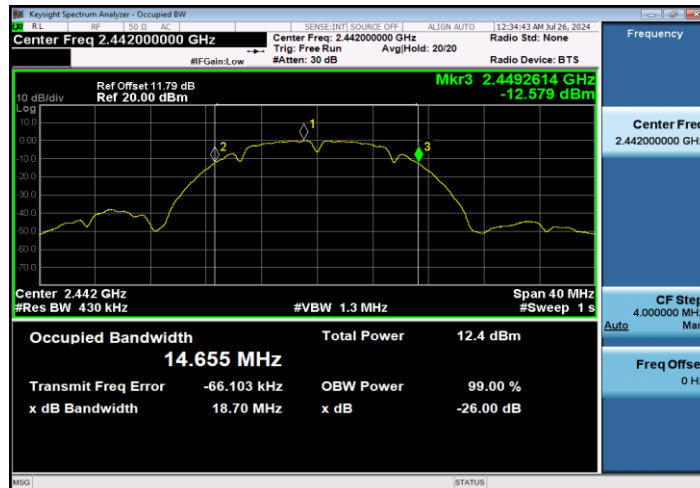
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11B_Ant2_2412



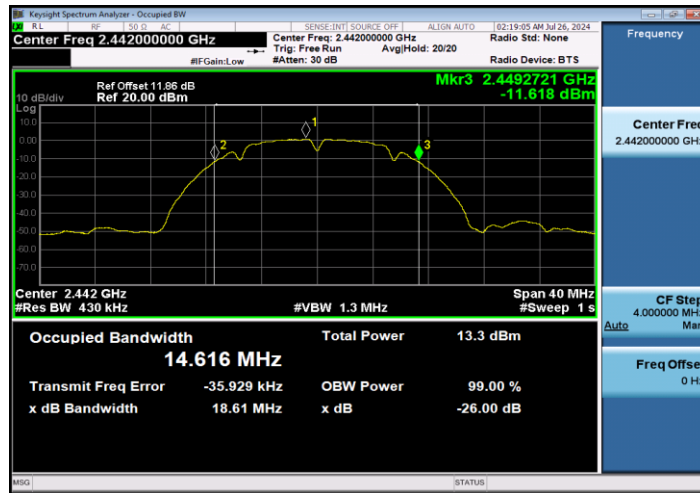
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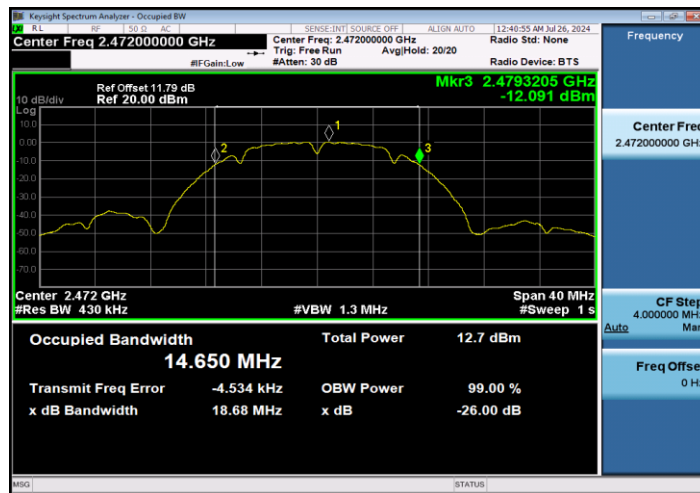


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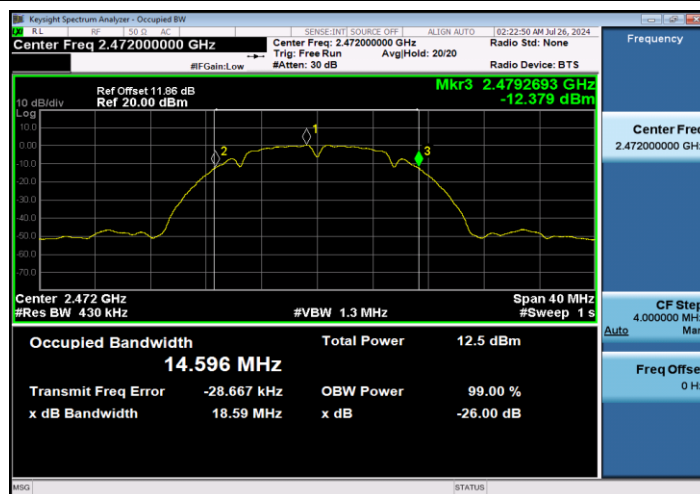
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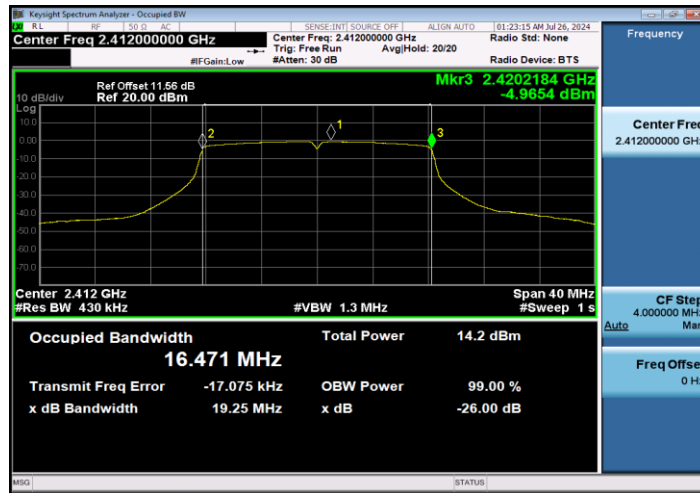


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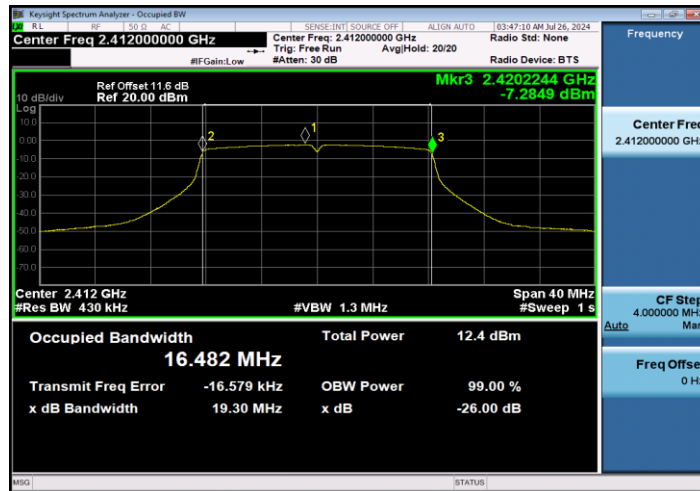


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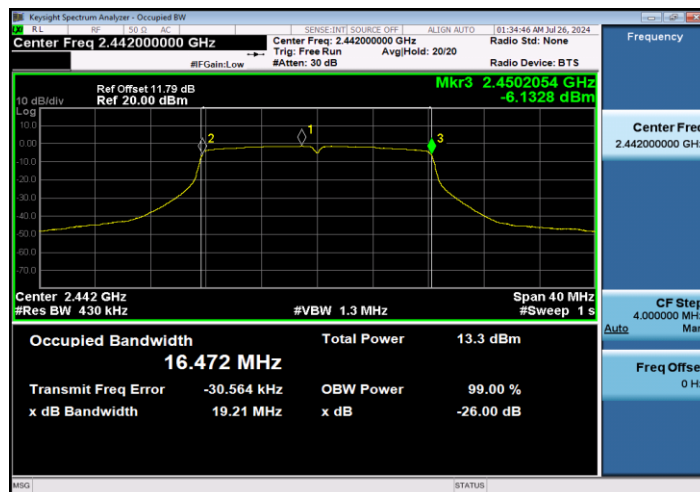
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11G_Ant2_2412

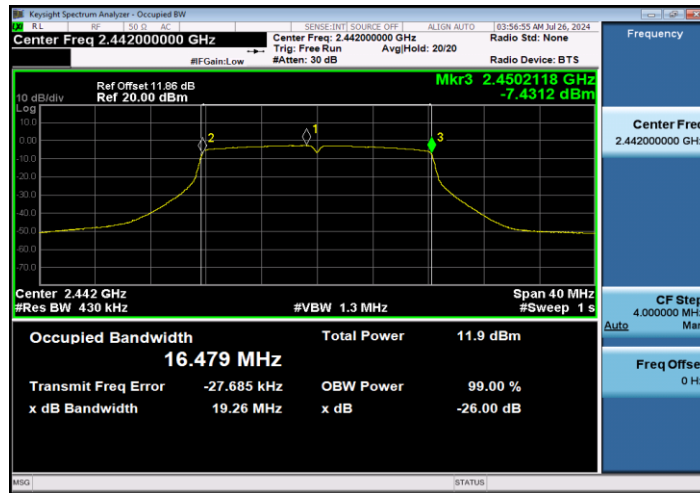


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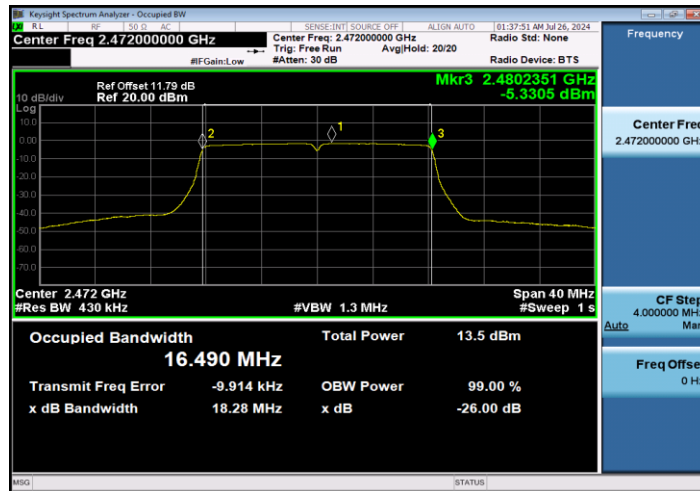


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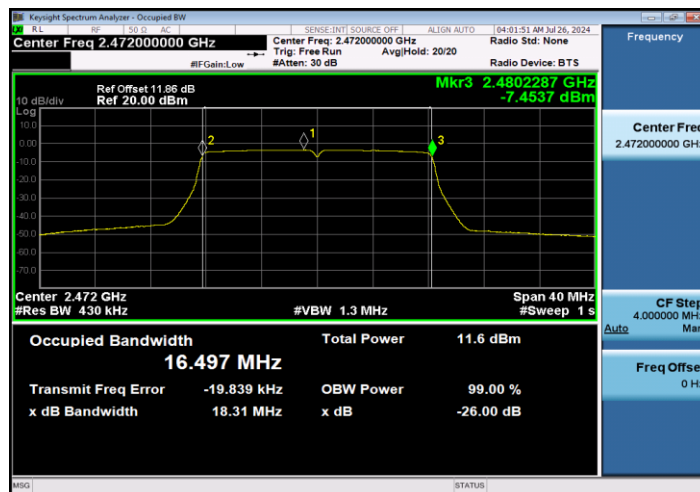
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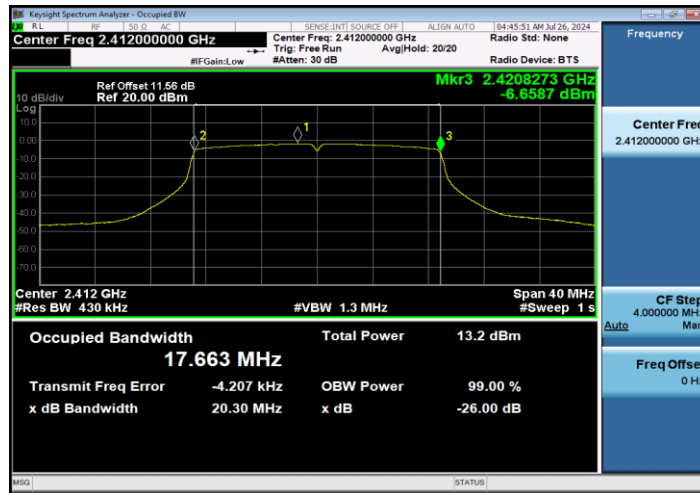
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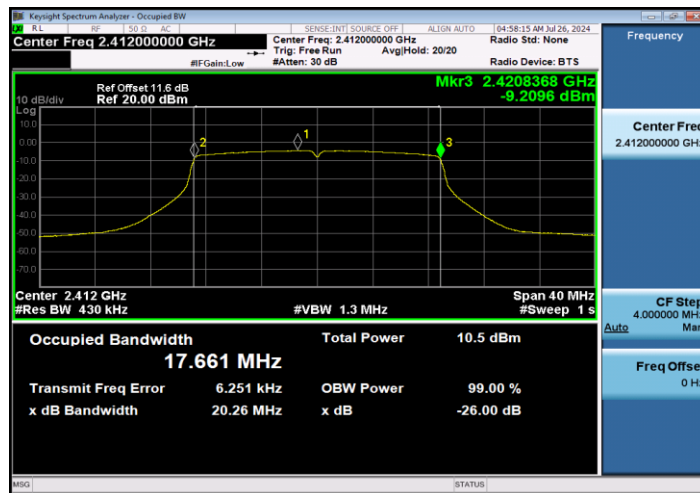


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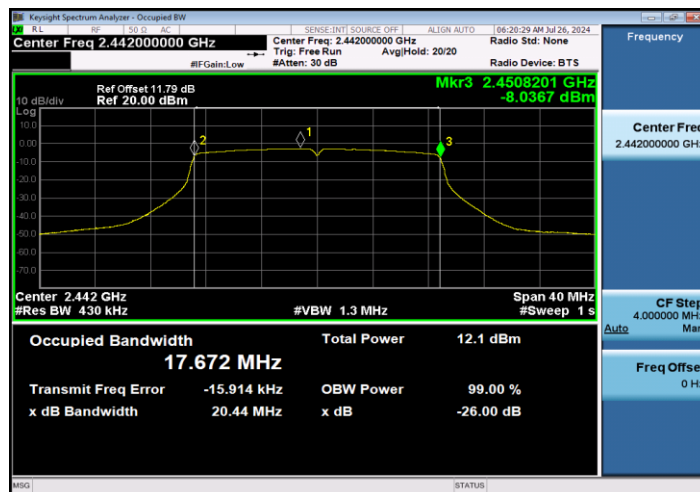
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11N20MIMO_Ant2_2412

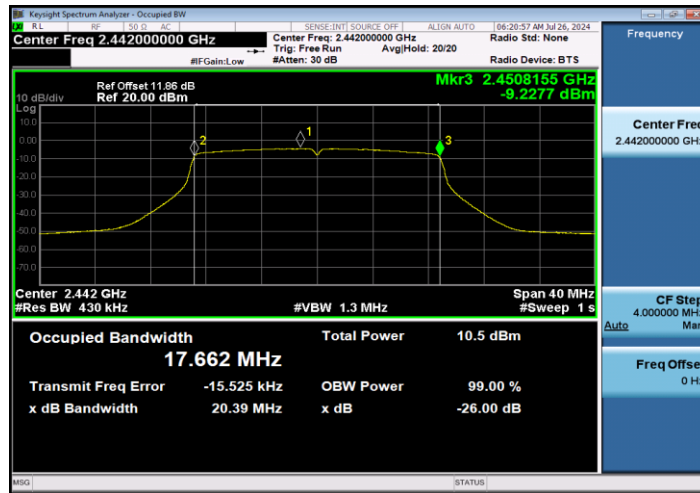


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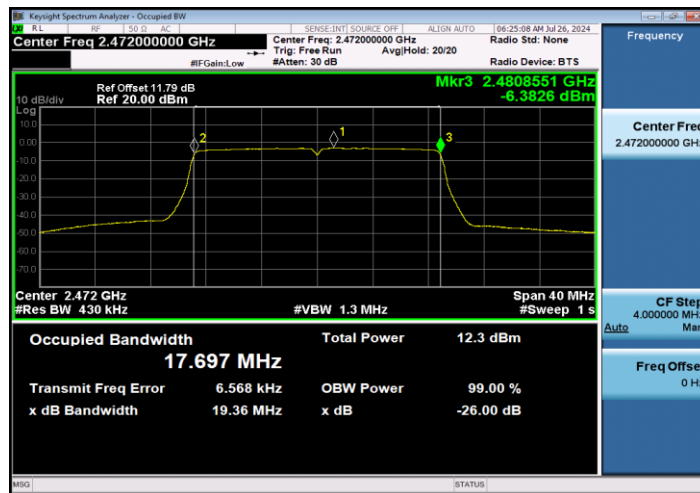


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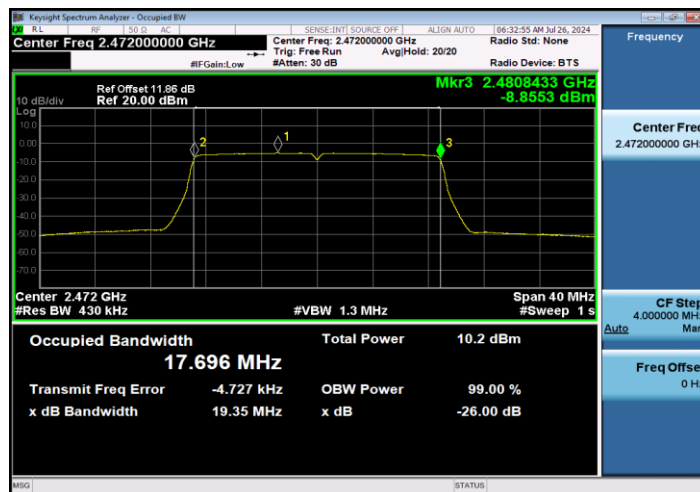
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11N20MIMO_Ant1_2472



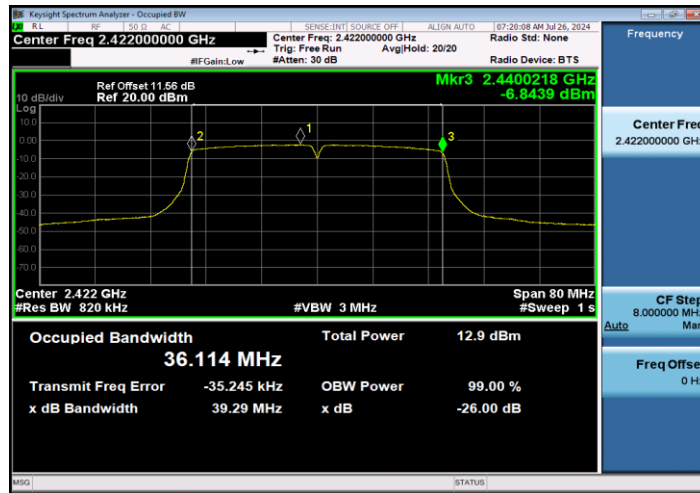
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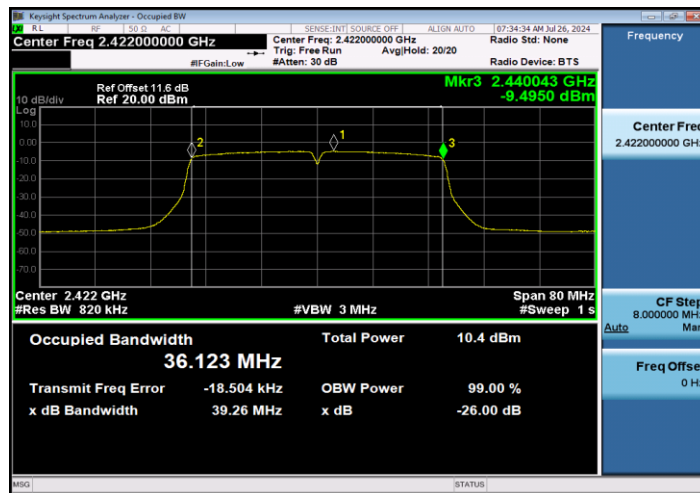


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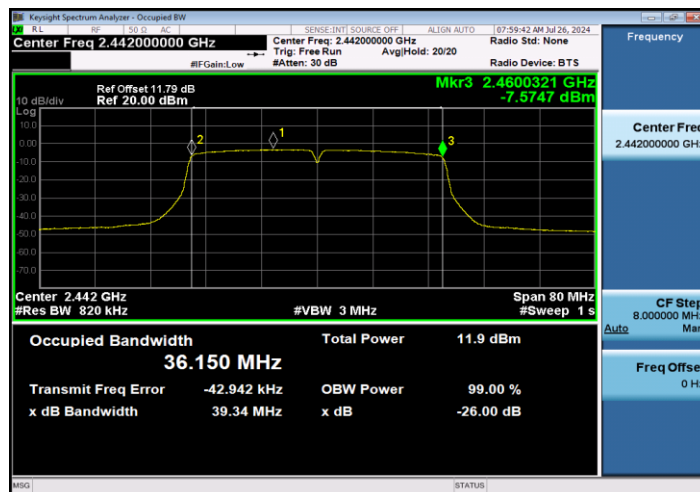
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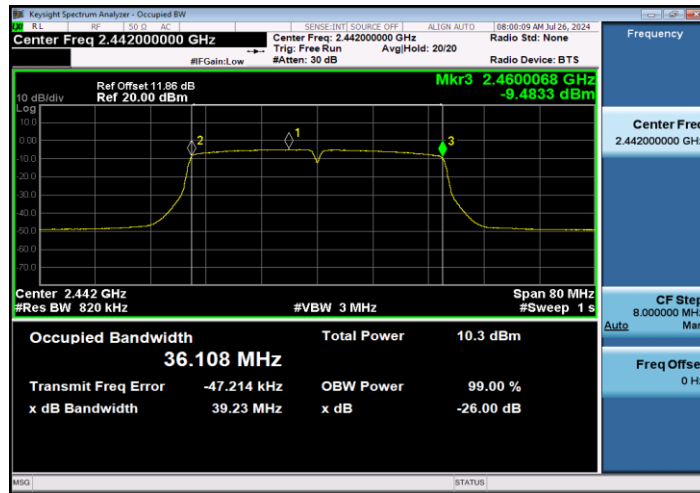
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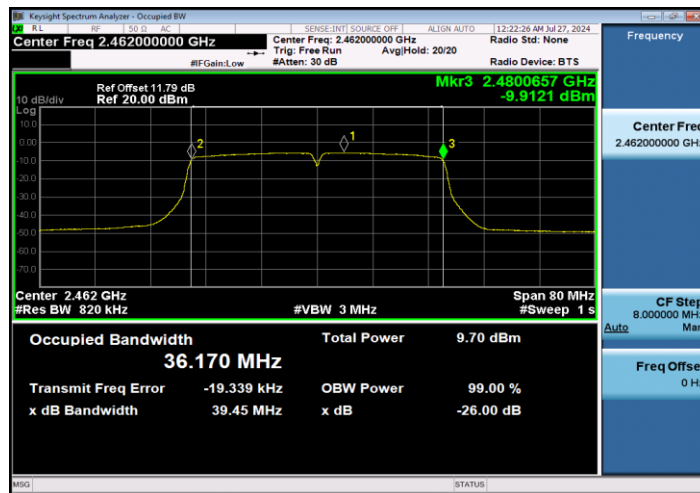


TEST REPORT N°: KSK-ESH-P24071264B-4

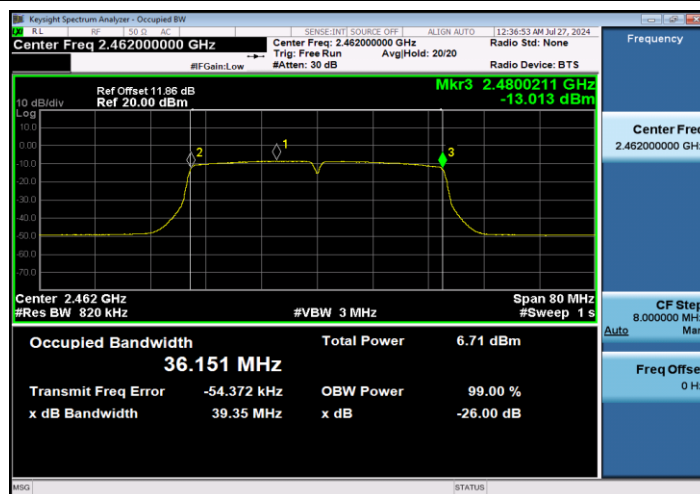
11N40MIMO_Ant2_2442



11N40MIMO_Ant1_2462



11N40MIMO_Ant2_2462

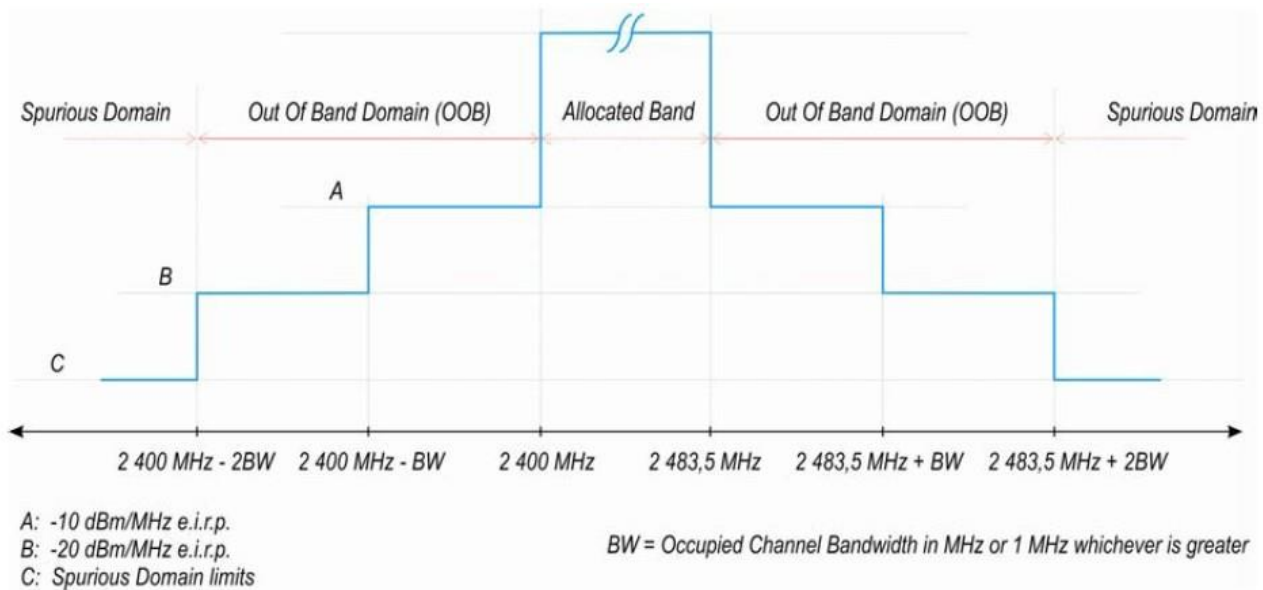


TEST REPORT N°: KSK-ESH-P24071264B-4

3.5 Transmitter Unwanted Emissions in the Out-of-band Domain

3.5.1 Limits of Transmitter Unwanted Emissions in the Out-of-band Domain

Condition	Limit
Under all test conditions	The transmitter unwanted emissions in the out-of-band domain but outside the allocated band, shall not exceed the values provided by the mask in below figure.



3.5.2 Test Procedure

1. Refer to chapter 5.4.8.2 of EN 300 328 V2.2.2.
2. These measurements shall only be performed at normal test conditions.
3. For conducted measurements on devices with multiple transmit chains using the results for each of the transmit chains for the corresponding 1 MHz segments shall be added and compared with the transmit mask limit.
4. These measurements shall only be performed at normal test conditions.
5. For conducted measurements on devices with multiple transmit chains using the results for each of the transmit chains for the corresponding 1 MHz segments shall be added and compared with the transmit mask limit.

Measurement Method	
☒ Conducted measurement	☐ Radiated measurement

3.5.3 Deviation from Test Standard

No deviation



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3.5.4 Test Setup

The measurements were performed at normal environmental conditions and shall be repeated at the extremes of the operating temperature. The measurement was performed at the lowest and the highest channel on which the equipment can operate. The equipment was configured to operate under its worst case situation with respect to output power. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator. The frequency has to be recorded for the right and left end above threshold of highest and lowest channel respectively.



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3.5.5 Test Results
WCT1DR2201D

Test Mode	Antenna	Channel [MHz]	Freq [MHz]	Result [dBm/MHz]	Limit [dBm/MHz]	Verdict
11B	Ant1	2412	2384.75	-49.19	-20.00	PASS
			2397.5	-28.92	-10.00	PASS
			2492	-50.91	-10.00	PASS
			2498.75	-52.39	-20.00	PASS
	Ant2	2412	2383.9	-50.38	-20.00	PASS
			2399.5	-42.25	-10.00	PASS
			2489	-51.75	-10.00	PASS
			2510.6	-52.21	-20.00	PASS
	Ant1	2472	2384.79	-52.65	-20.00	PASS
			2391.5	-51.27	-10.00	PASS
			2487	-33.82	-10.00	PASS
			2498.71	-49.07	-20.00	PASS
	Ant2	2472	2378.91	-52.3	-20.00	PASS
			2399.5	-51.12	-10.00	PASS
			2486	-39.99	-10.00	PASS
			2499.59	-50.6	-20.00	PASS
11G	Ant1	2412	2383.02	-46.57	-20.00	PASS
			2399.5	-27.8	-10.00	PASS
			2492	-50.99	-10.00	PASS
			2500.48	-51.99	-20.00	PASS
	Ant2	2412	2383.02	-49.52	-20.00	PASS
			2399.5	-31.01	-10.00	PASS
			2485	-51.53	-10.00	PASS
			2511.48	-51.91	-20.00	PASS
	Ant1	2472	2383	-52.3	-20.00	PASS
			2399.5	-51.18	-10.00	PASS
			2484	-32.76	-10.00	PASS
			2500.5	-48.41	-20.00	PASS
	Ant2	2472	2382	-51.84	-20.00	PASS
			2399.5	-50.55	-10.00	PASS
			2485	-39.92	-10.00	PASS
			2500.5	-50.09	-20.00	PASS
11N20MIMO	Ant1	2412	2381.83	-48.74	-23.01	PASS
			2399.5	-28.96	-13.01	PASS
			2492	-51.25	-13.01	PASS
			2518.35	-52.17	-23.01	PASS



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	Ant2	2412	2381.83	-50.74	-23.01	PASS
			2399.5	-31	-13.01	PASS
			2485	-51.89	-13.01	PASS
			2512.67	-52.14	-23.01	PASS
	Ant1	2472	2375.8	-52.45	-23.01	PASS
			2391.5	-51.08	-13.01	PASS
			2484	-34.24	-13.01	PASS
			2501.7	-49.77	-23.01	PASS
	Ant2	2472	2381.8	-52.17	-23.01	PASS
			2399.5	-51.29	-13.01	PASS
			2484	-43.56	-13.01	PASS
			2501.7	-51.15	-23.01	PASS
11N40MIMO	Ant1	2422	2363.41	-49.67	-23.01	PASS
			2399.5	-34.65	-13.01	PASS
			2485	-50.3	-13.01	PASS
			2555.19	-51.54	-23.01	PASS
	Ant2	2422	2363.38	-50.97	-23.01	PASS
			2399.5	-36.61	-13.01	PASS
			2485	-51.15	-13.01	PASS
			2520.12	-51.85	-23.01	PASS
	Ant1	2462	2360.34	-51.88	-23.01	PASS
			2399.5	-50.25	-13.01	PASS
			2484	-33.64	-13.01	PASS
			2542.16	-49.1	-23.01	PASS
	Ant2	2462	2363.37	-51.9	-23.01	PASS
			2399.5	-50.56	-13.01	PASS
			2484	-35.78	-13.01	PASS
			2520.13	-51.38	-23.01	PASS



TEST REPORT N°: KSK-ESH-P24071264B-4

WC0NR2201

Test Mode	Antenna	Channel [MHz]	Freq [MHz]	Result [dBm/MHz]	Limit [dBm/MHz]	Verdict
11B	Ant1	2412	2384.81	-50.33	-20.00	PASS
			2397.5	-32.34	-10.00	PASS
			2493	-50.77	-10.00	PASS
			2498.69	-52.25	-20.00	PASS
	Ant2	2412	2384.87	-50.07	-20.00	PASS
			2399.5	-43.04	-10.00	PASS
			2489	-52.08	-10.00	PASS
			2507.63	-52.33	-20.00	PASS
	Ant1	2472	2384.85	-52.42	-20.00	PASS
			2392.5	-49.86	-10.00	PASS
			2487	-36.98	-10.00	PASS
			2498.65	-50.22	-20.00	PASS
	Ant2	2472	2380.9	-52.42	-20.00	PASS
			2399.5	-50.78	-10.00	PASS
			2487	-40.41	-10.00	PASS
			2498.6	-50.99	-20.00	PASS
11G	Ant1	2412	2383.03	-44.96	-20.00	PASS
			2399.5	-28.38	-10.00	PASS
			2492	-49.55	-10.00	PASS
			2500.47	-50.99	-20.00	PASS
	Ant2	2412	2383.02	-48.42	-20.00	PASS
			2399.5	-30.69	-10.00	PASS
			2484	-51.33	-10.00	PASS
			2513.48	-51.67	-20.00	PASS
	Ant1	2472	2383.01	-51.45	-20.00	PASS
			2399.5	-48.33	-10.00	PASS
			2484	-31.9	-10.00	PASS
			2500.49	-45.75	-20.00	PASS
	Ant2	2472	2379	-51.44	-20.00	PASS
			2399.5	-48.88	-10.00	PASS
			2484	-39.08	-10.00	PASS
			2500.5	-49.8	-20.00	PASS
11N20MIMO	Ant1	2412	2381.84	-46.98	-23.01	PASS
			2399.5	-28.74	-13.01	PASS
			2492	-50.26	-13.01	PASS
			2517.66	-51.58	-23.01	PASS



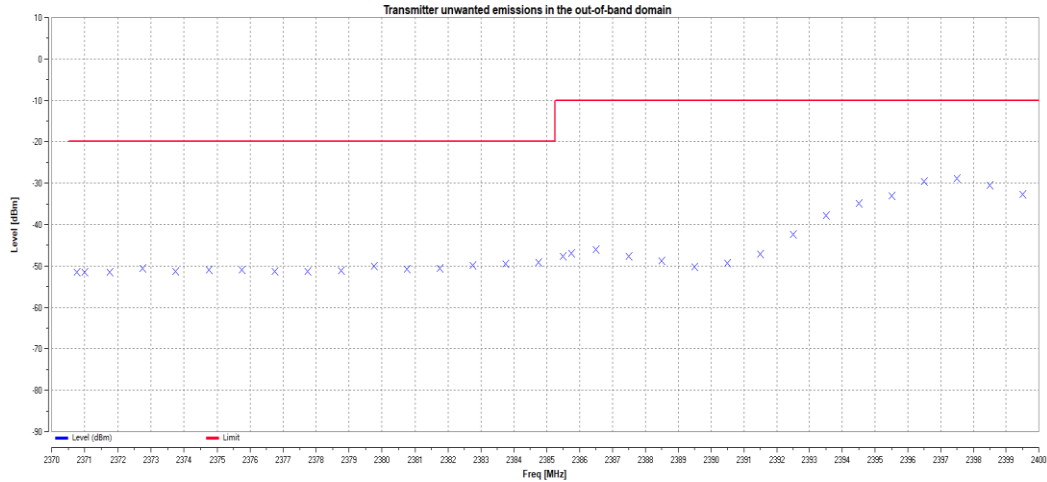
TEST REPORT N°: KSK-ESH-P24071264B-4

	Ant2	2412	2381.84	-50.24	-23.01	PASS
			2399.5	-31.1	-13.01	PASS
			2484	-51.75	-13.01	PASS
			2518.66	-52	-23.01	PASS
	Ant1	2472	2367.8	-51.77	-23.01	PASS
			2399.5	-48.9	-13.01	PASS
			2487	-34.9	-13.01	PASS
			2501.7	-47.31	-23.01	PASS
	Ant2	2472	2381.8	-51.8	-23.01	PASS
			2399.5	-50.38	-13.01	PASS
			2484	-41.5	-13.01	PASS
			2501.7	-50.66	-23.01	PASS
11N40MIMO	Ant1	2422	2360.39	-47.29	-23.01	PASS
			2399.5	-31.8	-13.01	PASS
			2484	-48.51	-13.01	PASS
			2520.11	-50.7	-23.01	PASS
	Ant2	2422	2340.38	-49.93	-23.01	PASS
			2399.5	-35.2	-13.01	PASS
			2486	-50.06	-13.01	PASS
			2521.12	-51.72	-23.01	PASS
	Ant1	2462	2362.33	-51.92	-23.01	PASS
			2399.5	-49.99	-13.01	PASS
			2484	-33.7	-13.01	PASS
			2520.17	-51	-23.01	PASS
	Ant2	2462	2363.35	-52.28	-23.01	PASS
			2399.5	-50.49	-13.01	PASS
			2484	-37.38	-13.01	PASS
			2526.15	-51.68	-23.01	PASS

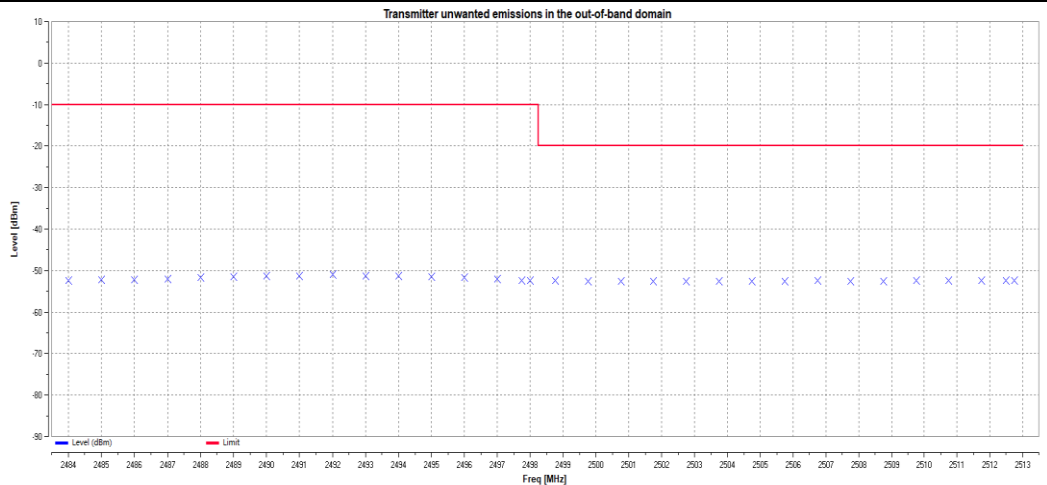
TEST REPORT N°: KSK-ESH-P24071264B-4

3.5.6 Test Graphs
WCT1DR2201D

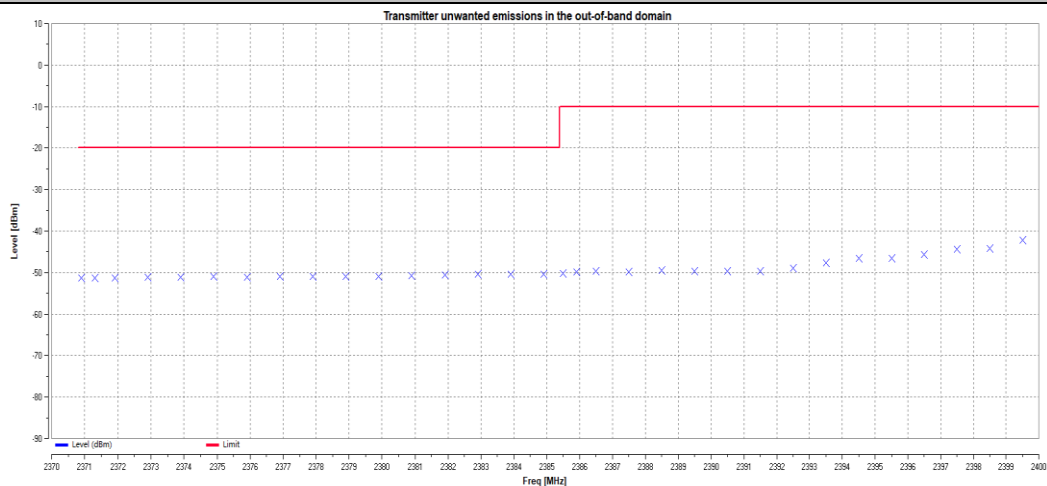
11B_Ant1_2412_2400MHz-2BW to 2400MHz



11B_Ant1_2412_2483.5MHz to 2483.5MHz+2BW

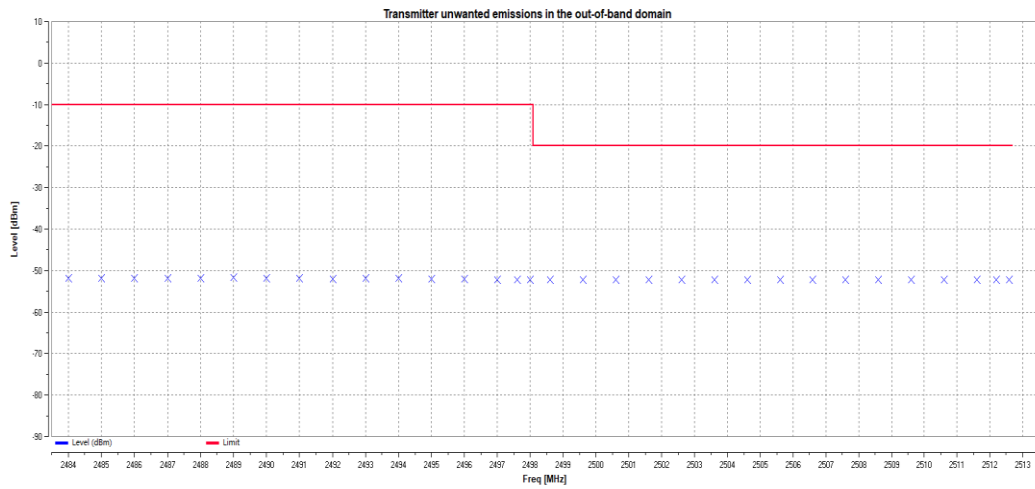


11B_Ant2_2412_2400MHz-2BW to 2400MHz

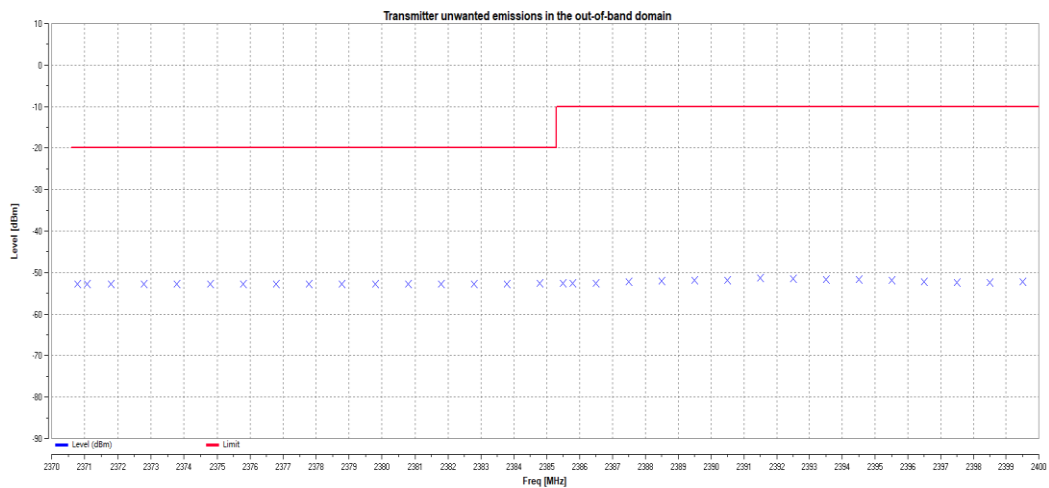


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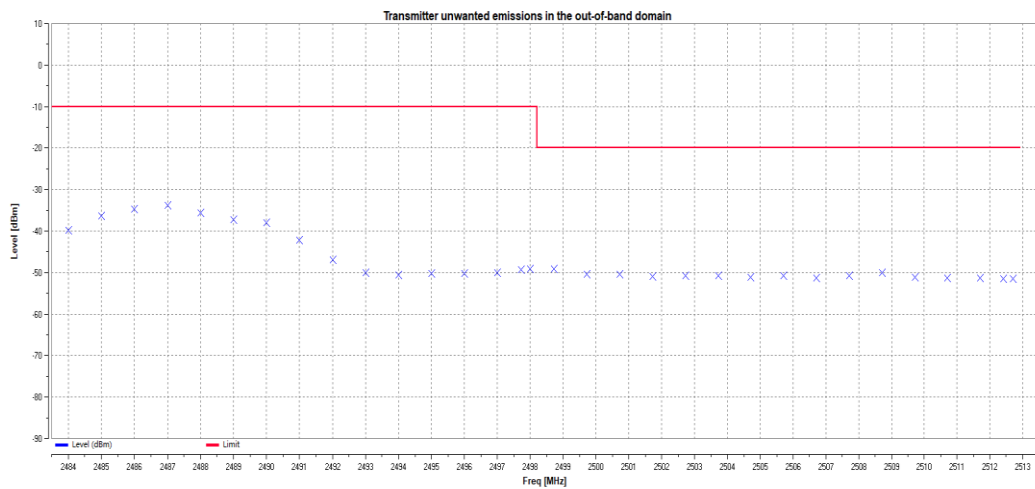
11B_Ant2_2412_2483.5MHz to 2483.5MHz+2BW



11B_Ant1_2472_2400MHz-2BW to 2400MHz

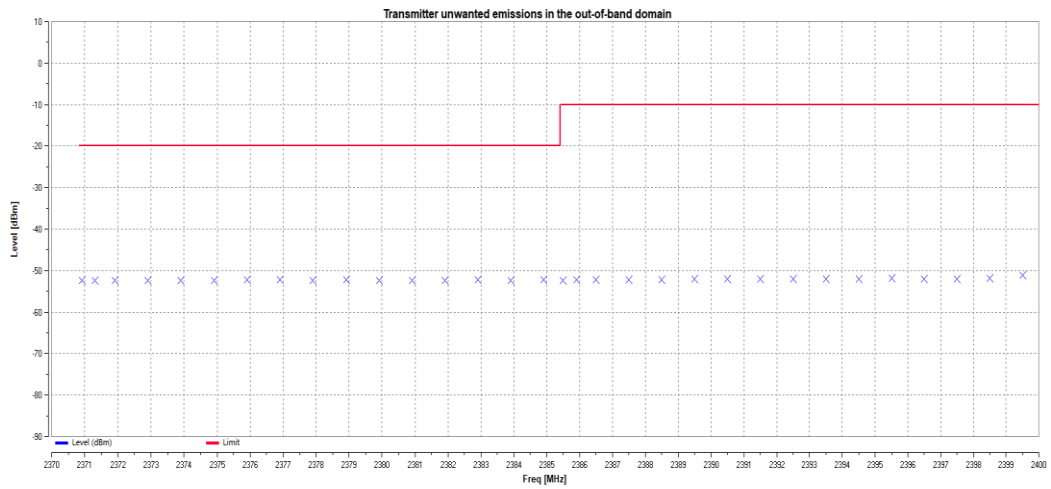


11B_Ant1_2472_2483.5MHz to 2483.5MHz+2BW

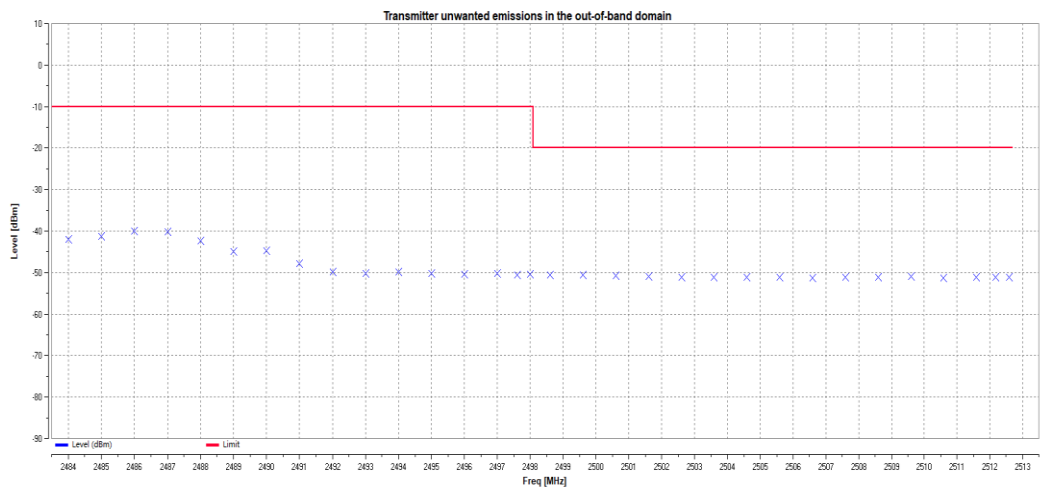


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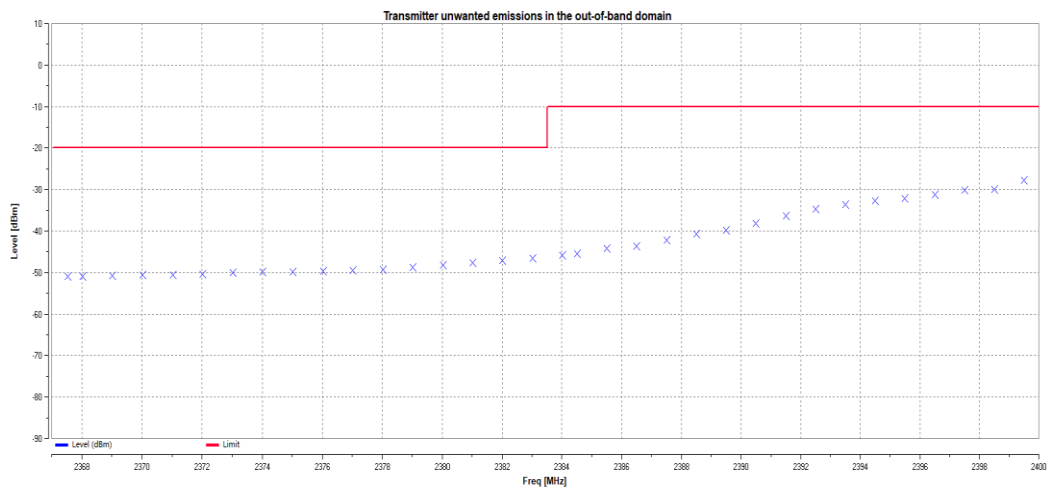
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11B_Ant2_2472_2483.5MHz to 2483.5MHz+2BW

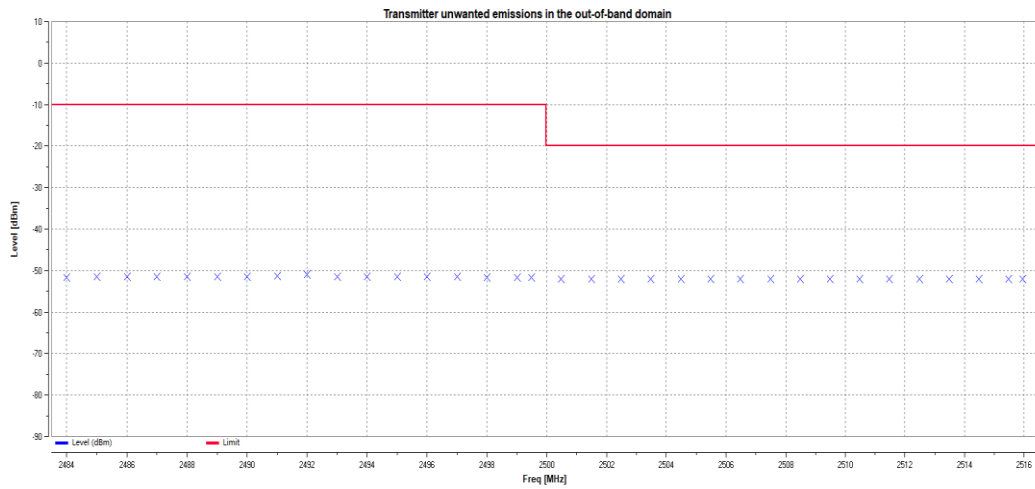


11G_Ant1_2412_2400MHz-2BW to 2400MHz

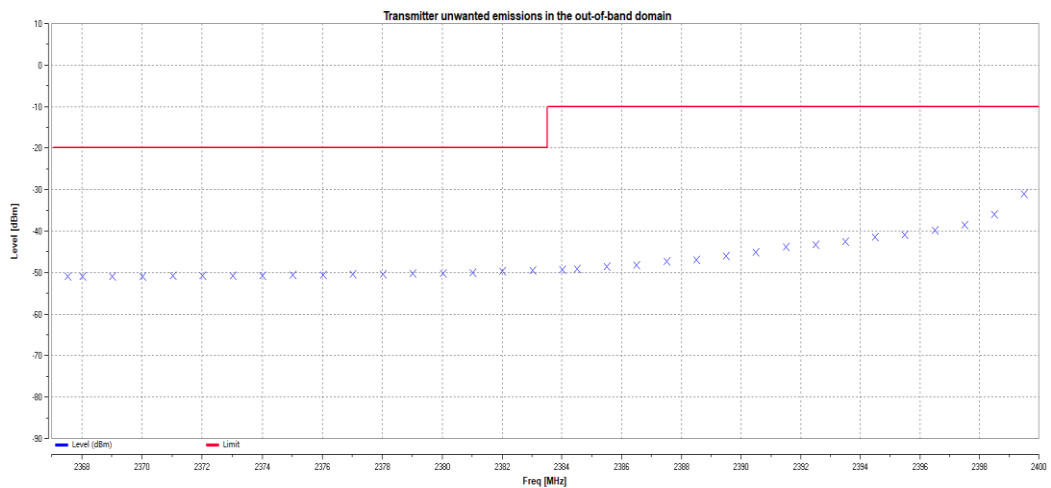


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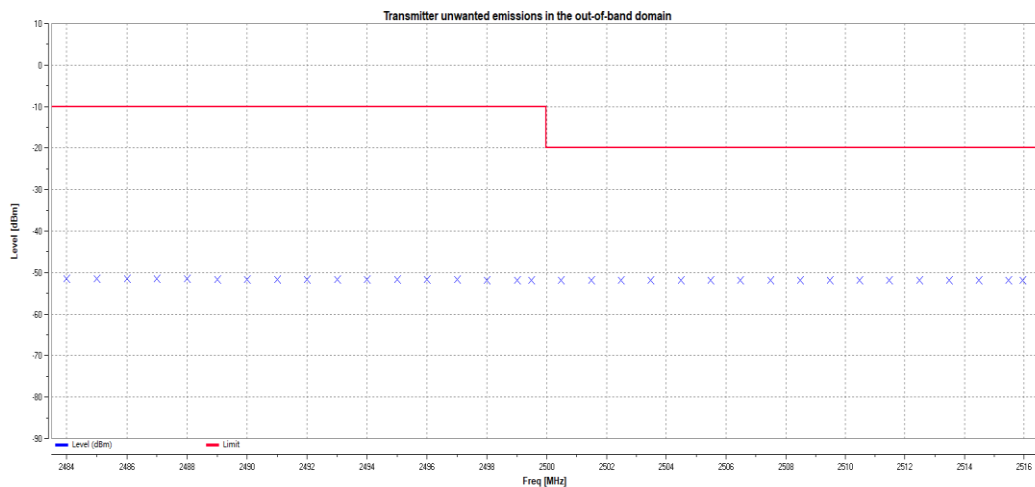
11G_Ant1_2412_2483.5MHz to 2483.5MHz+2BW



11G_Ant2_2412_2400MHz-2BW to 2400MHz

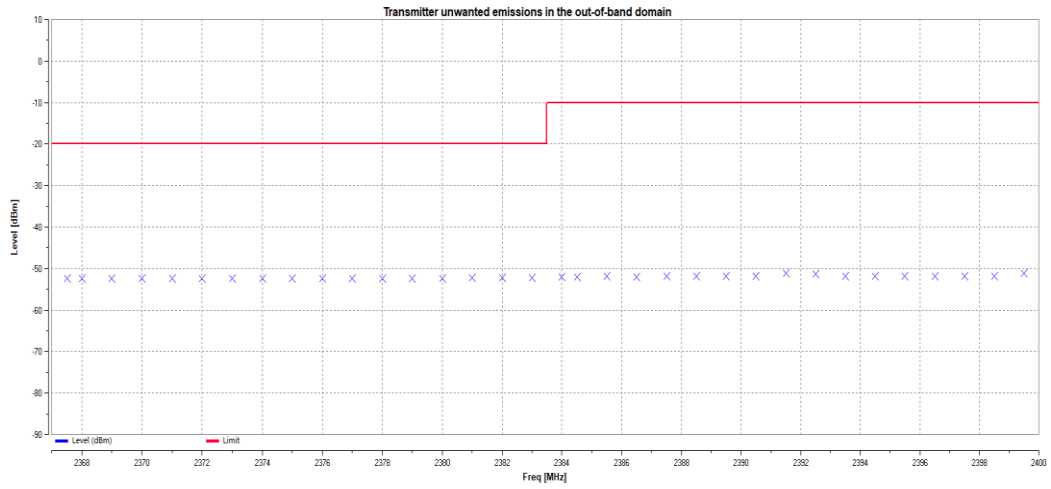


11G_Ant2_2412_2483.5MHz to 2483.5MHz+2BW

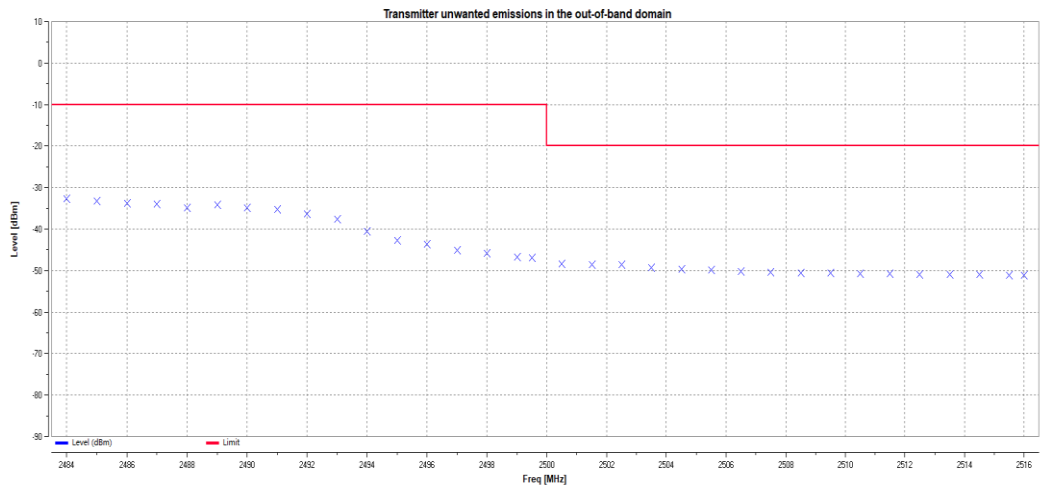


TEST REPORT N°: KSK-ESH-P24071264B-4

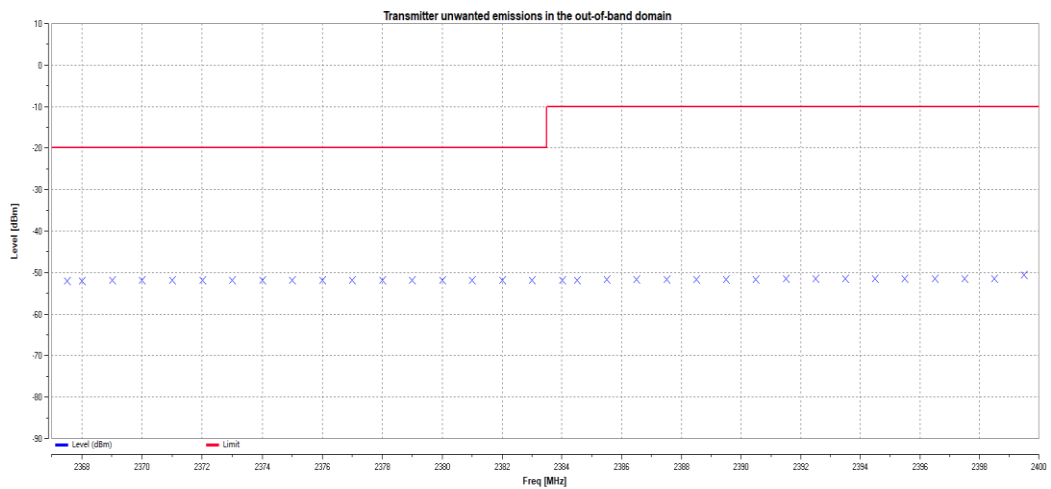
11G_Ant1_2472_2400MHz-2BW to 2400MHz



11G_Ant1_2472_2483.5MHz to 2483.5MHz+2BW

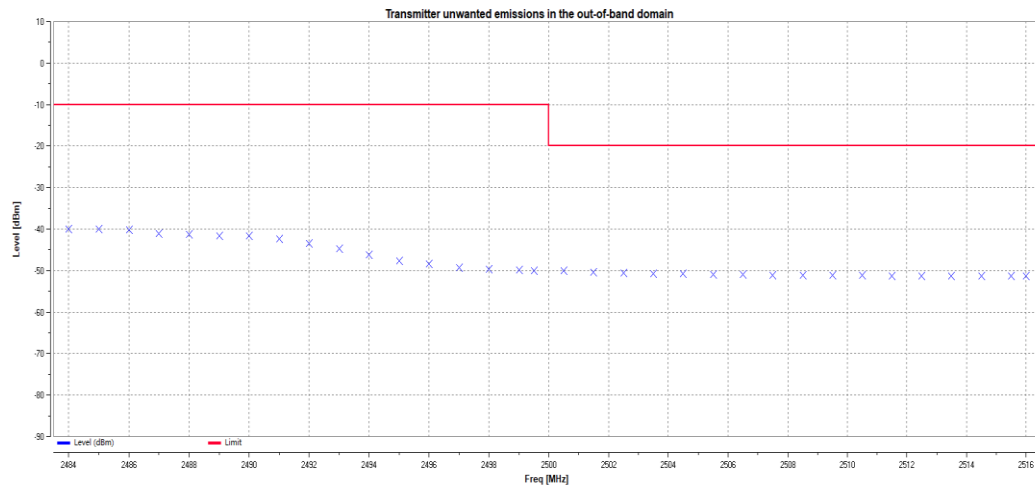


11G_Ant2_2472_2400MHz-2BW to 2400MHz

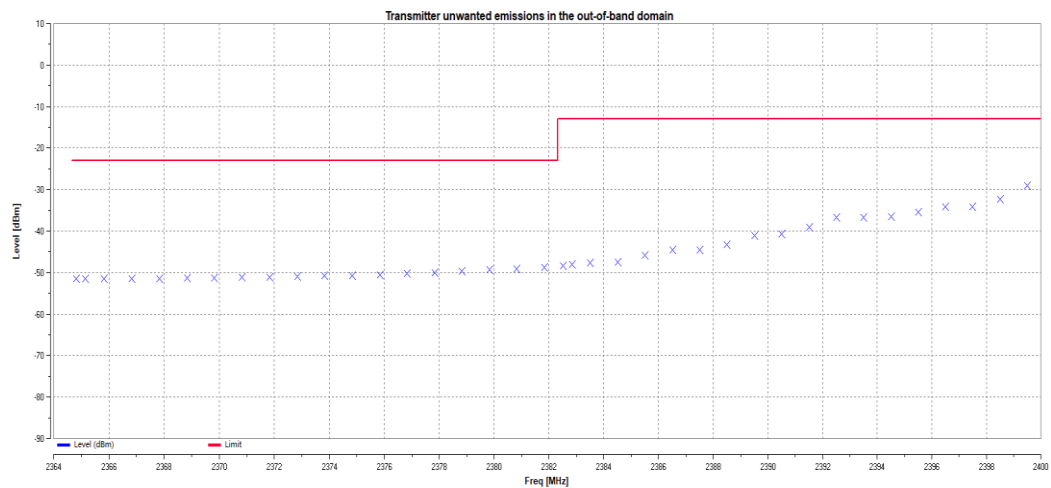


TEST REPORT N°: KSK-ESH-P24071264B-4

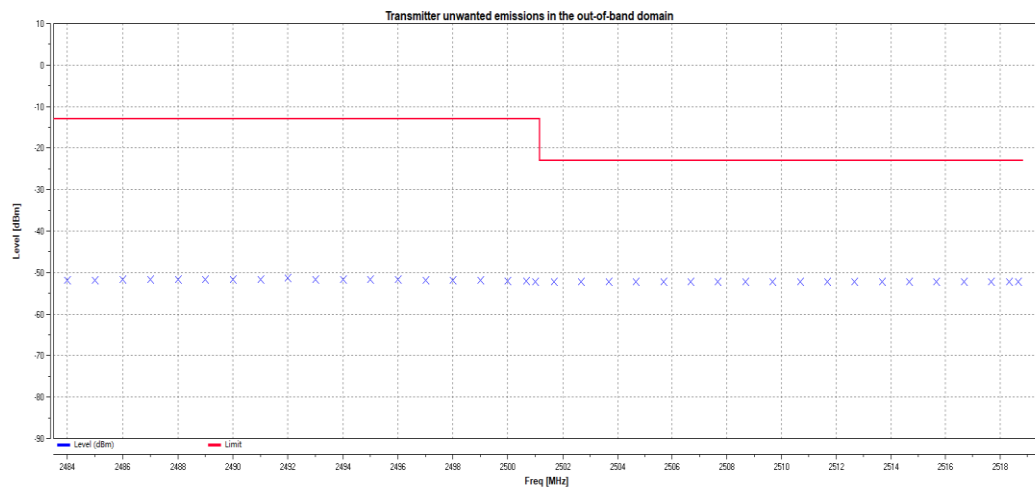
11G_Ant2_2472_2483.5MHz to 2483.5MHz+2BW



11N20MIMO_Ant1_2412_2400MHz-2BW to 2400MHz

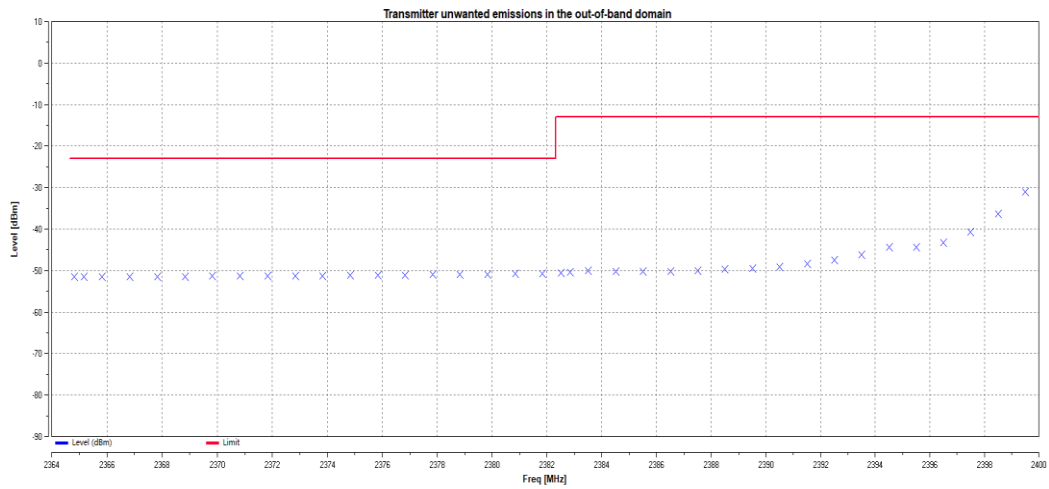


11N20MIMO_Ant1_2412_2483.5MHz to 2483.5MHz+2BW

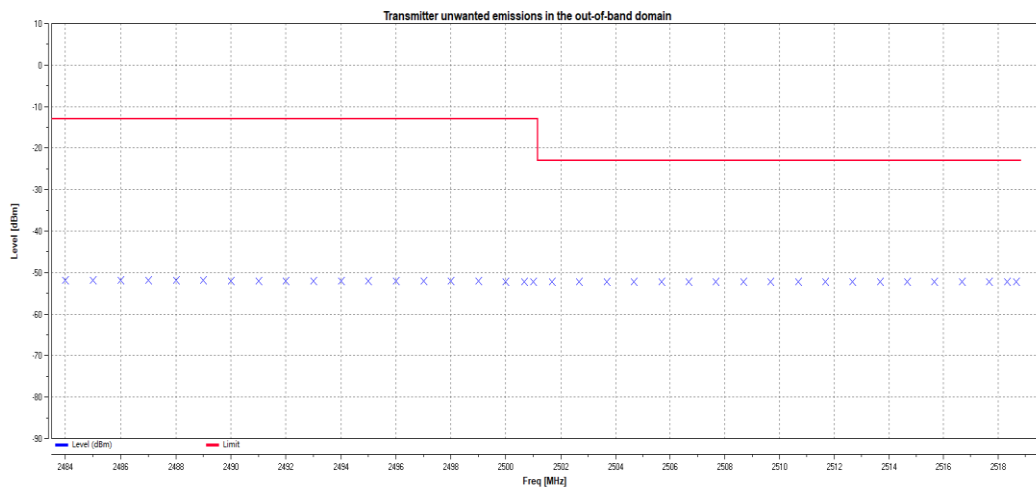


TEST REPORT N°: KSK-ESH-P24071264B-4

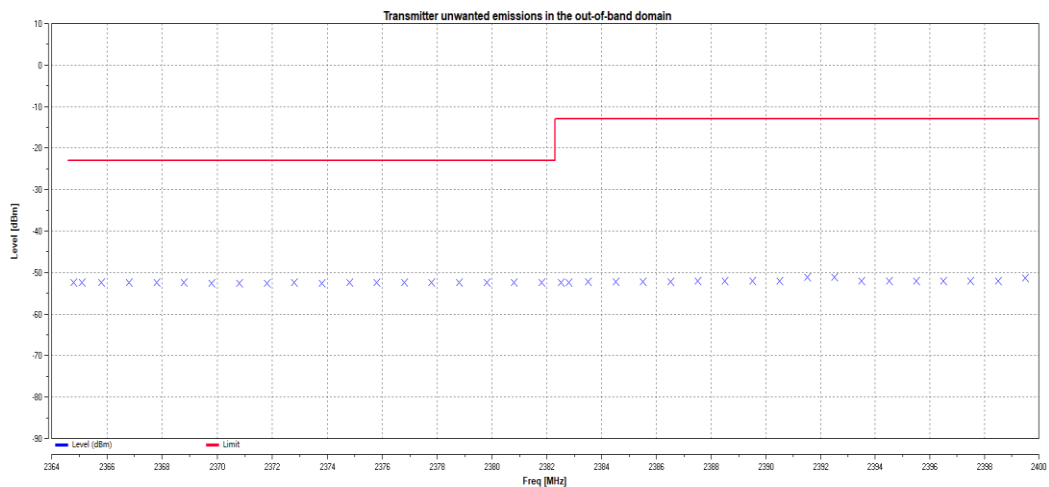
11N20MIMO_Ant2_2412_2400MHz-2BW to 2400MHz



11N20MIMO_Ant2_2412_2483.5MHz to 2483.5MHz+2BW

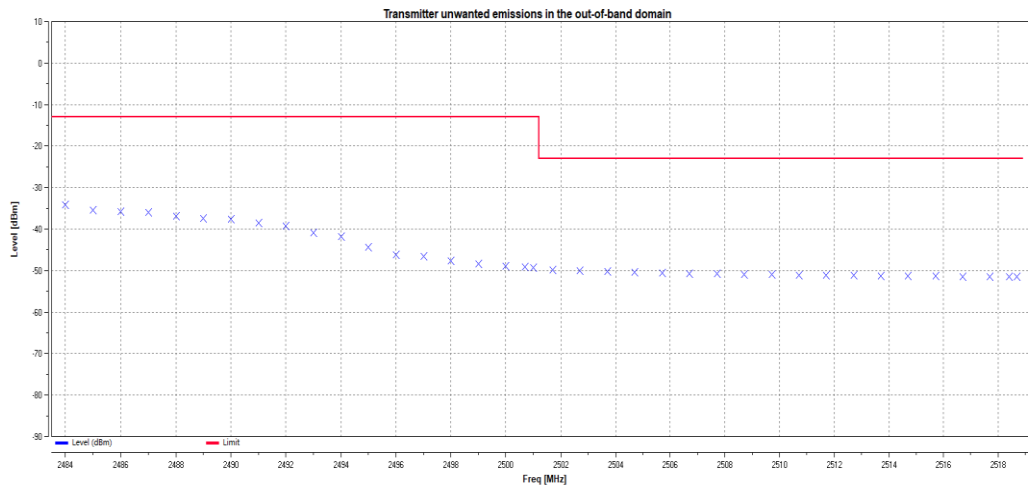


11N20MIMO_Ant1_2472_2400MHz-2BW to 2400MHz

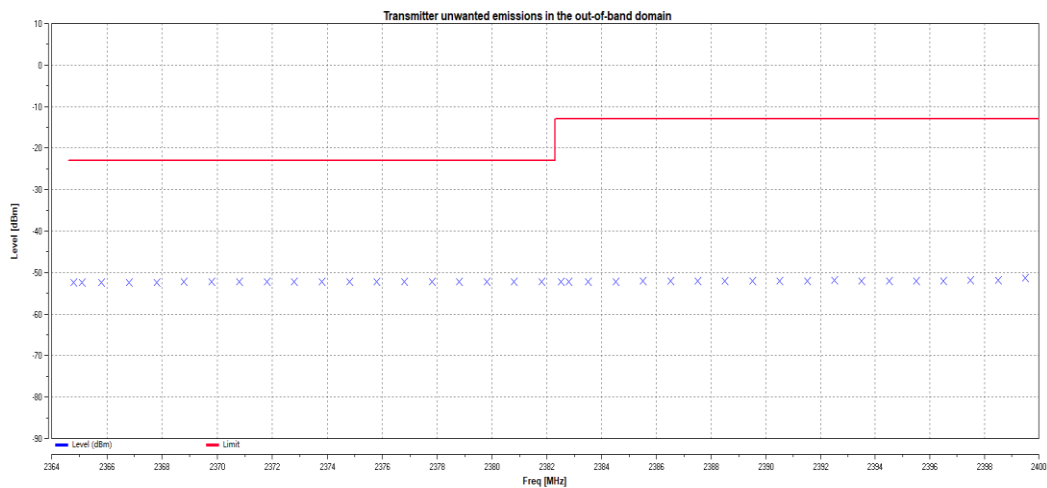


TEST REPORT N°: KSK-ESH-P24071264B-4

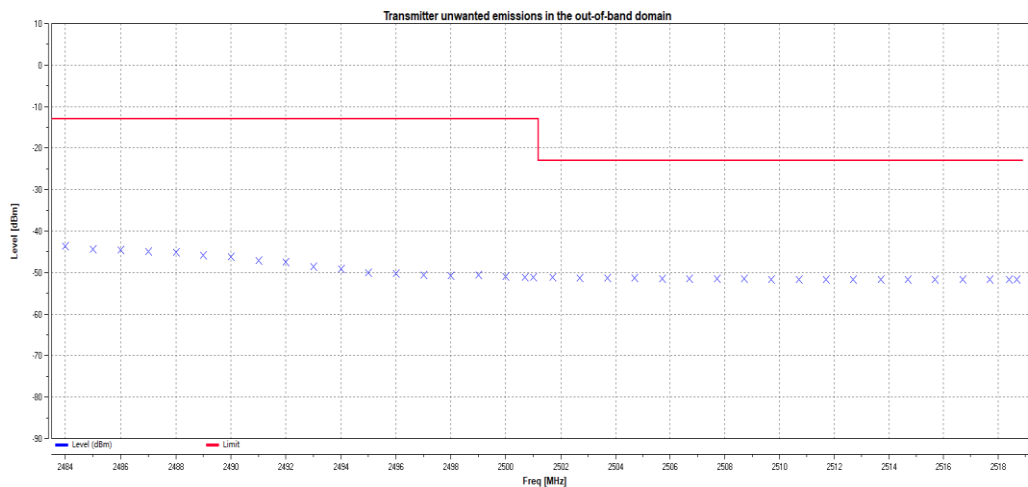
11N20MIMO_Ant1_2472_2483.5MHz to 2483.5MHz+2BW



11N20MIMO_Ant2_2472_2400MHz-2BW to 2400MHz

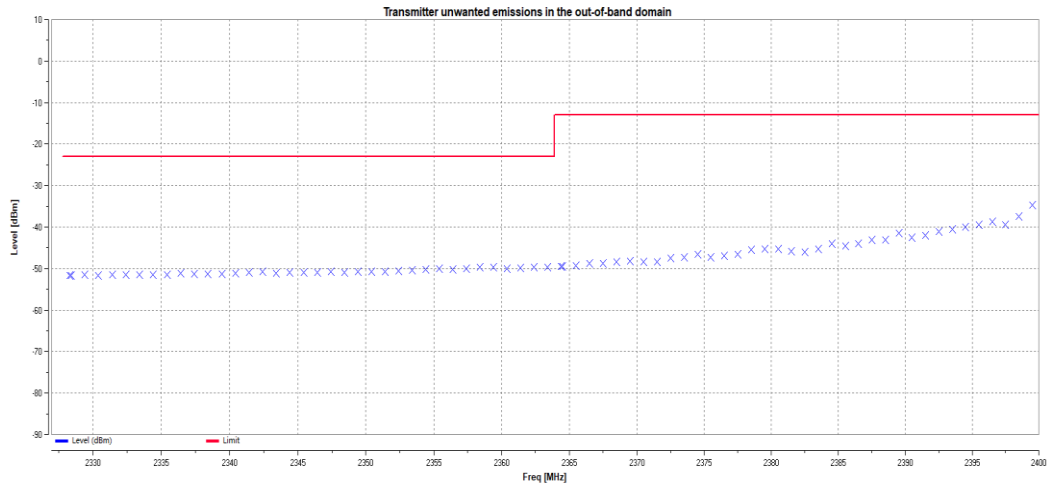


11N20MIMO_Ant2_2472_2483.5MHz to 2483.5MHz+2BW

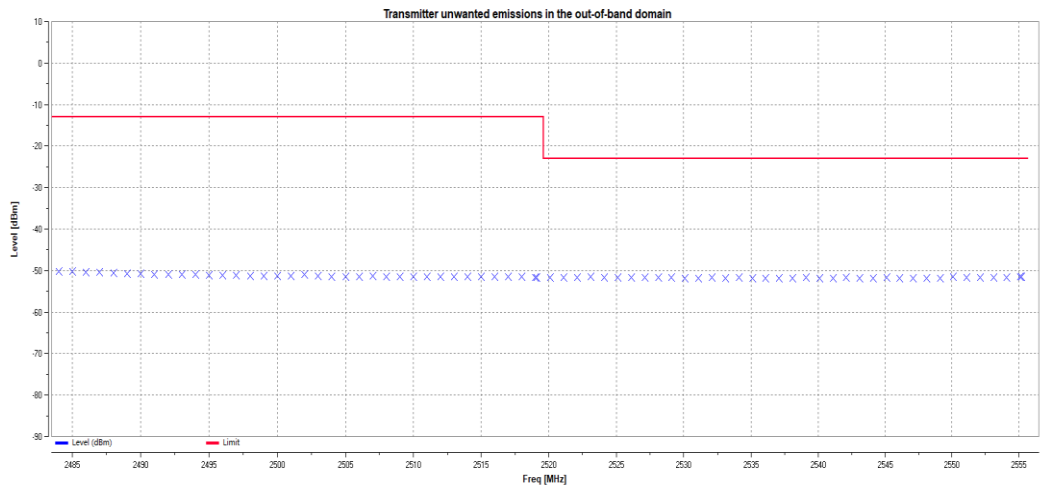


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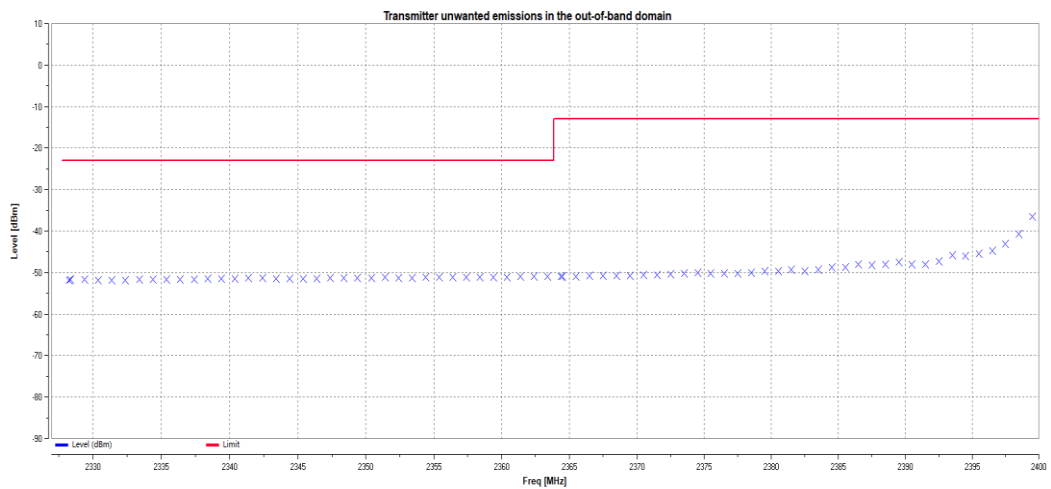
11N40MIMO_Ant1_2422_2400MHz-2BW to 2400MHz



11N40MIMO_Ant1_2422_2483.5MHz to 2483.5MHz+2BW

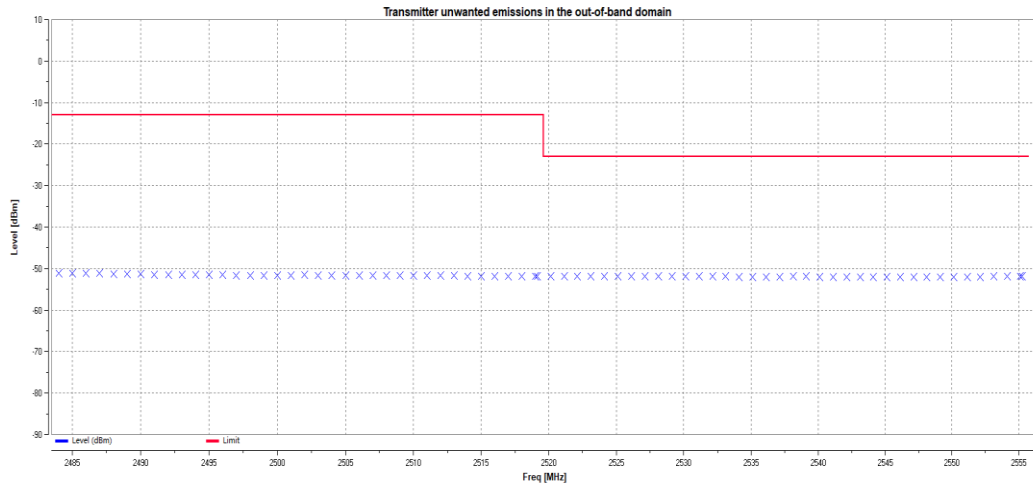


11N40MIMO_Ant2_2422_2400MHz-2BW to 2400MHz

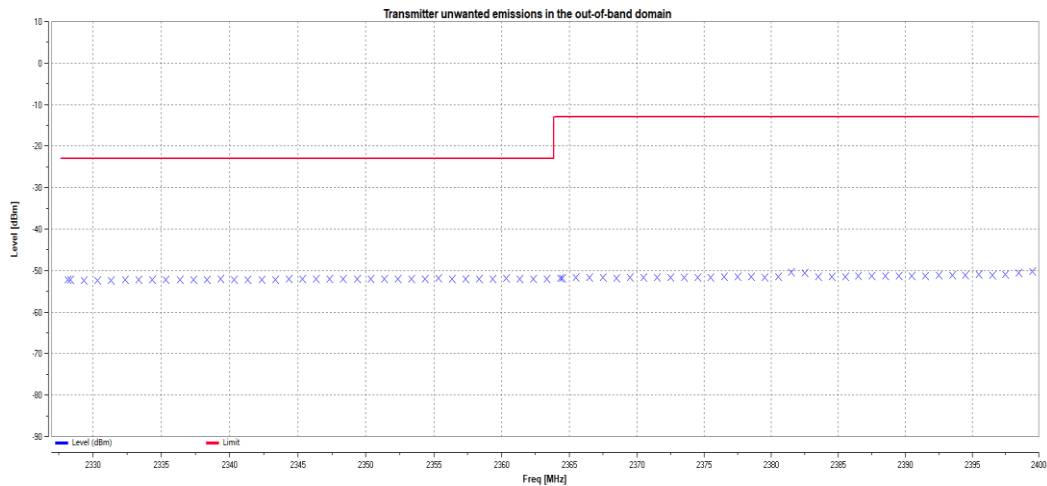


TEST REPORT N°: KSK-ESH-P24071264B-4

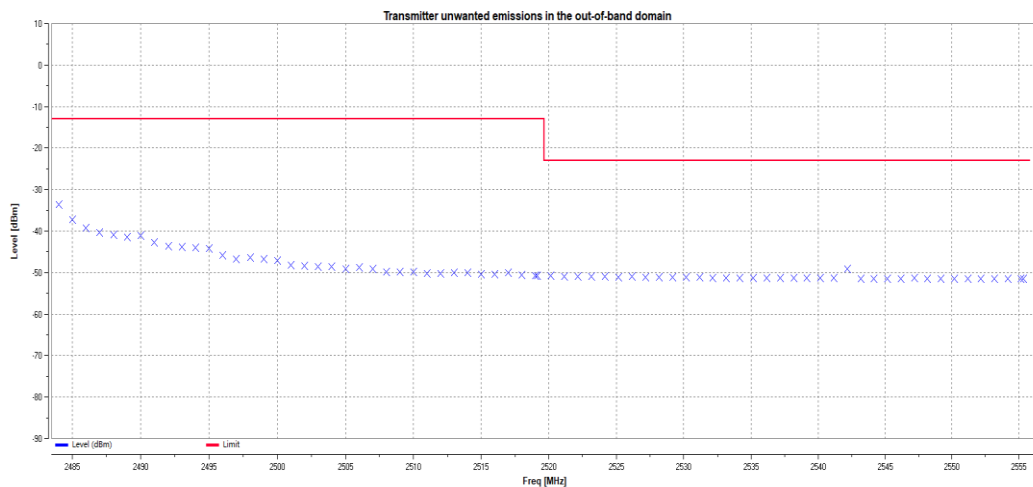
11N40MIMO_Ant2_2422_2483.5MHz to 2483.5MHz+2BW



11N40MIMO_Ant1_2462_2400MHz-2BW to 2400MHz

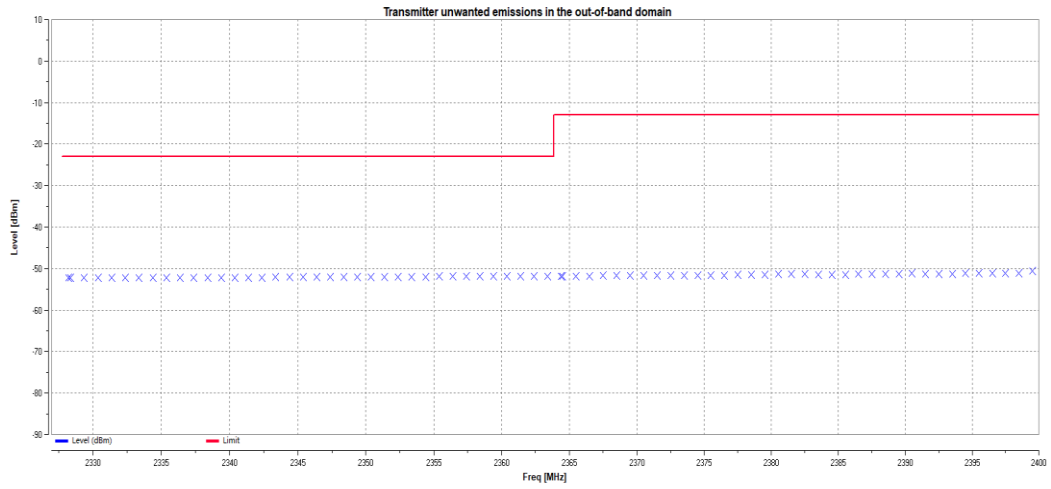


11N40MIMO_Ant1_2462_2483.5MHz to 2483.5MHz+2BW

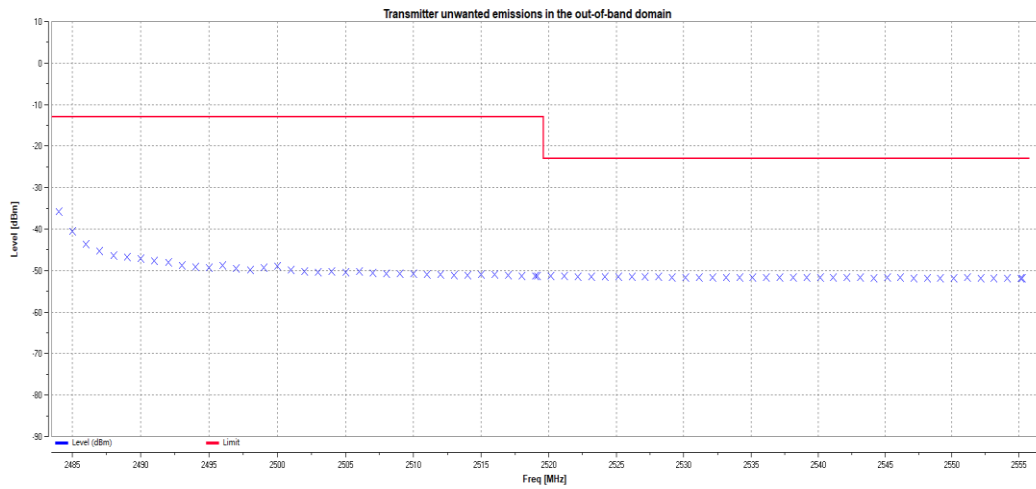


TEST REPORT N°: KSK-ESH-P24071264B-4

11N40MIMO_Ant2_2462_2400MHz-2BW to 2400MHz



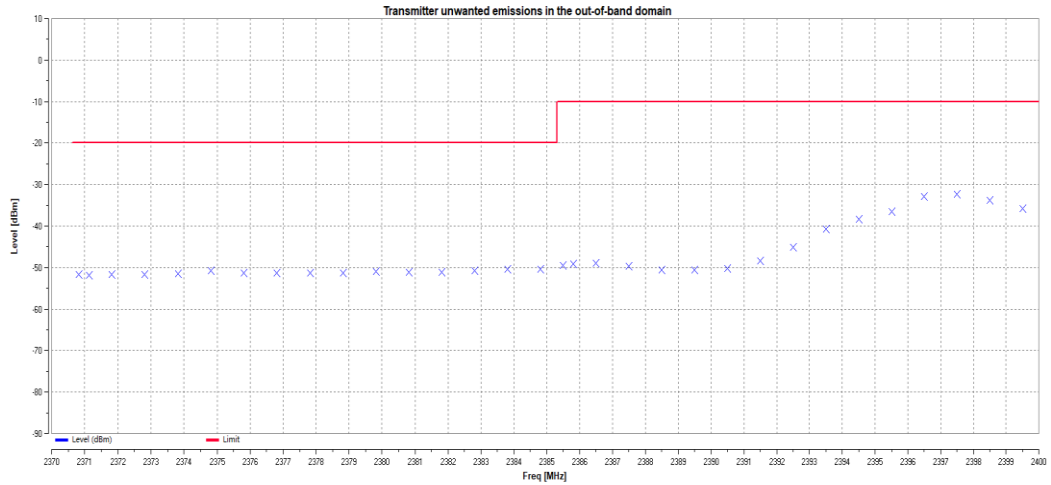
11N40MIMO_Ant2_2462_2483.5MHz to 2483.5MHz+2BW



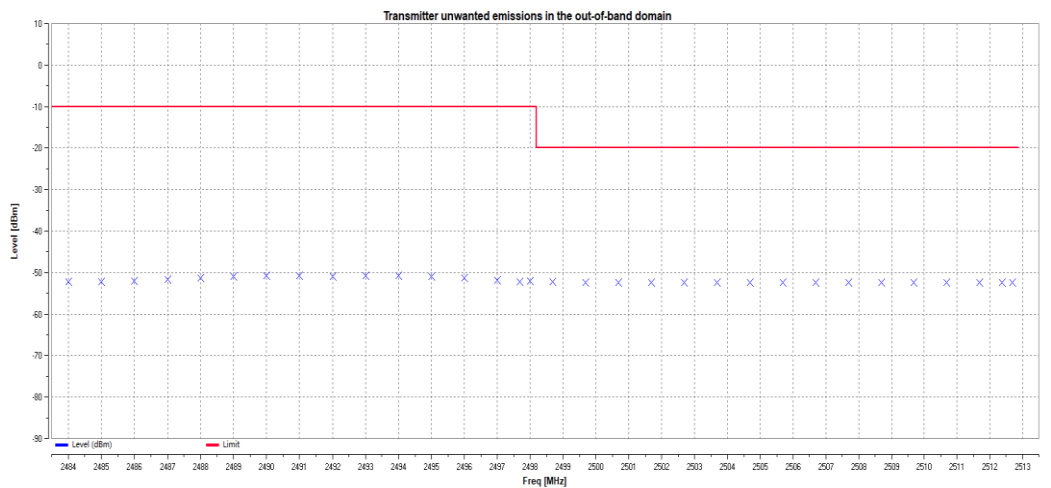
TEST REPORT N°: KSK-ESH-P24071264B-4

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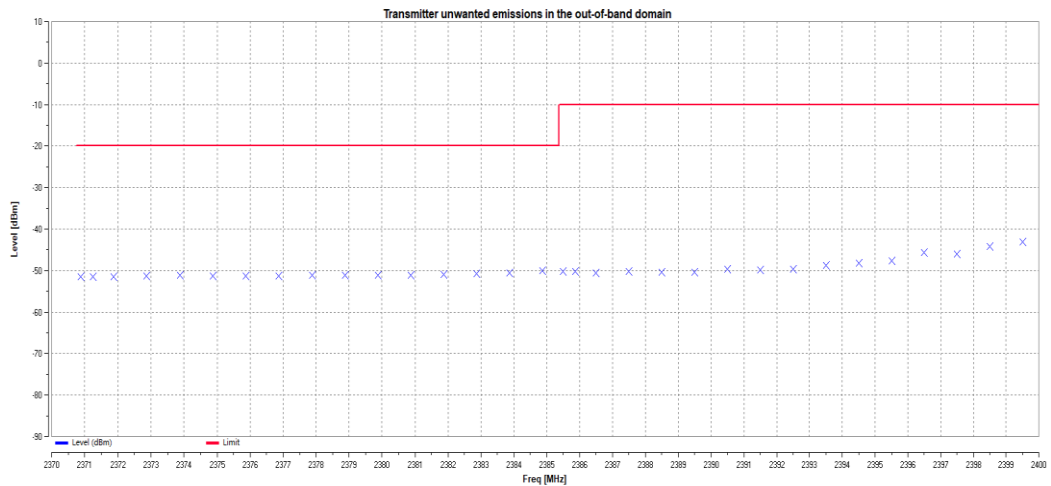
11B_Ant1_2412_2400MHz-2BW to 2400MHz



11B_Ant1_2412_2483.5MHz to 2483.5MHz+2BW



11B_Ant2_2412_2400MHz-2BW to 2400MHz

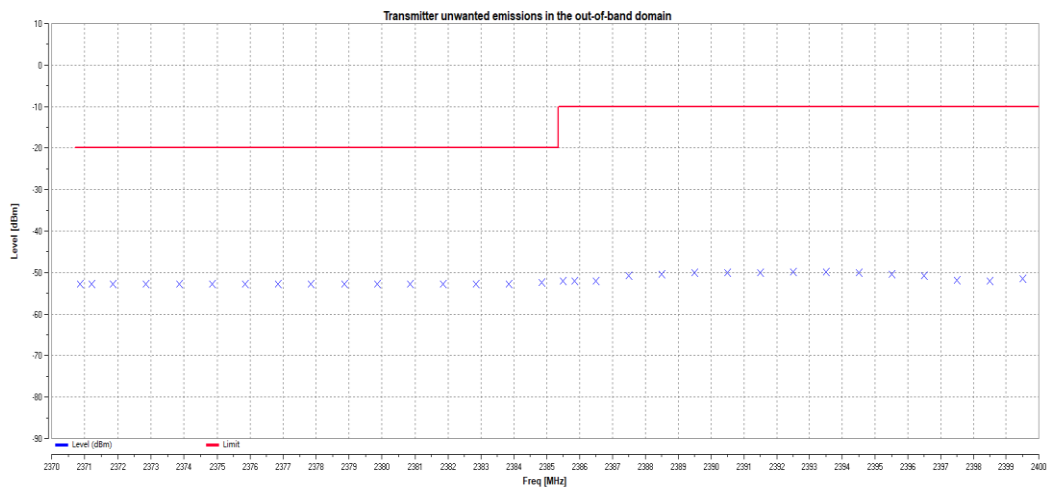


TEST REPORT N°: KSK-ESH-P24071264B-4

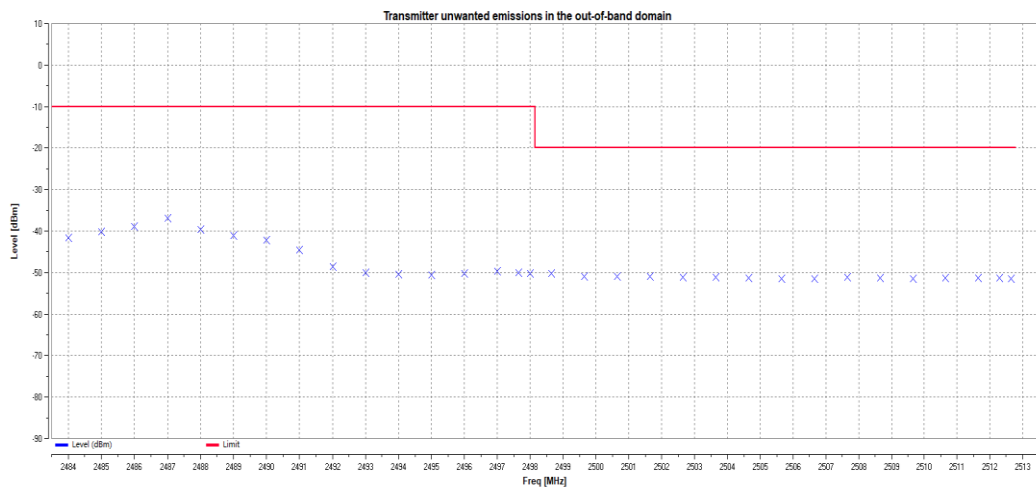
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11B_Ant1_2472_2400MHz-2BW to 2400MHz

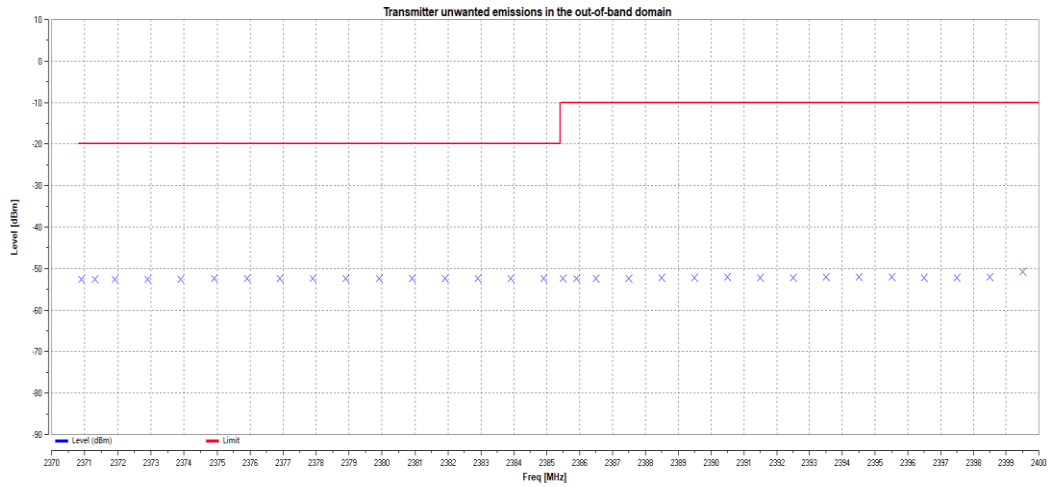


11B_Ant1_2472_2483.5MHz to 2483.5MHz+2BW

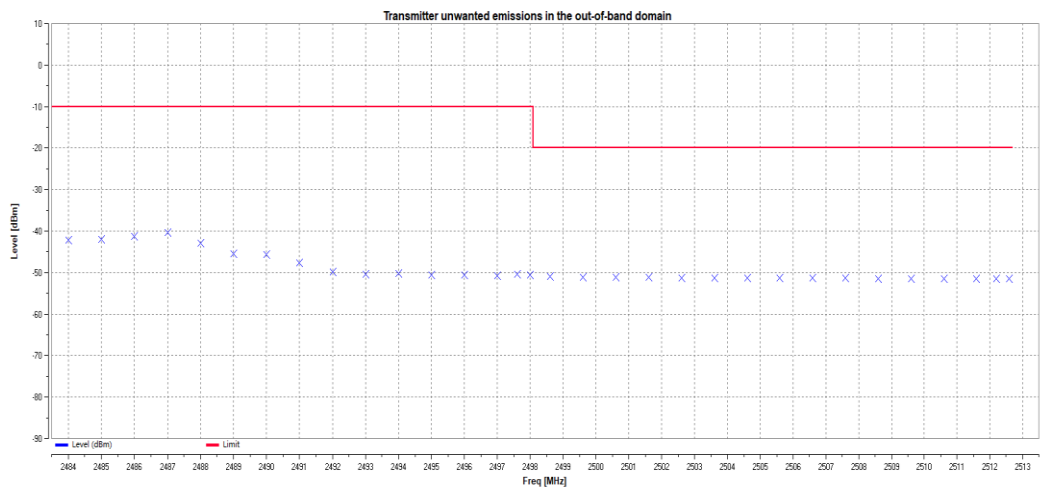


TEST REPORT N°: KSK-ESH-P24071264B-4

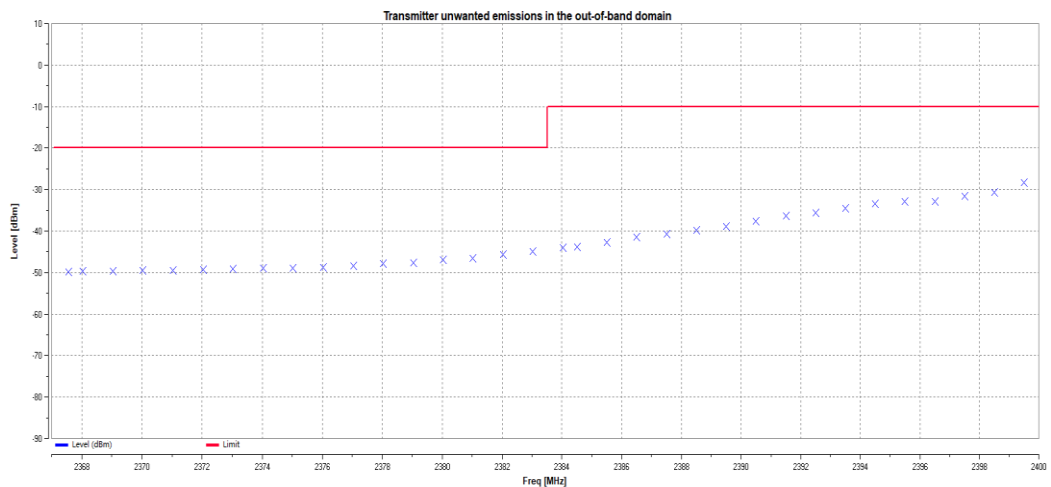
11B_Ant2_2472_2400MHz-2BW to 2400MHz



11B_Ant2_2472_2483.5MHz to 2483.5MHz+2BW

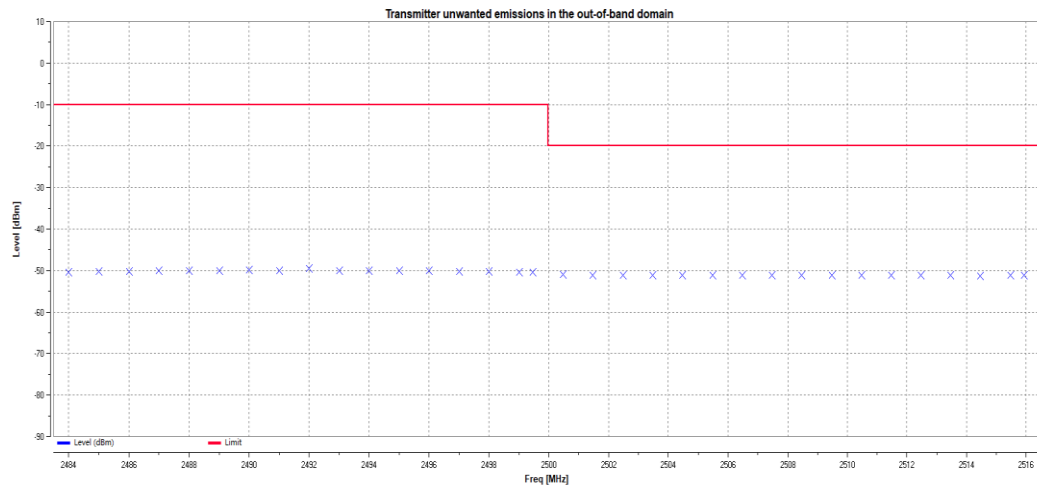


11G_Ant1_2412_2400MHz-2BW to 2400MHz

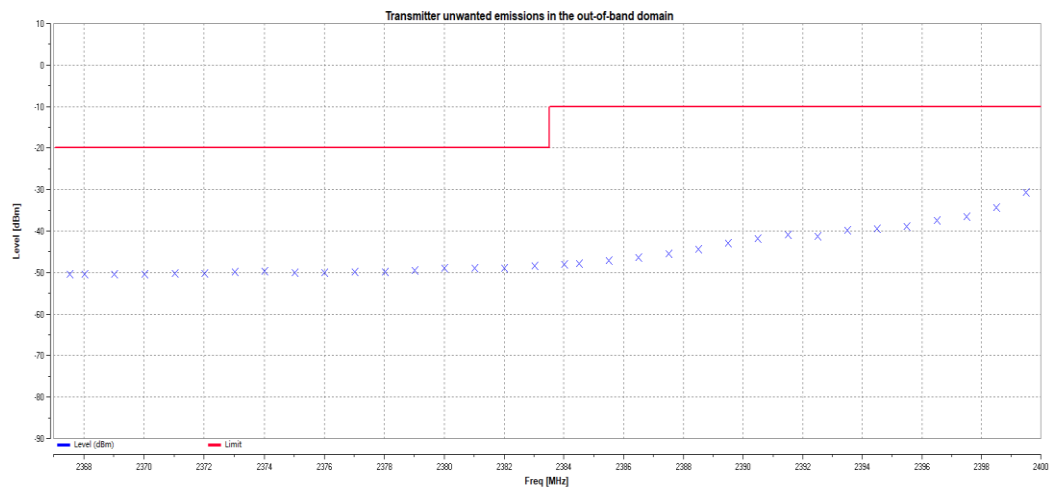


TEST REPORT N°: KSK-ESH-P24071264B-4

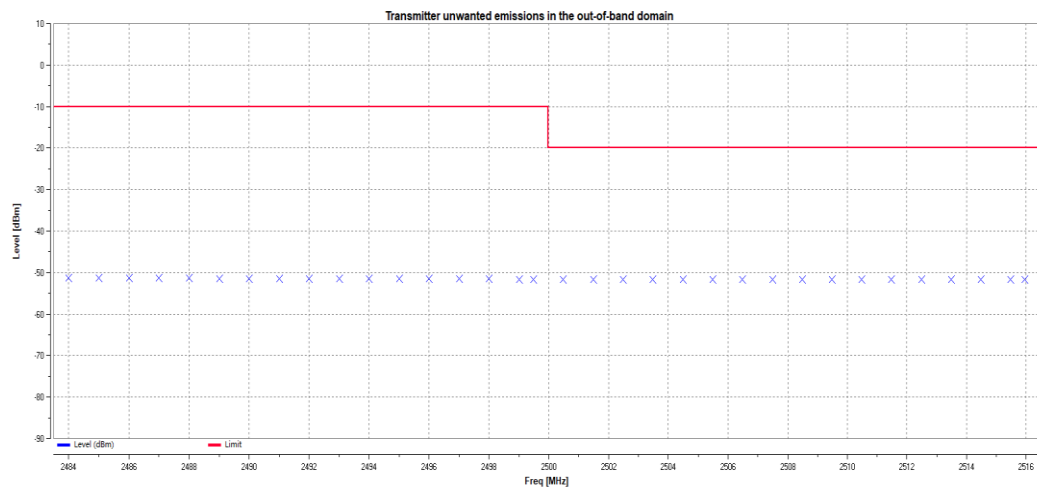
11G_Ant1_2412_2483.5MHz to 2483.5MHz+2BW



11G_Ant2_2412_2400MHz-2BW to 2400MHz

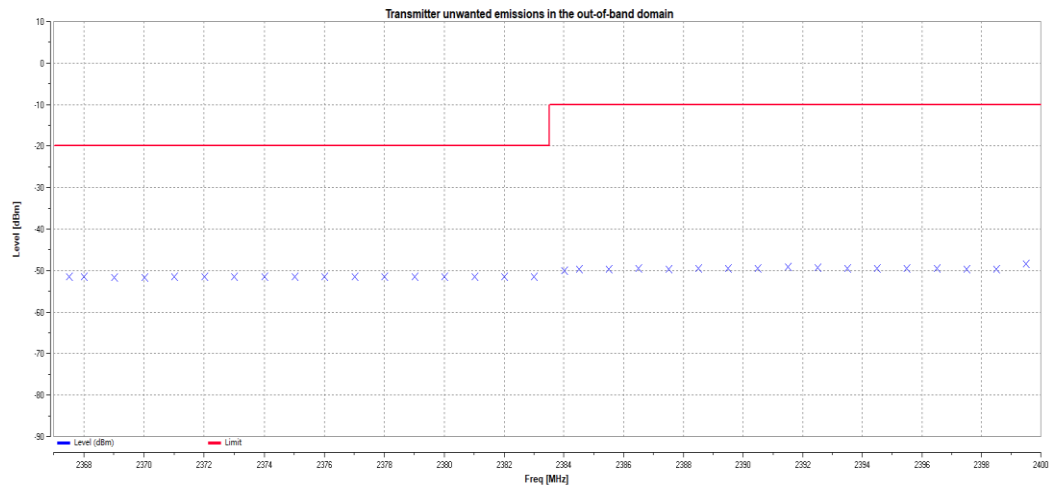


11G_Ant2_2412_2483.5MHz to 2483.5MHz+2BW

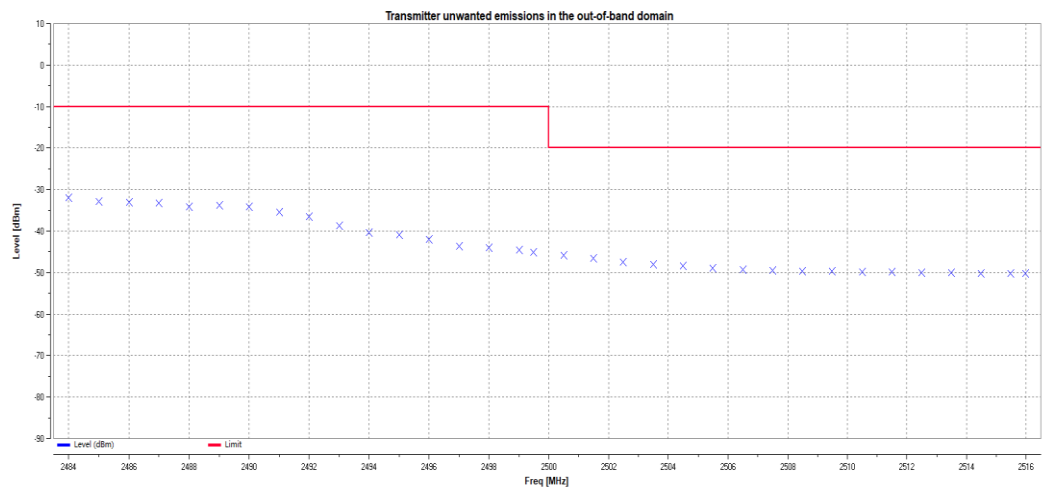


TEST REPORT N°: KSK-ESH-P24071264B-4

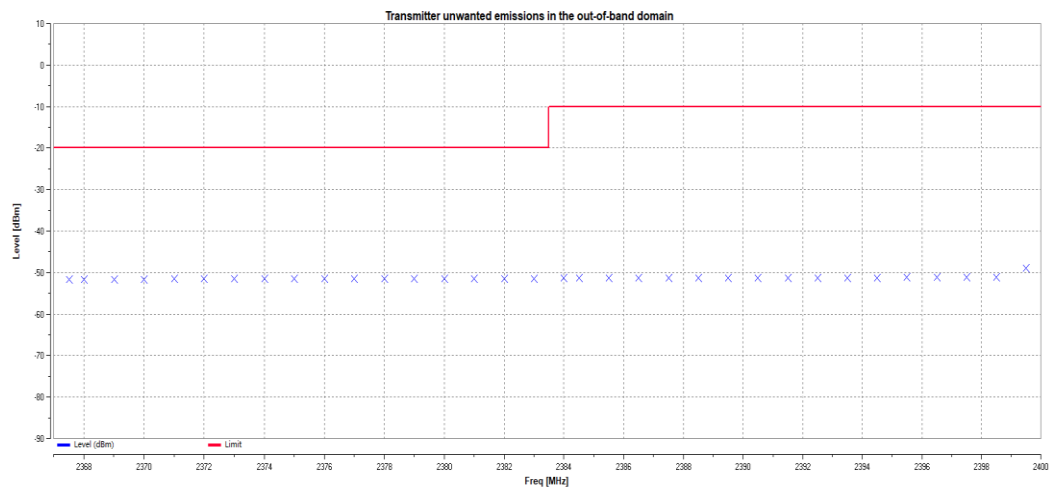
11G_Ant1_2472_2400MHz-2BW to 2400MHz



11G_Ant1_2472_2483.5MHz to 2483.5MHz+2BW

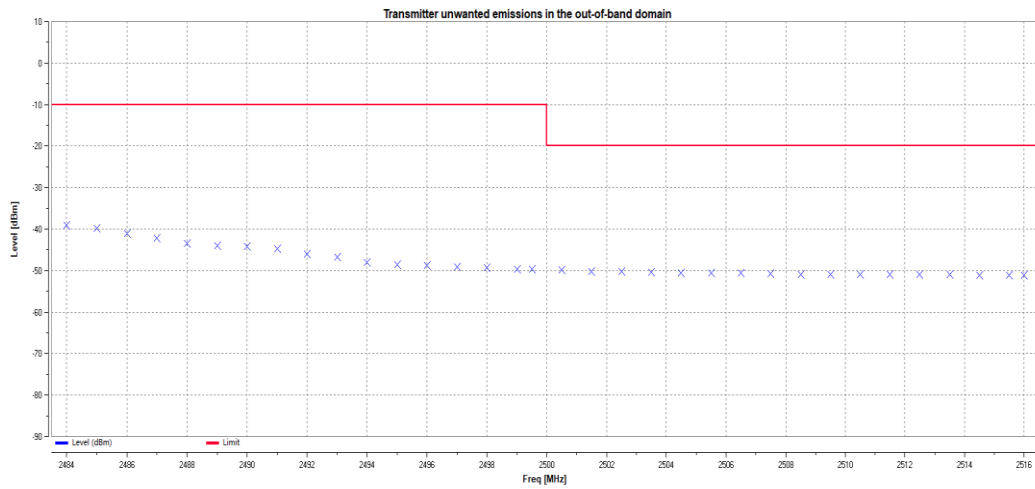


11G_Ant2_2472_2400MHz-2BW to 2400MHz

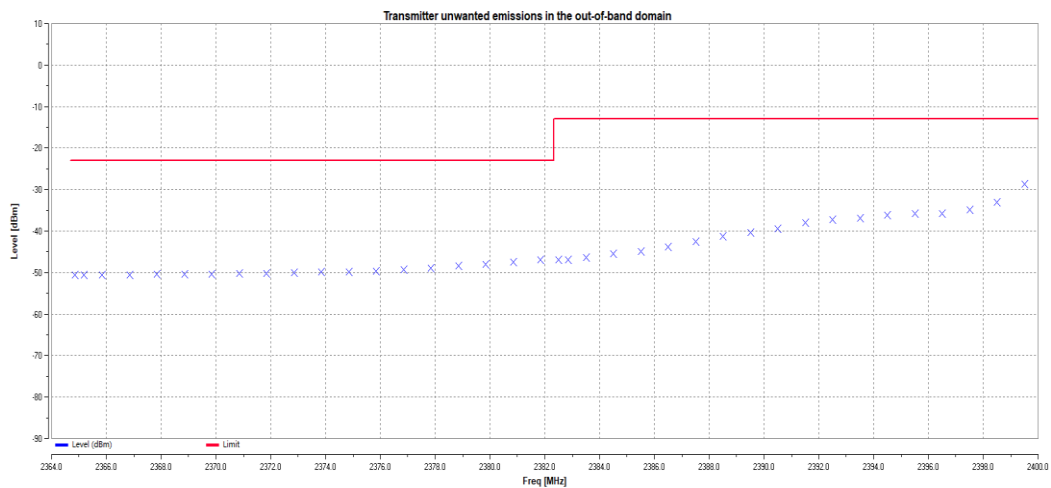


TEST REPORT N°: KSK-ESH-P24071264B-4

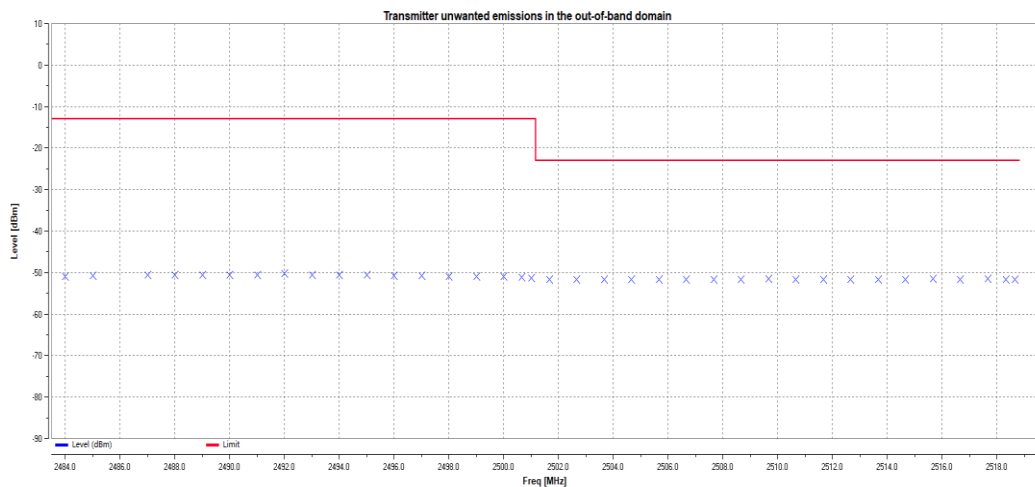
11G_Ant2_2472_2483.5MHz to 2483.5MHz+2BW



11N20MIMO_Ant1_2412_2400MHz-2BW to 2400MHz

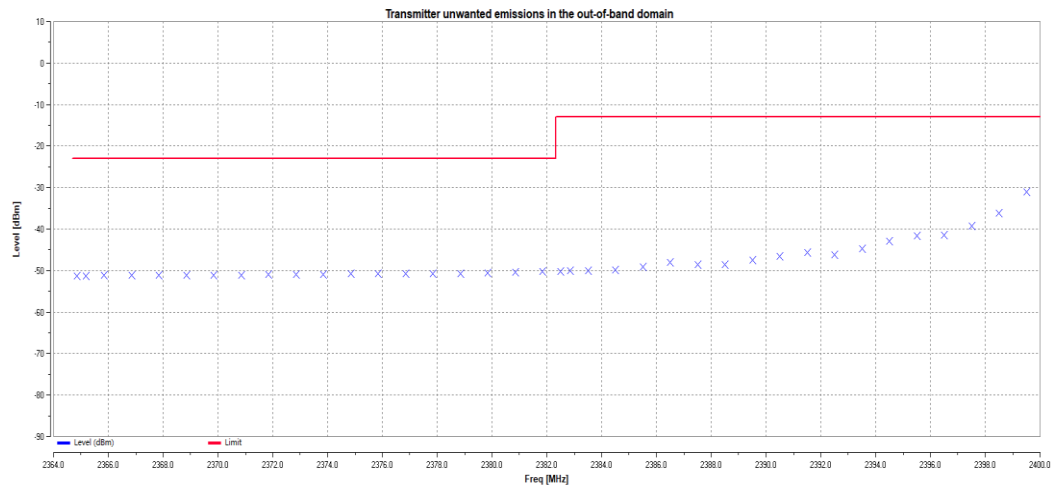


11N20MIMO_Ant1_2412_2483.5MHz to 2483.5MHz+2BW

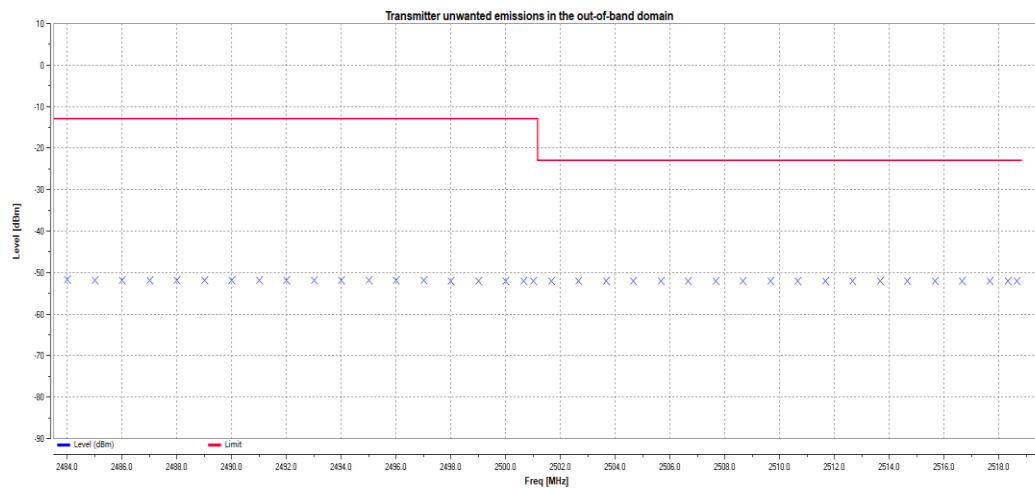


TEST REPORT N°: KSK-ESH-P24071264B-4

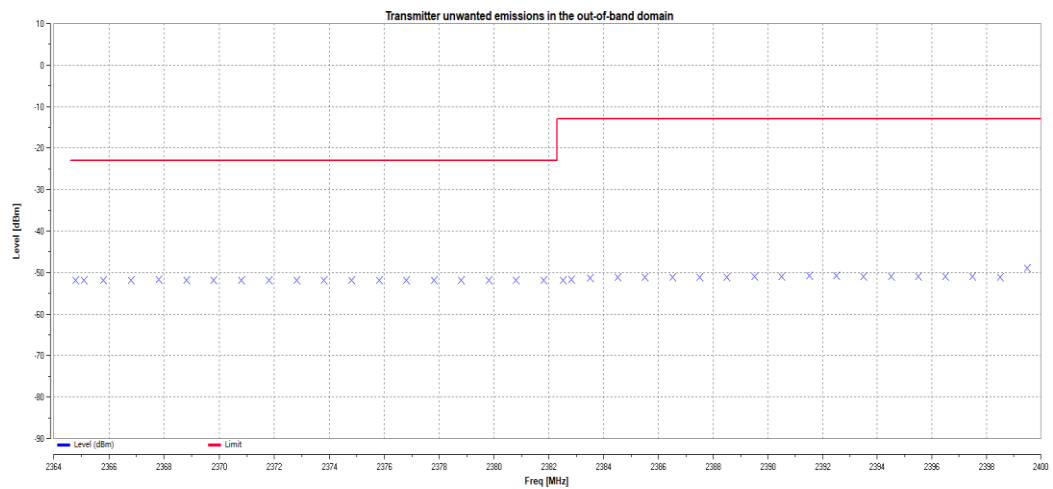
11N20MIMO_Ant2_2412_2400MHz-2BW to 2400MHz



11N20MIMO_Ant2_2412_2483.5MHz to 2483.5MHz+2BW

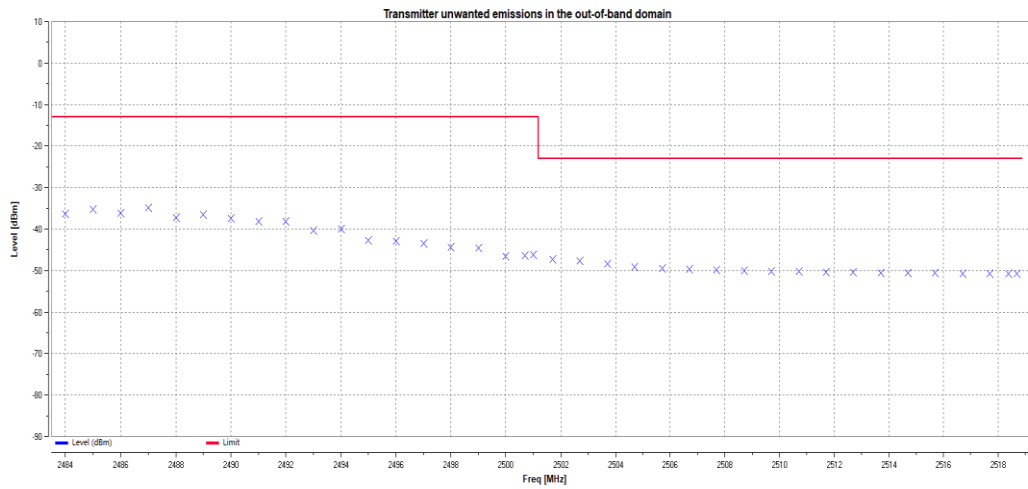


11N20MIMO_Ant1_2472_2400MHz-2BW to 2400MHz

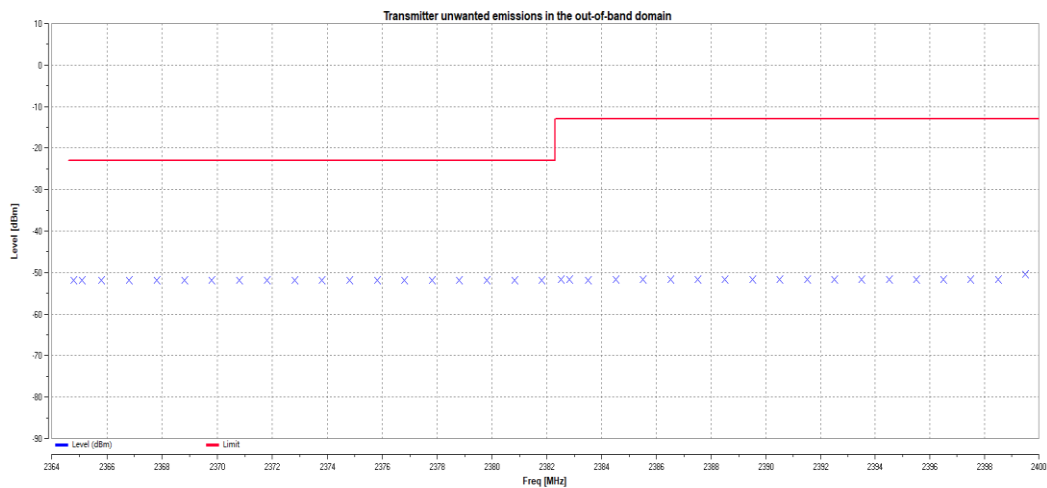


TEST REPORT N°: KSK-ESH-P24071264B-4

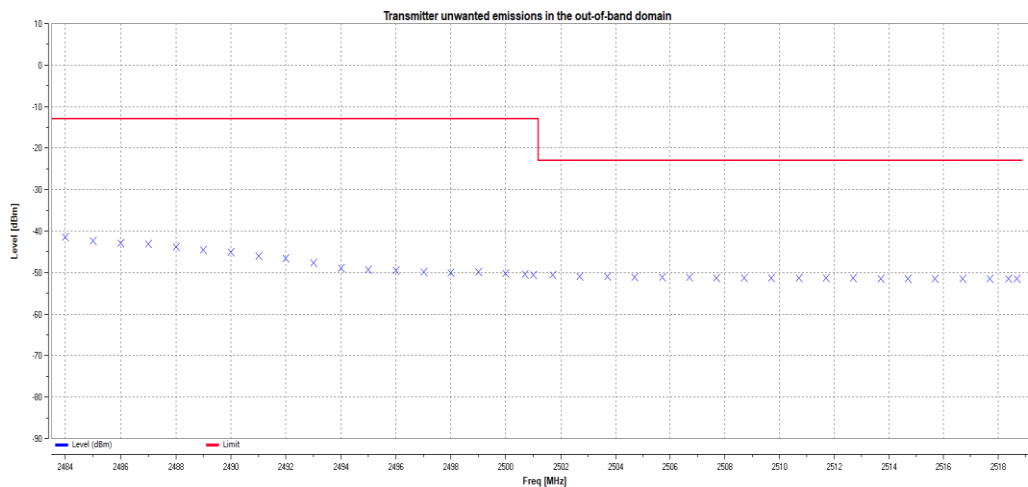
11N20MIMO_Ant1_2472_2483.5MHz to 2483.5MHz+2BW



11N20MIMO_Ant2_2472_2400MHz-2BW to 2400MHz

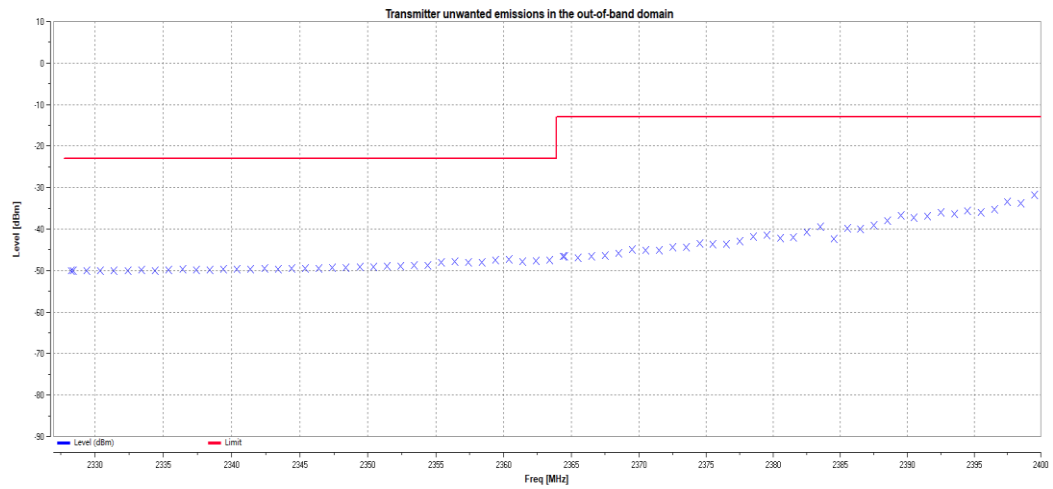


11N20MIMO_Ant2_2472_2483.5MHz to 2483.5MHz+2BW

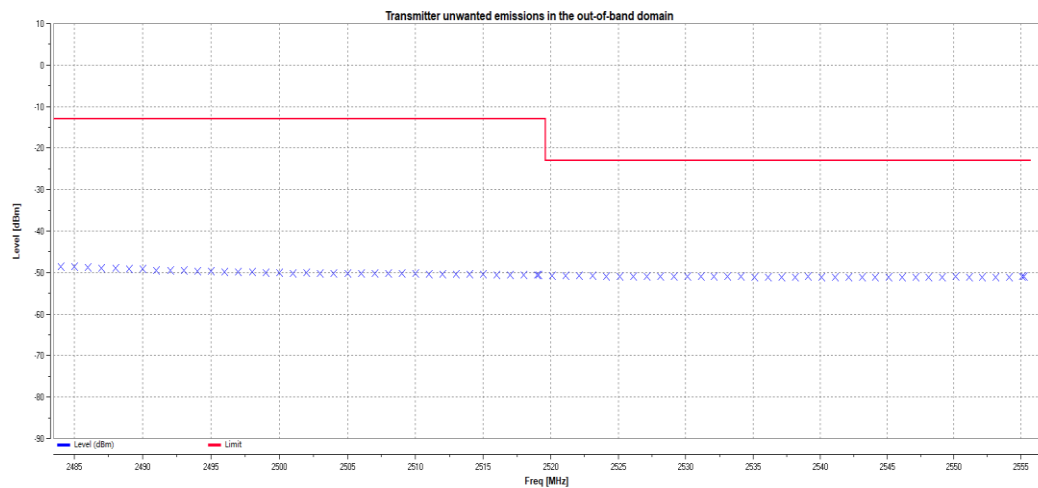


TEST REPORT N°: KSK-ESH-P24071264B-4

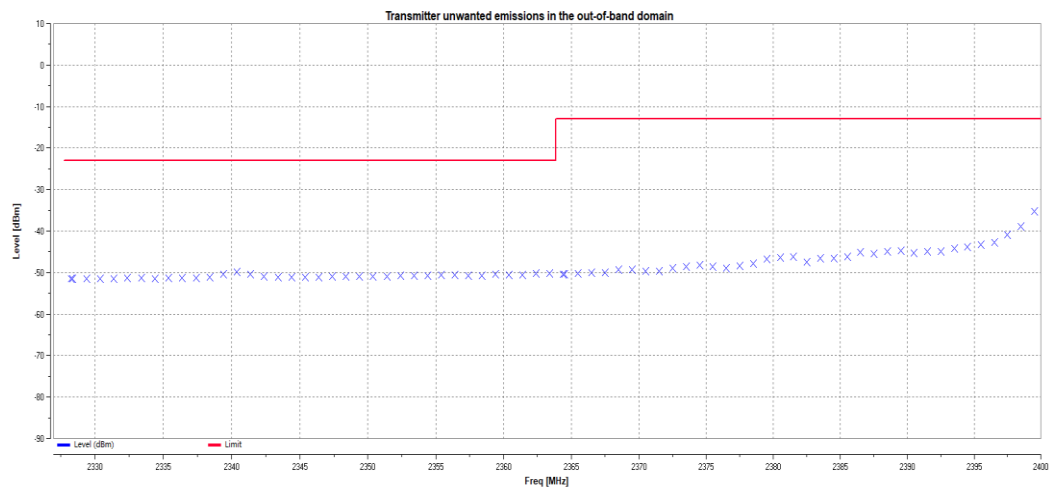
11N40MIMO_Ant1_2422_2400MHz-2BW to 2400MHz



11N40MIMO_Ant1_2422_2483.5MHz to 2483.5MHz+2BW

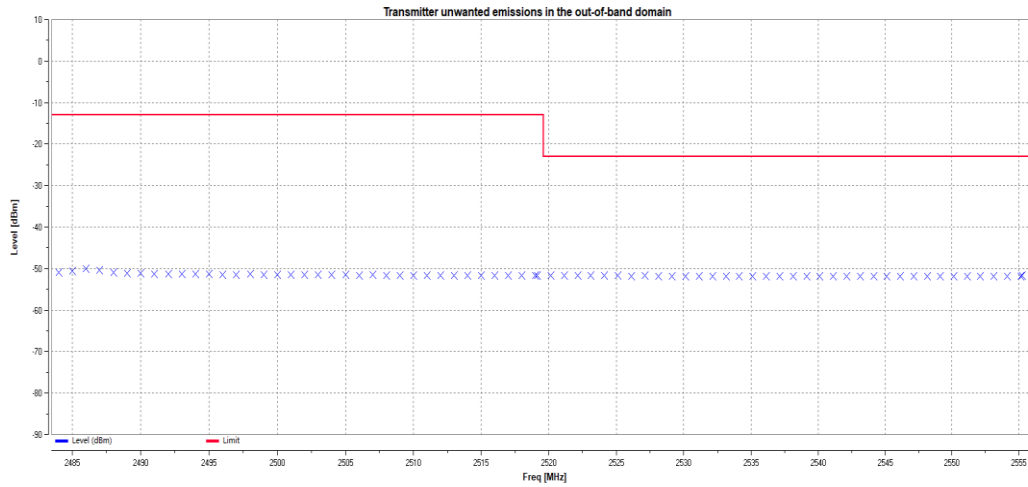


11N40MIMO_Ant2_2422_2400MHz-2BW to 2400MHz

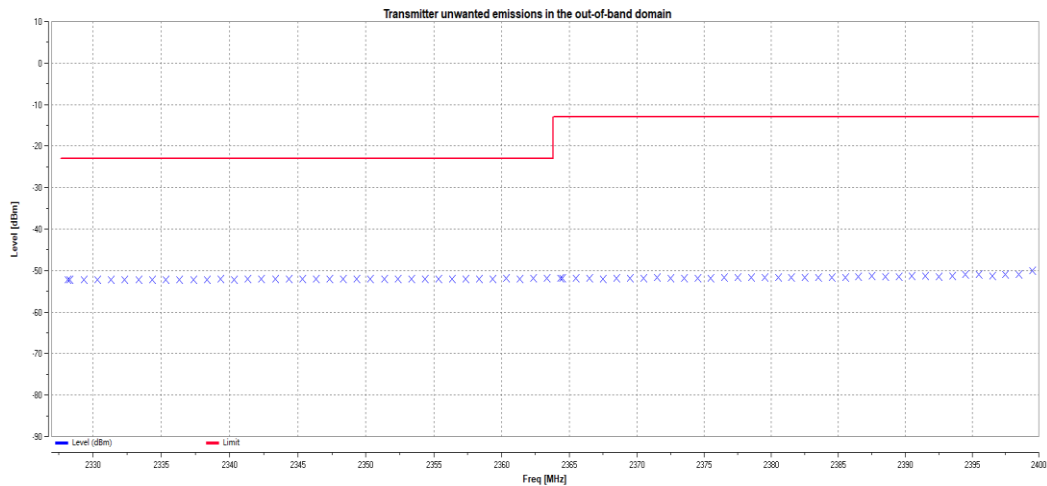


TEST REPORT N°: KSK-ESH-P24071264B-4

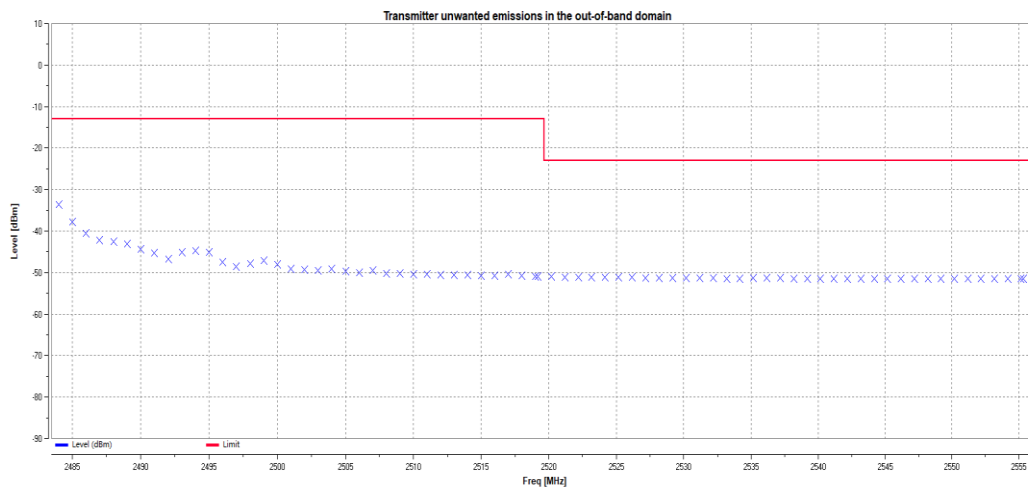
11N40MIMO_Ant2_2422_2483.5MHz to 2483.5MHz+2BW



11N40MIMO_Ant1_2462_2400MHz-2BW to 2400MHz

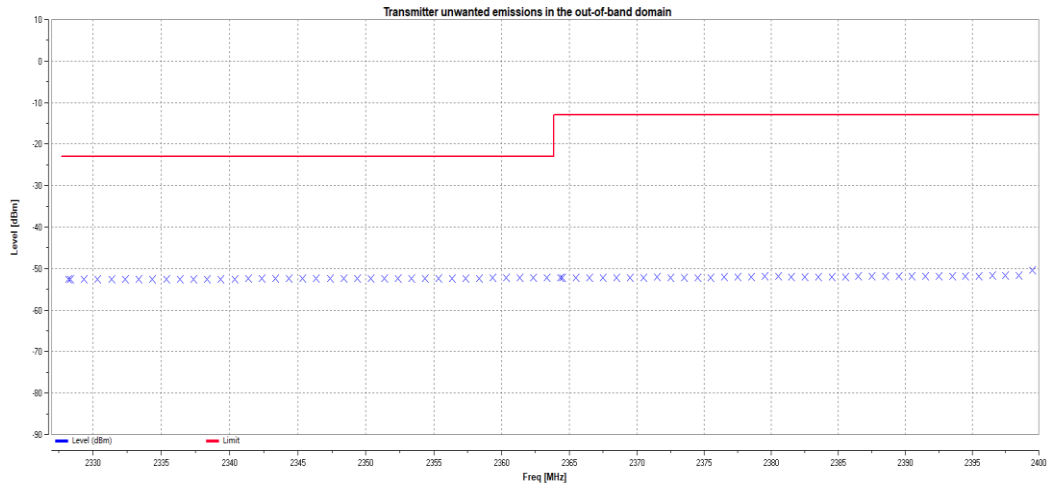


11N40MIMO_Ant1_2462_2483.5MHz to 2483.5MHz+2BW

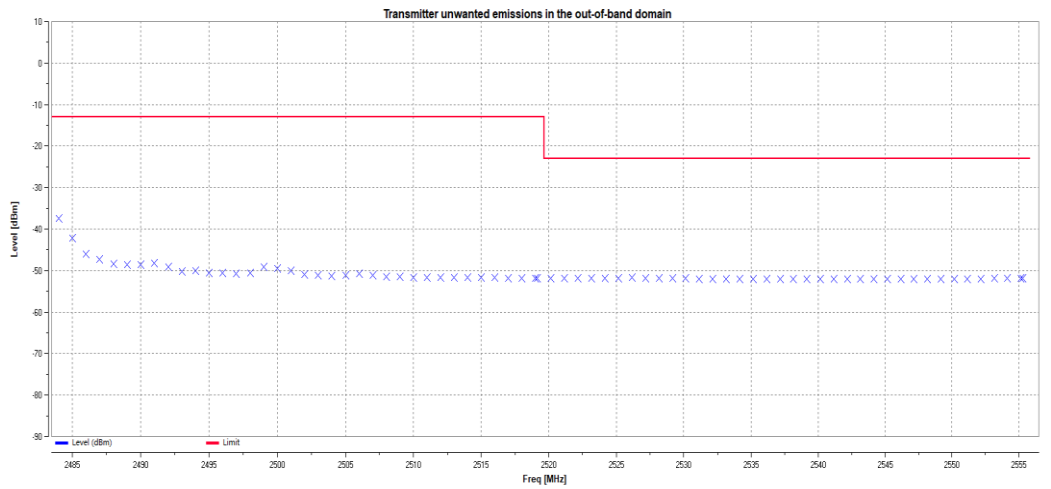


TEST REPORT N°: KSK-ESH-P24071264B-4

11N40MIMO_Ant2_2462_2400MHz-2BW to 2400MHz



11N40MIMO_Ant2_2462_2483.5MHz to 2483.5MHz+2BW



TEST REPORT N°: KSK-ESH-P24071264B-4

3.6 Transmitter Spurious Emissions in the spurious domain

3.6.1 Limits of Transmitter Spurious Emissions

Frequency Range	Maximum Power Limit	Bandwidth
30 MHz to 47 MHz	-36dBm	100kHz
47 MHz to 74 MHz	-54dBm	100kHz
74 MHz to 87,5 MHz	-36dBm	100kHz
87,5 MHz to 118 MHz	-54dBm	100kHz
118 MHz to 174 MHz	-36dBm	100kHz
174 MHz to 230 MHz	-54dBm	100kHz
230 MHz to 470 MHz	-36dBm	100kHz
470 MHz to 694 MHz	-54dBm	100kHz
694 MHz to 1 GHz	-36dBm	100kHz
1GHz ~ 12.75GHz	-30dBm	1MHz

Note: These limits are e.r.p. for emissions up to 1 GHz and as e.i.r.p. for emissions above 1 GHz.

3.6.2 Test Procedure

1. Refer to chapter 5.4.9 of EN 300 328 V2.2.2.
2. The EUT was placed on a turntable with 1.5m height.
3. The test distance between the receiving antenna and the EUT is 3meter below 1GHz frequency range, and 3 meter which is in far field test condition for measured frequency above 1GHz, while the receiving (test) antenna is kept at 1.5 meter height.
4. Set EUT in continuous transmitting with maximum output power.
5. The table was rotated from 0 to 360 degree to search the highest radiated emission.

Measurement Method	
☐ Conducted measurement	☒ Radiated measurement
<u>For Conducted measurement:</u> The level of unwanted emissions shall be measured as their power in a specified load (conducted spurious emissions) and their effective radiated power when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation).	
<u>Conducted measurement (For equipment with multiple transmit chains):</u> ☐ Option 1: The results for each of the transmit chains for the corresponding 1MHz segments shall be added and compared with the limits. ☐ Option 2: The results for each of the transmit chains shall be individually compared with the limits after these limits have been reduced by $10 \times \log(N)$ (number of active transmit chains)	

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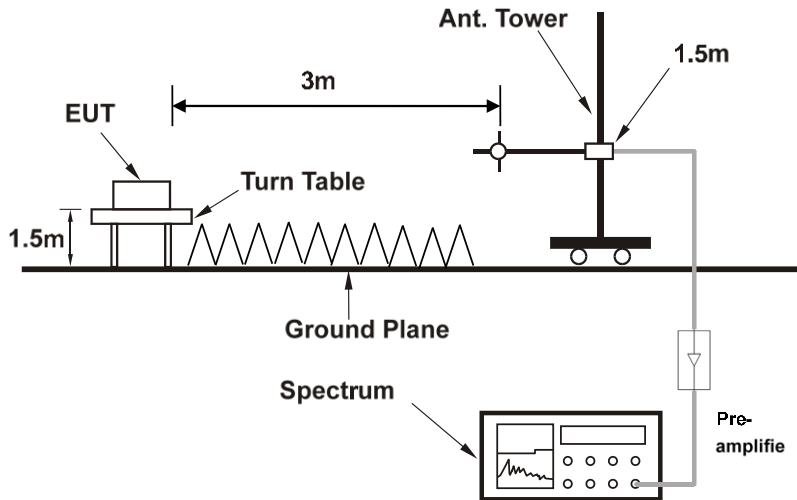
3.6.3 Deviation from Test Standard

No deviation.

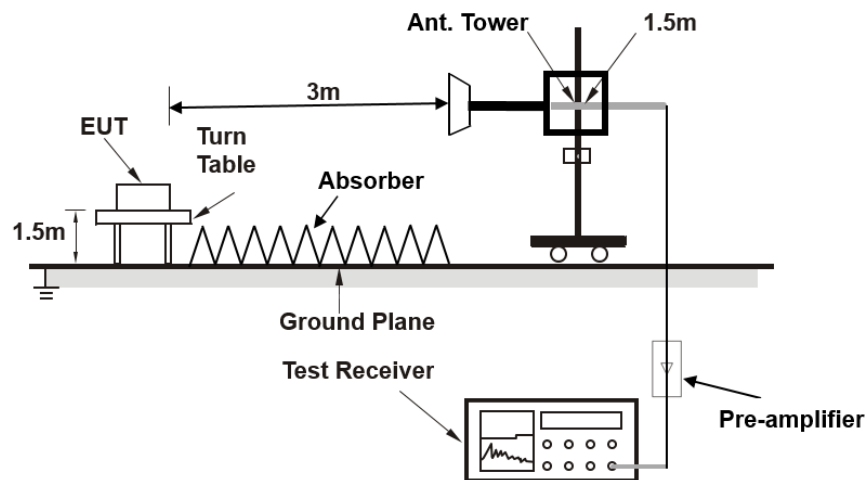
3.6.4 Test Setup

1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
2. The equipment was configured to operate under its worst case situation with respect to output power.
3. The test setup has been constructed as the normal use condition.

< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>





TEST REPORT N°: KSK-ESH-P24071264B-4

3.6.5 Test Results

WCT1DR2201D

Below 1GHz Worst-case Data

Frequency Range	30 MHz ~ 1 GHz	Operating Channel	1
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Spurious Emission Level				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
90.40	H	-60.24	-54.00	6.24
98.32	H	-61.68	-54.00	7.68
102.35	H	-59.07	-54.00	5.07
117.52	H	-60.16	-54.00	6.16
187.74	H	-61.12	-54.00	7.12
206.65	H	-60.57	-54.00	6.57
52.22	V	-57.26	-54.00	3.26
69.28	V	-61.39	-54.00	7.39
89.74	V	-60.37	-54.00	6.37
101.92	V	-64.05	-54.00	10.05
518.24	V	-62.68	-54.00	8.68
573.53	V	-64.78	-54.00	10.78



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Above 1GHz Worst-case Data

802.11b

Frequency Range	1GHz ~ 12.75GHz	Operating Channel	1,13
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Spurious Emission Level					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1	4824.00	H	-64.38	-30.00	34.38
	7236.00	H	-58.75	-30.00	28.75
	4824.00	V	-63.68	-30.00	33.68
	7236.00	V	-60.71	-30.00	30.71
13	4944.00	H	-65.12	-30.00	35.12
	7416.00	H	-58.34	-30.00	28.34
	4944.00	V	-64.72	-30.00	34.72
	7416.00	V	-57.13	-30.00	27.13

802.11g

Frequency Range	1GHz ~ 12.75GHz	Operating Channel	1,13
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Spurious Emission Level					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1	4824.00	H	-64.52	-30.00	34.52
	7236.00	H	-59.23	-30.00	29.23
	4824.00	V	-63.62	-30.00	33.62
	7236.00	V	-60.21	-30.00	30.21
13	4944.00	H	-64.86	-30.00	34.86
	7416.00	H	-59.57	-30.00	29.57
	4944.00	V	-64.11	-30.00	34.11
	7416.00	V	-59.49	-30.00	29.49

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802.11n20

Frequency Range	1GHz ~ 12.75GHz	Operating Channel	1,13
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Spurious Emission Level					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1	4824.00	H	-64.11	-30.00	34.11
	7236.00	H	-60.18	-30.00	30.18
	4824.00	V	-59.39	-30.00	29.39
	7236.00	V	-59.42	-30.00	29.42
13	4944.00	H	-64.86	-30.00	34.86
	7416.00	H	-59.79	-30.00	29.79
	4944.00	V	-64.24	-30.00	34.24
	7416.00	V	-60.08	-30.00	30.08

802.11n40

Frequency Range	1GHz ~ 12.75GHz	Operating Channel	3,11
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Spurious Emission Level					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3	4844.00	H	-65.02	-30.00	35.02
	7266.00	H	-59.21	-30.00	29.21
	4844.00	V	-63.87	-30.00	33.87
	7266.00	V	-59.52	-30.00	29.52
11	4924.00	H	-65.26	-30.00	35.26
	7386.00	H	-58.67	-30.00	28.67
	4924.00	V	-63.15	-30.00	33.15
	7386.00	V	-59.12	-30.00	29.12



TEST REPORT N°: KSK-ESH-P24071264B-4

WC0NR2201

Below 1GHz Worst-case Data

Frequency Range	30 MHz ~ 1 GHz	Operating Channel	1
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Spurious Emission Level				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
57.34	H	-66.27	-54.00	12.27
95.61	H	-57.86	-54.00	3.86
192.42	H	-66.25	-54.00	12.25
216.21	H	-68.42	-54.00	14.42
478.07	H	-68.37	-54.00	14.37
573.35	H	-66.65	-54.00	12.65
53.62	V	-56.54	-54.00	2.54
68.57	V	-61.42	-54.00	7.42
190.68	V	-64.63	-54.00	10.63
214.57	V	-69.21	-54.00	15.21
484.29	V	-64.67	-54.00	10.67
558.38	V	-64.32	-54.00	10.32



TEST REPORT N°: KSK-ESH-P24071264B-4

Above 1GHz Worst-case Data

802.11b

Frequency Range	1GHz ~ 12.75GHz	Operating Channel	1,13
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Spurious Emission Level					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1	4824.00	H	-64.24	-30.00	34.24
	7236.00	H	-58.61	-30.00	28.61
	4824.00	V	-63.37	-30.00	33.37
	7236.00	V	-60.25	-30.00	30.25
13	4944.00	H	-65.17	-30.00	35.17
	7416.00	H	-58.23	-30.00	28.23
	4944.00	V	-64.71	-30.00	34.71
	7416.00	V	-57.08	-30.00	27.08

802.11g

Frequency Range	1GHz ~ 12.75GHz	Operating Channel	1,13
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Spurious Emission Level					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1	4824.00	H	-64.39	-30.00	34.39
	7236.00	H	-59.22	-30.00	29.22
	4824.00	V	-63.57	-30.00	33.57
	7236.00	V	-60.21	-30.00	30.21
13	4944.00	H	-64.43	-30.00	34.43
	7416.00	H	-59.36	-30.00	29.36
	4944.00	V	-64.10	-30.00	34.10
	7416.00	V	-59.28	-30.00	29.28



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802.11n20

Frequency Range	1GHz ~ 12.75GHz	Operating Channel	1,13
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Spurious Emission Level					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1	4824.00	H	-64.12	-30.00	34.12
	7236.00	H	-60.09	-30.00	30.09
	4824.00	V	-59.32	-30.00	29.32
	7236.00	V	-59.27	-30.00	29.27
13	4944.00	H	-64.65	-30.00	34.65
	7416.00	H	-59.54	-30.00	29.54
	4944.00	V	-64.17	-30.00	34.17
	7416.00	V	-60.12	-30.00	30.12

802.11n40

Frequency Range	1GHz ~ 12.75GHz	Operating Channel	3,11
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Spurious Emission Level					
Channel	Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
3	4844.00	H	-65.09	-30.00	35.09
	7266.00	H	-59.18	-30.00	29.18
	4844.00	V	-63.64	-30.00	33.64
	7266.00	V	-59.51	-30.00	29.51
11	4924.00	H	-65.32	-30.00	35.32
	7386.00	H	-58.57	-30.00	28.57
	4924.00	V	-63.16	-30.00	33.16
	7386.00	V	-59.14	-30.00	29.14



TEST REPORT N°: KSK-ESH-P24071264B-4

3.7 Receiver Spurious Emissions

3.7.1 Limit of Receiver Spurious Radiation

Frequency Range	Maximum Power Limit	Bandwidth
30 MHz ~ 1 GHz	-57dBm	100 kHz
1 GHz ~ 12.75 GHz	-47dBm	1 MHz

Note: These limits are e.r.p. for emissions up to 1 GHz and as e.i.r.p. for emissions above 1 GHz.

3.7.2 Test Procedure

1. Refer to chapter 5.4.10 of EN 300 328 V2.2.2.
2. The test distance between the receiving antenna and the EUT is 3meter below 1GHz frequency range, and 3 meter which is in far field test condition for measured frequency above 1GHz, while the receiving (test) antenna is kept at 1.5 meter height.
3. Set EUT in receiving mode.
4. The table was rotated from 0 to 360 degree to search the highest radiated emission.

Measurement Method	
☐ Conducted measurement	☒ Radiated measurement
<u>For Conducted measurement:</u> The level of unwanted emissions shall be measured as their power in a specified load (conducted spurious emissions) and their effective radiated power when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation).	
<u>Conducted measurement (For equipment with multiple transmit chains):</u> ☐ Option 1: The results for each of the transmit chains for the corresponding 1MHz segments shall be added and compared with the limits. ☐ Option 2: The results for each of the transmit chains shall be individually compared with the limits after these limits have been reduced by $10 \times \log(N)$ (number of active transmit chains)	

3.7.3 Deviation from Test Standard

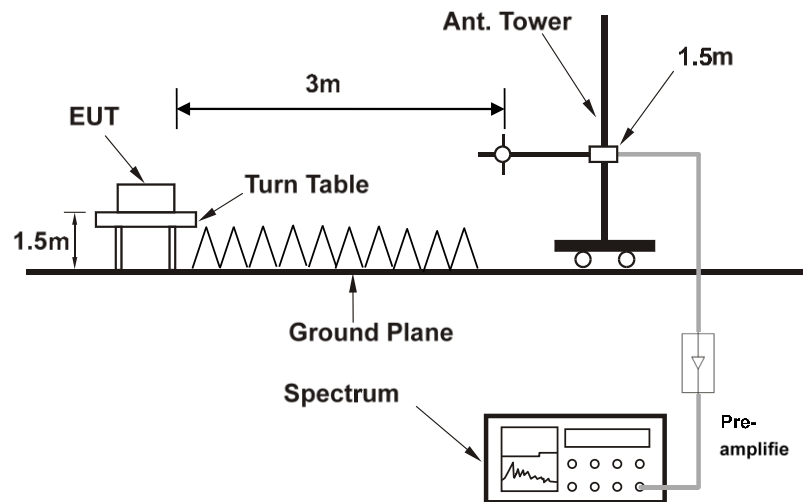
No deviation.

TEST REPORT N°: KSK-ESH-P24071264B-4

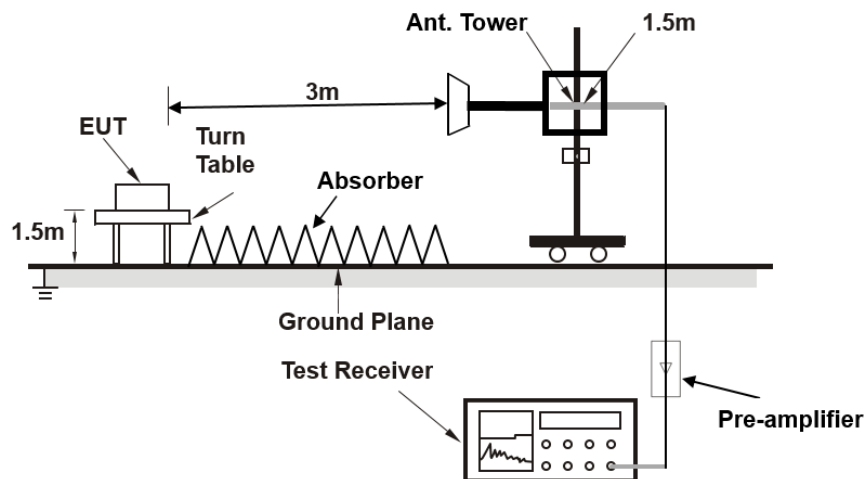
3.7.4 Test Setup

1. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration).
2. Testing was performed when the equipment was in a receive-only mode.
3. The test setup has been constructed as the normal use condition.

< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>





TEST REPORT N°: KSK-ESH-P24071264B-4

3.7.5 Test Results

WCT1DR2201D

RX Worst-case Data

Frequency Range	30 MHz ~ 1 GHz	Operating Channel	Receiver mode
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Spurious Emission Level				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
61.65	H	-60.57	-57.00	3.57
144.61	H	-60.82	-57.00	3.82
160.94	H	-60.47	-57.00	3.47
178.58	H	-60.21	-57.00	3.21
190.06	H	-58.67	-57.00	1.67
223.72	H	-62.98	-57.00	5.98
68.34	V	-59.23	-57.00	2.23
86.91	V	-58.73	-57.00	1.73
97.68	V	-61.14	-57.00	4.14
102.05	V	-59.72	-57.00	2.72
500.22	V	-63.97	-57.00	6.97
557.67	V	-66.83	-57.00	9.83

Frequency Range	1 GHz ~ 12.75 GHz	Operating Channel	Receiver mode
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Spurious Emission Level				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1230.40	H	-66.12	-47.00	19.12
1375.65	H	-64.31	-47.00	17.31
1708.27	H	-59.05	-47.00	12.05
2475.92	H	-58.72	-47.00	11.72
3520.45	H	-60.77	-47.00	13.77
5808.12	H	-55.68	-47.00	8.68
1170.26	V	-59.71	-47.00	12.71
1704.32	V	-59.16	-47.00	12.16
2348.05	V	-60.08	-47.00	13.08
3525.10	V	-60.51	-47.00	13.51
5817.65	V	-57.41	-47.00	10.41
9462.16	V	-55.68	-47.00	8.68



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WC0NR2201

RX Worst-case Data

Frequency Range	30 MHz ~ 1 GHz	Operating Channel	Receiver mode
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Spurious Emission Level				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
45.22	H	-62.82	-57.00	5.82
67.53	H	-59.47	-57.00	2.47
115.16	H	-66.19	-57.00	9.19
154.95	H	-59.58	-57.00	2.58
211.74	H	-65.64	-57.00	8.64
276.85	H	-65.34	-57.00	8.34
60.32	V	-65.27	-57.00	8.27
71.44	V	-65.72	-57.00	8.72
123.39	V	-63.36	-57.00	6.36
181.75	V	-65.14	-57.00	8.14
252.52	V	-64.22	-57.00	7.22
317.26	V	-67.11	-57.00	10.11

Frequency Range	1 GHz ~ 12.75 GHz	Operating Channel	Receiver mode
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Spurious Emission Level				
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin (dB)
1317.25	H	-56.21	-47.00	9.21
1985.37	H	-54.62	-47.00	7.62
2345.94	H	-55.94	-47.00	8.94
3527.45	H	-59.72	-47.00	12.72
4512.23	H	-62.64	-47.00	15.64
8021.50	H	-57.12	-47.00	10.12
1175.17	V	-59.43	-47.00	12.43
1705.26	V	-59.27	-47.00	12.27
2345.07	V	-60.12	-47.00	13.12
3520.02	V	-60.44	-47.00	13.44
5818.58	V	-57.36	-47.00	10.36
9465.10	V	-55.57	-47.00	8.57



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3.8 Receiver Blocking

3.8.1 Limit of Receiver Blocking

This requirement applies to all receiver categories.

Receiver Category		
☒ Category 1	☐ Category 2	☐ Category 3
Minimum performance criterion	☒ PER $\leq 10\%$	
	☐ Alternative performance criteria (See note)	
Note: The manufacturer was declared performance criteria is x% for the intended use of the equipment.		

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 dBm + 10 × log10(OCBW)) or -68 dBm whichever is less (see note 2)	2 380	-34	CW
	2 504		
(-139 dBm + 10 × log10(OCBW)) or -74 dBm whichever is less (see note 3)	2 300		
	2 330		
	2 360		
	2 524		
	2 584		
	2 674		

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: 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 $P_{min} + 20$ 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 0dBi 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.

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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)	2 380 2 504 2 300 2 584	-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 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)	2 380 2 504 2 300 2 584	-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 the 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 0dBi 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

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3.8.2 Test Procedure

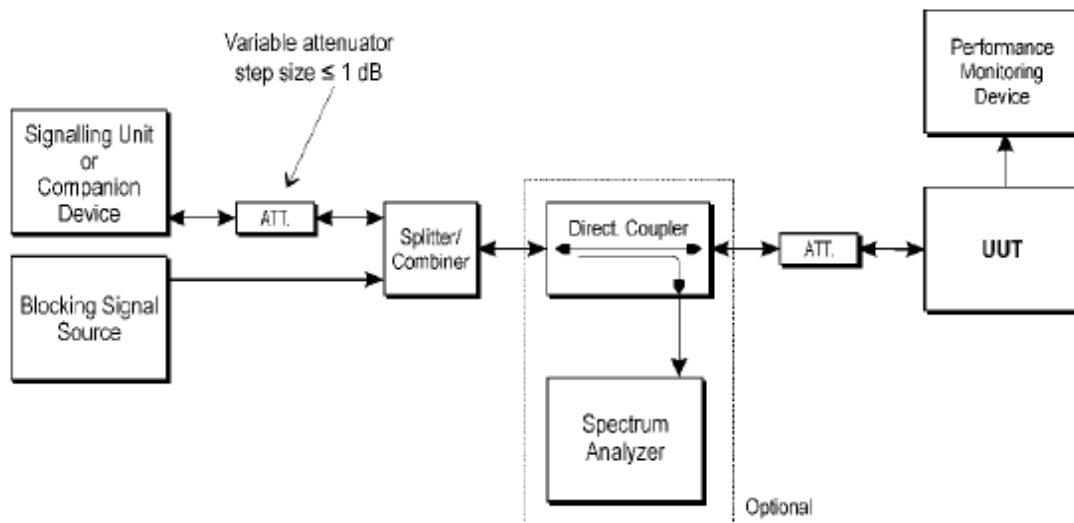
1. Refer to chapter 5.4.11.2 of EN 300 328 V2.2.2.
2. For systems using multiple receive chains only one chain (antenna port) need to be tested.

Measurement Method	
☒ Conducted measurement	☐ Radiated measurement

3.8.3 Deviation from Test Standard

No deviation.

3.8.4 Test Setup Configuration



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3.8.5 Test Results
Receiver Category 1 Equipment

Receiver blocking performance when operating at the lowest operating channel	
The actual blocking signal power(Note1)	antenna gain(G) :2.8dBi
	☒ at the antenna connector
	☐ in front of the antenna
Note1: For the conducted measurements , the level shall be corrected as follows: the actual blocking signal power = blocking signal power + G	

WCT1DR2201D

Test Mode	Antenna	Channel [MHz]	Wanted signal [dBm]	Freq. [MHz]	CW [dBm]	PER [%]	Limit [%]	Verdict
11B	Ant1	2412	-71.2	2300	-31.2	2.50	≤10	PASS
			-71.2	2330	-31.2	1.50	≤10	PASS
			-71.2	2360	-31.2	1.10	≤10	PASS
			-65.2	2380	-31.2	0.20	≤10	PASS
		2472	-65.2	2504	-31.2	0.20	≤10	PASS
			-71.2	2524	-31.2	0.40	≤10	PASS
			-71.2	2584	-31.2	0.10	≤10	PASS
			-71.2	2674	-31.2	0.60	≤10	PASS

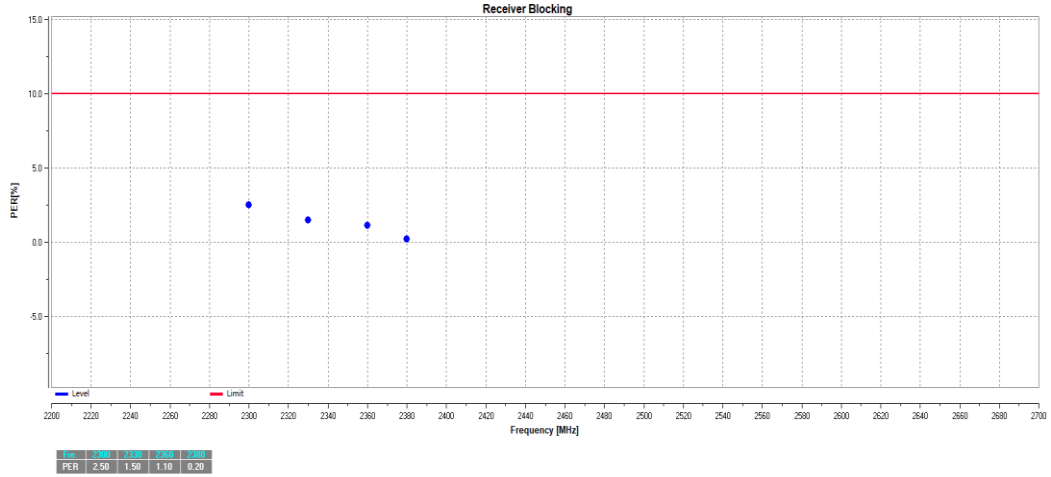
WC0NR2201

Test Mode	Antenna	Channel [MHz]	Wanted signal [dBm]	Freq. [MHz]	CW [dBm]	PER [%]	Limit [%]	Verdict
11B	Ant1	2412	-71.2	2300	-31.2	1.90	≤10	PASS
			-71.2	2330	-31.2	1.90	≤10	PASS
			-71.2	2360	-31.2	1.60	≤10	PASS
			-65.2	2380	-31.2	0.60	≤10	PASS
		2472	-65.2	2504	-31.2	0.20	≤10	PASS
			-71.2	2524	-31.2	0.20	≤10	PASS
			-71.2	2584	-31.2	0.10	≤10	PASS
			-71.2	2674	-31.2	0.50	≤10	PASS

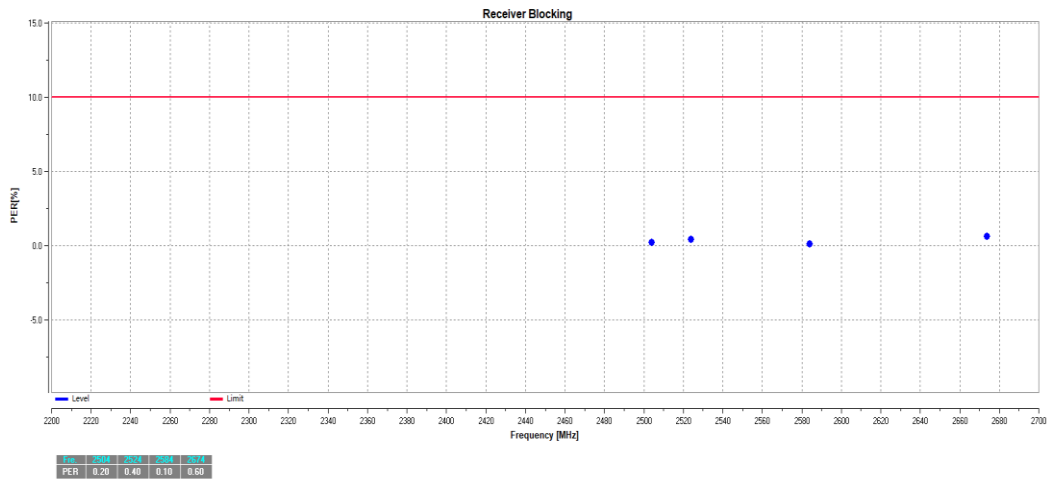
TEST REPORT N°: KSK-ESH-P24071264B-4

3.8.6 Test Graphs
WCT1DR2201D

11B_Ant1_2412



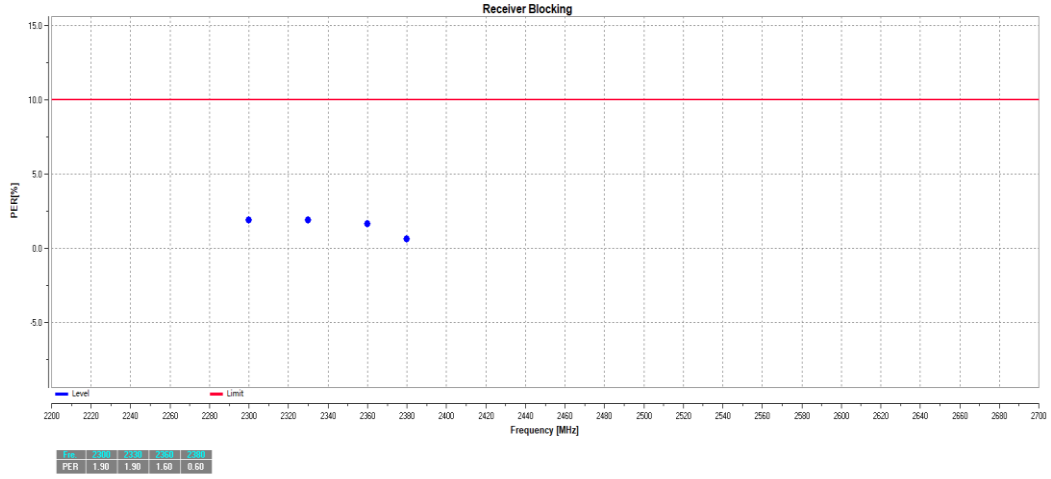
11B_Ant1_2472



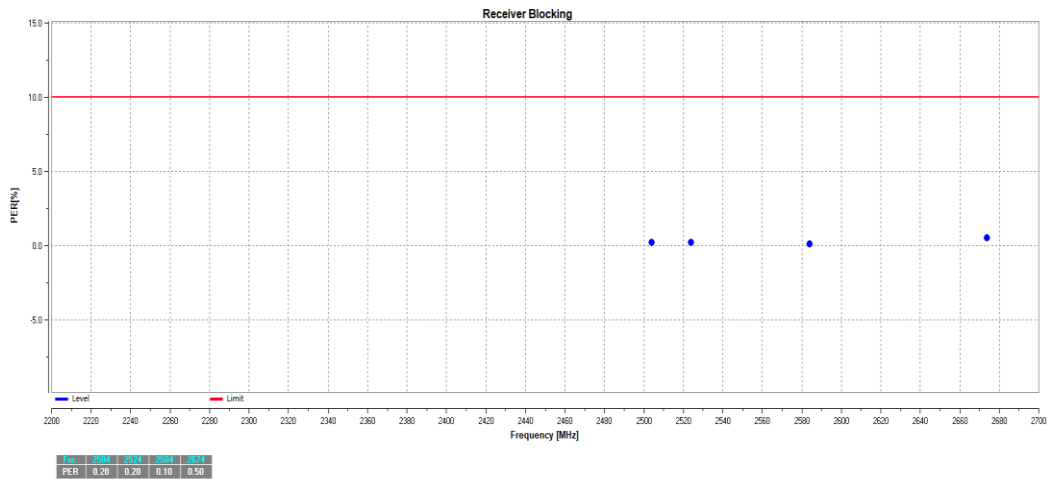
TEST REPORT N°: KSK-ESH-P24071264B-4

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11B_Ant1_2412

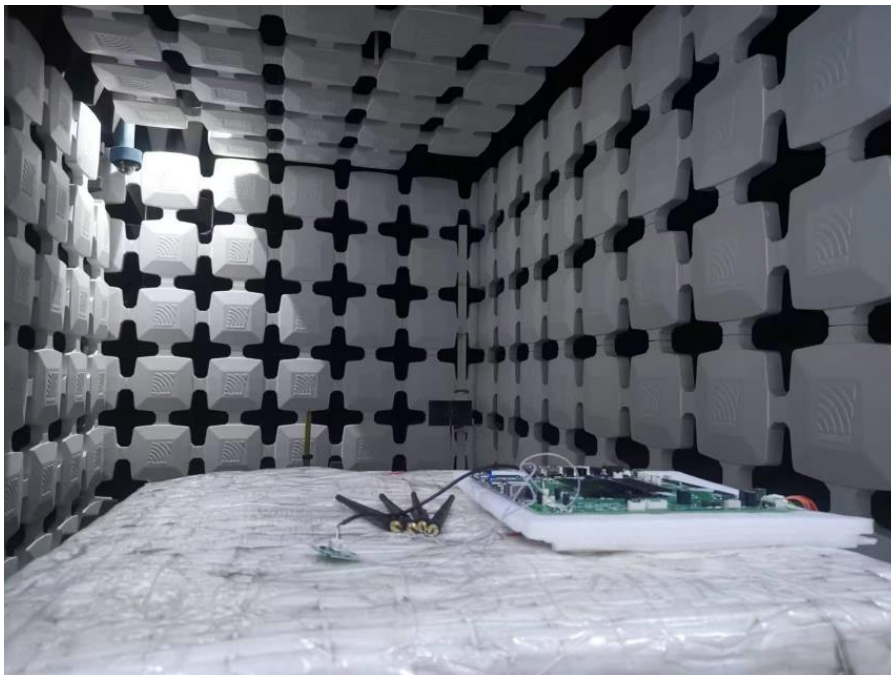
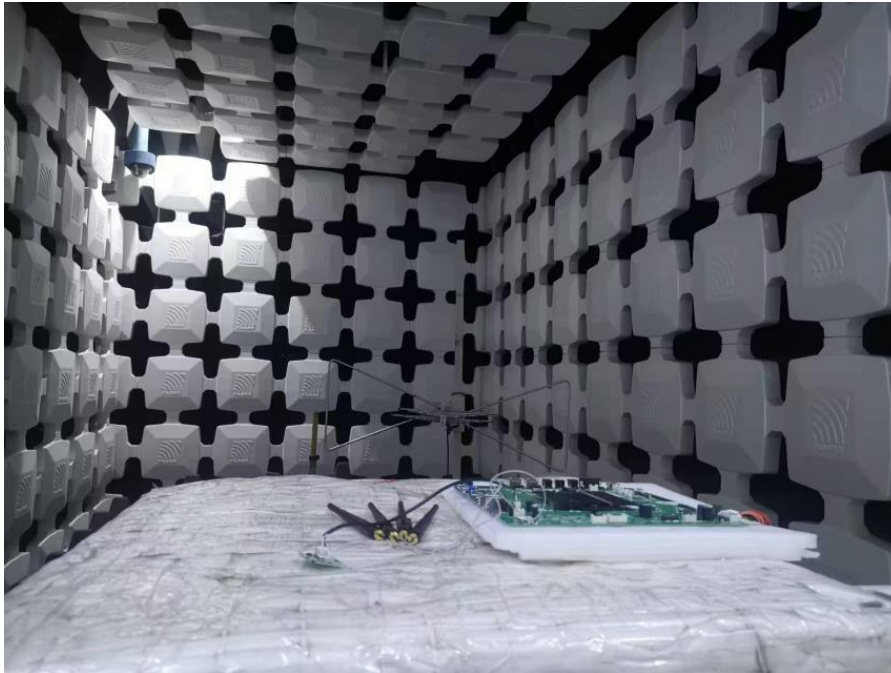


11B_Ant1_2472



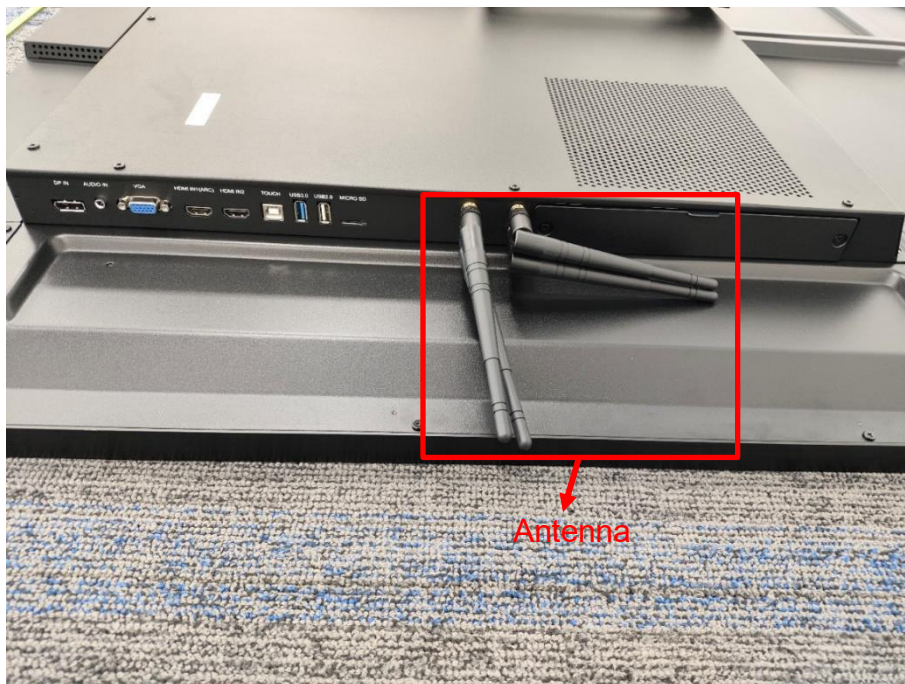
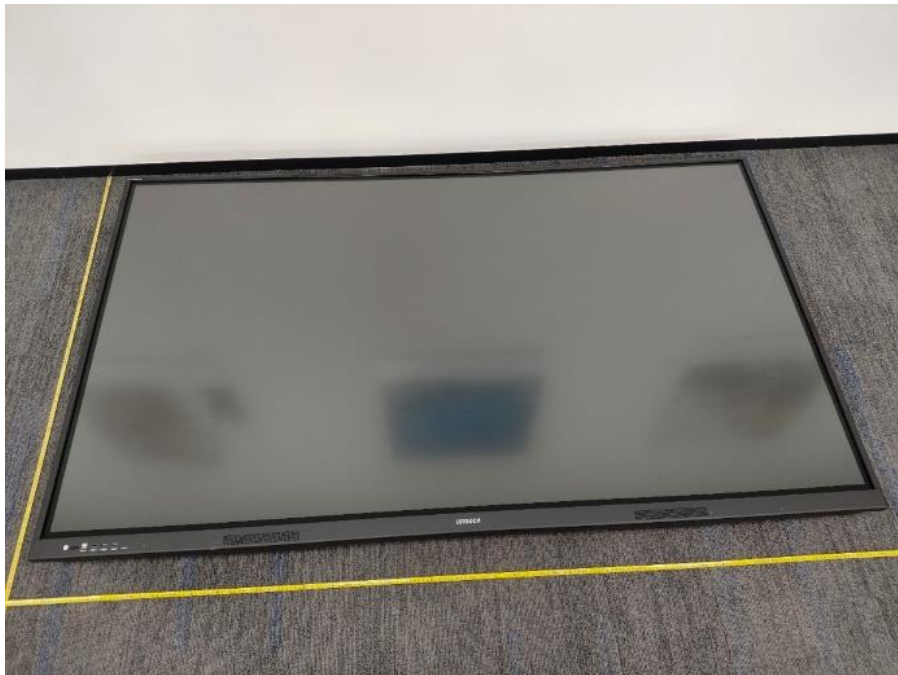
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4 Photographs of the Test Configuration

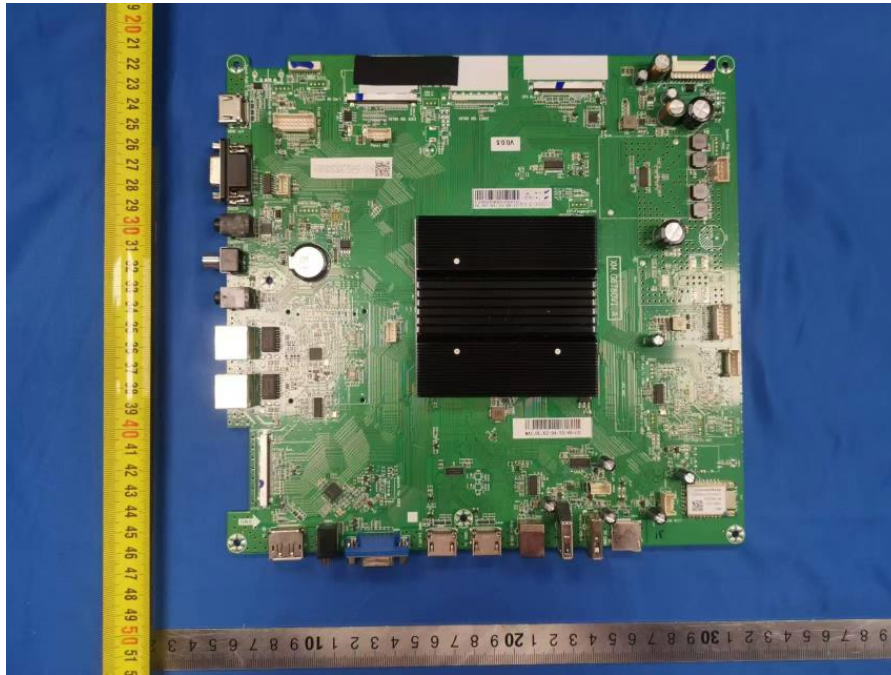


TEST REPORT N°: KSK-ESH-P24071264B-4

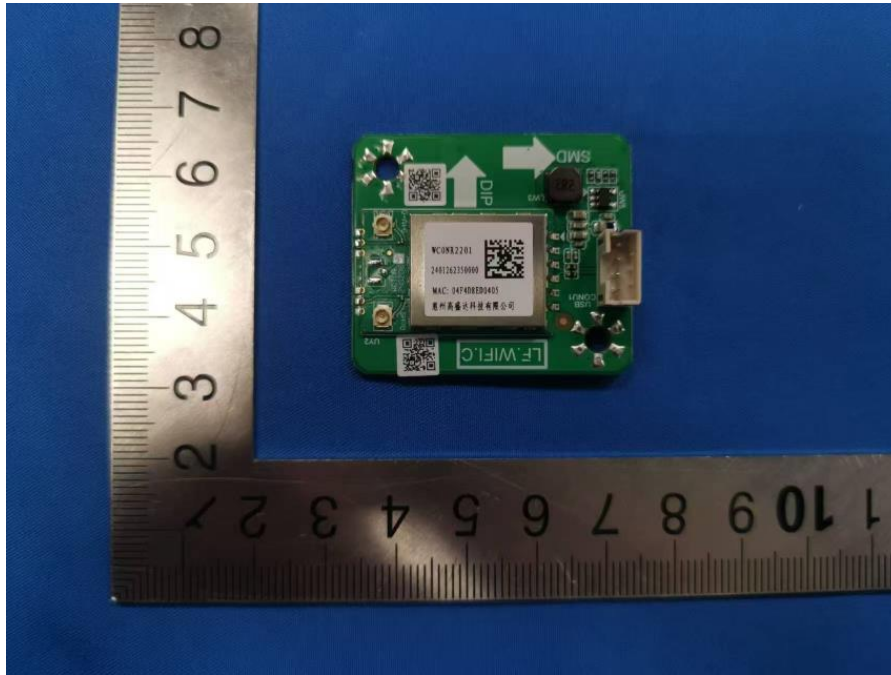
5 Photographs of the EUT



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APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

----- END -----

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