

FCC TAS ALGORITHM COMPLIANCE

TEST REPORT

FCC ID : B94HNI61KLR
Equipment : Notebook Computer
Brand Name : HP
Model Name : HSN-I61C
Applicant : HP Inc.
1501 Page Mill Road, Palo Alto CA 94304 USA
Standard : FCC 47 CFR Part 2 (2.1093)

The product was received on Sep. 18, 2024 and testing was started from Nov. 01, 2024 and completed on Nov. 02, 2024. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. Laboratory, the test report shall not be reproduced except in full.



Approved by: Cona Huang / Deputy Manager



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History of this test report

Report No.	Version	Description	Issued Date
FA490504B	01	Initial issue of report	Nov. 07, 2024

1. Test Setup Description

1.1 Measurement System

The conducted power measurement test setup is described in the following and illustrated in Figure 1

- The DUT is a RW350R-GL Cellular Modem installed inside HP model HSN-I61C Convertible PC.
- The control PC is used to configure the call box to send power control test sequences to the RW350R-GL
- Uplink signal power is monitored by the spectrum analyzer and recorded by the PC with a time resolution of 25 msec which is substantially less than the power adjustment interval (Avg_SAR_Check_Period) of 1 sec used for RW350R-GL.
- The values of Avg_SAR_Power are read from the RW350R-GL by the PC at each Avg_SAR_Check_Period
- In addition to power results, the time sequence of power control commands and power samples are also recorded by the PC to enable results to be correlated and plotted. Uplink signal from the RW350R-GL is fed through a 3 dB power splitter, which delivers an equal amount of signal to the spectrum analyser and the call box. The splitter has high isolation between the spectrum analyser and the call box. Due to different uplink/downlink frequencies and the zero span time-domain measurement used, interference of uplink and downlink signals are avoided.
- Path loss in the power measurement setup from the RW350R-GL main antenna port to either the call box or the spectrum analyser is taken into account.

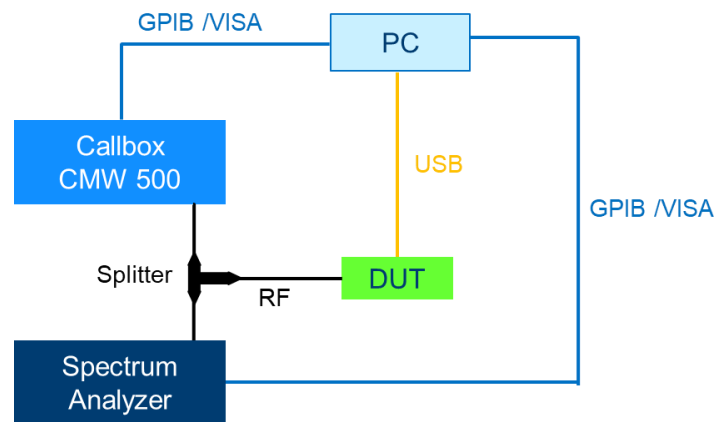


Figure 1 - Test Setup



2. Equipment list

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
R&S	Wideband Radio Communication Tester	CMX500	101931	Sep. 23, 2024	Sep. 22, 2025
R&S	Wideband Radio Communication Tester	CMW500	115793	Nov. 20, 2023	Nov. 19, 2024
R&S	Spectrum Analyzer	FSV3044	101103	Jan. 31, 2024	Jan. 30, 2025

3. Test samples

Sample	Description	Model	PC Serial	Module
#2	Notebook PC	HSN-I61C	00047709YR	RW350R-GL

4. Test Results

4.1 Summary of Test Cases

The following table lists the types of TAS algorithm validation tests performed and the corresponding Tables describing the test configurations and validation results.

The Average power is calculated using the measured instantaneous power and compared to the Upper Threshold Plus Tune-Up Tolerance. This is applied for all the test cases in this report.

Validation type	RAT	Configurations	Results	Verdict
Band validation	WDMa	Table 1	Section 4.2	PASS
Band validation	LTE			PASS
Band validation	5G NR			PASS
Time Varying Test Sequence	5G NR	Table 2	Section 4.3	PASS
Handover	LTE-LTE	Table 3	Section 4.4	PASS
Handover	LTE-WCDMA		Section 4.5	PASS
Call Drop and Reboot	5G NR	Table 4	Section 4.6/4.7	PASS



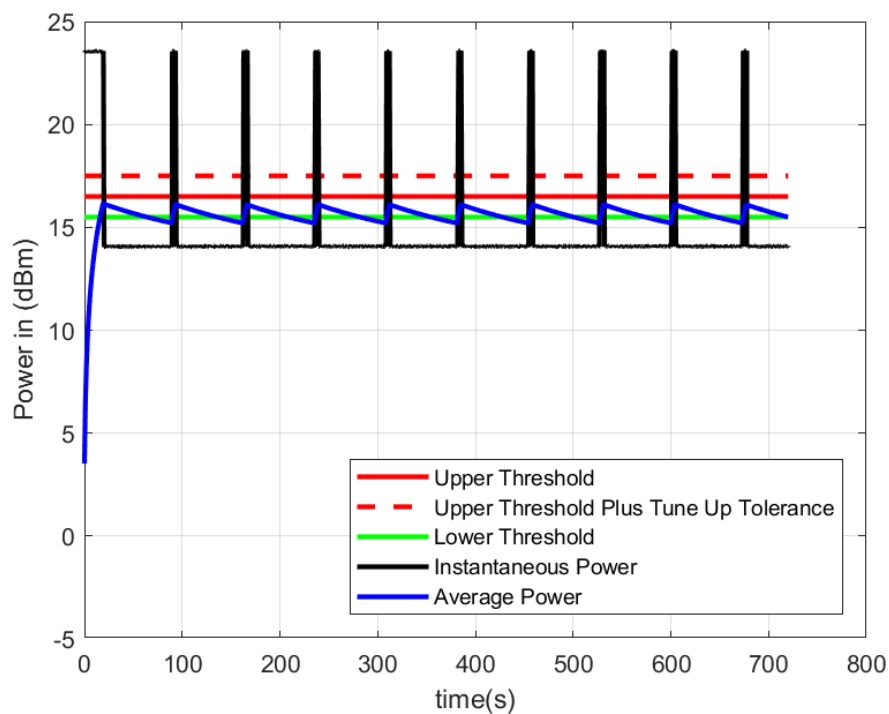
4.2 Bands Validation

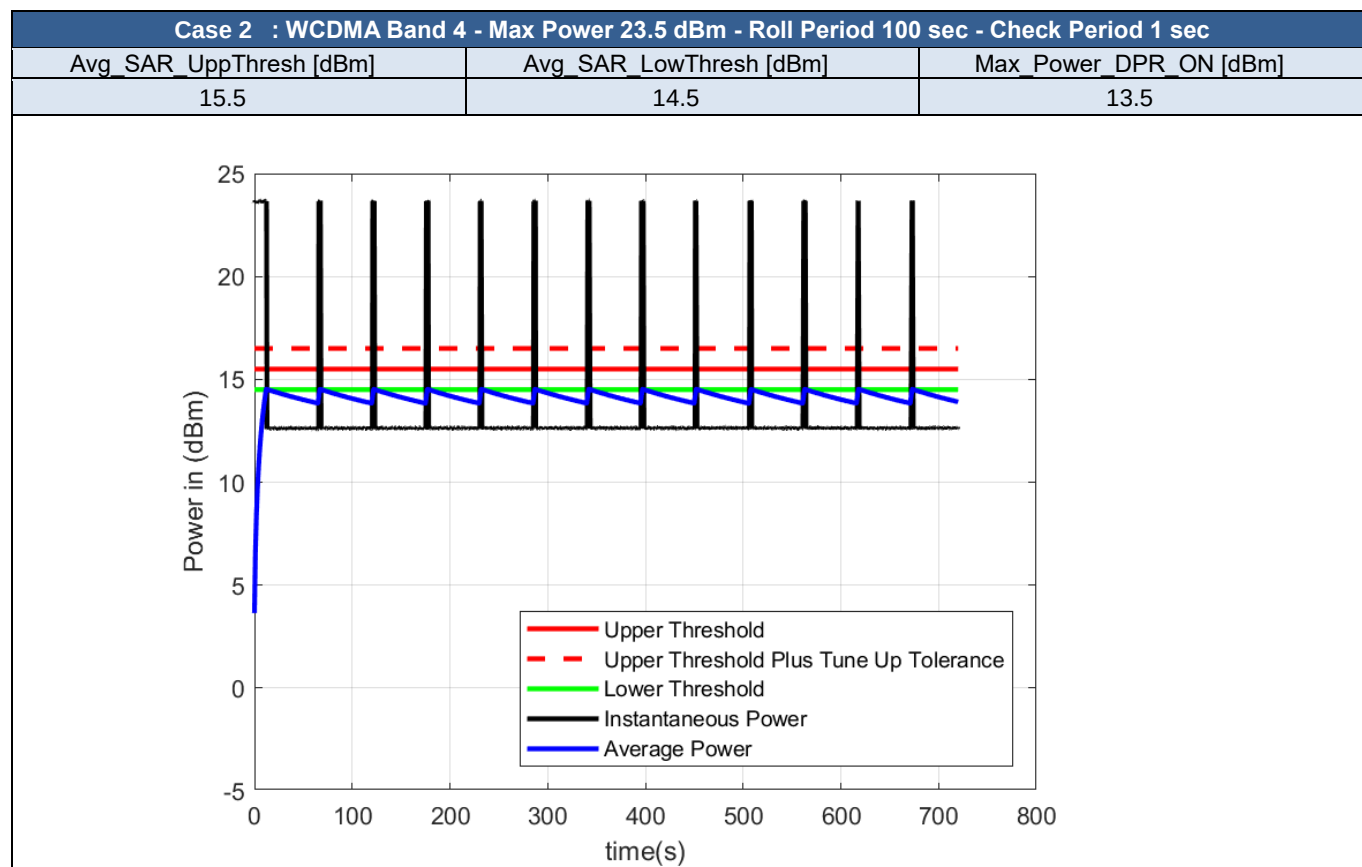
Table 1- Test cases for Band Validation

Test case #	Test scenario	Band	mode	Test Position	Gap (mm)	Antenna	Channel	Freq (MHz)	Max_Power DPR off Power (dBm)	Avg_SAR Upper Threshold [dBm]	Avg_SAR Low Threshold [dBm]	Max_Power DPR_ON [dBm]	Tolerance (dB)
1	Bands_Validation	WCDMA B2	RMC 12.2Kbps	Top Edge	0	Ant 8	9400	1880	23.5	16.5	15.5	14.5	1
2		WCDMA B4	RMC 12.2Kbps	Top Edge	0	Ant 8	1413	1732.6	23.5	15.5	14.5	13.5	1
3		WCDMA B5	RMC 12.2Kbps	Top Edge	0	Ant 5	4182	836.4	23.5	16.5	15.5	14.5	1
4		LTE B25/2	20M_QPSK_1_0	Top Edge	0	Ant 8	26340	1880	23	15.5	14.5	13.5	1
5		LTE B26/5	15M_QPSK_1_0	Top Edge	0	Ant 5	26865	831.5	23	16	15	14	1
6		LTE B7	20M_QPSK_1_0	Top Edge	0	Ant 8	21100	2535	23	13	12	11	1
7		LTE B38 pc3(B41)	20M_QPSK_1_0	Top Edge	0	Ant 8	40620	2593	23	16.5	15.5	14.5	1
8		LTE B41 pc3	20M_QPSK_1_0	Top Edge	0	Ant 8	40620	2593	23	16.5	15.5	14.5	1
9		LTE B66	20M_QPSK_1_0	Top Edge	0	Ant 8	132322	1745	23	15.5	14.5	13.5	1
10		FR1 n25/2	45M_BPSK_1_1	Top Edge	0	Ant 8	376500	1882.5	23	16.5	15.5	14.5	1
11		FR1 n26/5	20M_BPSK_1_1	Top Edge	0	Ant 5	166300	831.5	23	18	17	16	1
12		FR1 n7	50M_BPSK_1_1	Top Edge	0	Ant 8	507000	2535	23	13.5	12.5	11.5	1
13		FR1 n38 pc3(n41)	100M_BPSK_1_1	Top Edge	0	Ant 8	518598	2592.99	23	13	12	11	1
14		FR1 n41 pc3	100M_BPSK_1_1	Top Edge	0	Ant 8	518598	2592.99	23	13	12	11	1
15		FR1 n66	45M_BPSK_1_1	Top Edge	0	Ant 8	349000	1745	23	15.5	14.5	13.5	1

Case 1 : WCDMA Band 2 - Max Power 23.5 dBm - Roll Period 100 sec - Check Period 1 sec

Avg_SAR_UppThresh [dBm]	Avg_SAR_LowThresh [dBm]	Max_Power_DPR_ON [dBm]
16.5	15.5	14.5







Case 3 : WCDMA Band 5 - Max Power 23.5 dBm - Roll Period 100 sec - Check Period 1 sec

Avg_SAR_UppThresh [dBm]

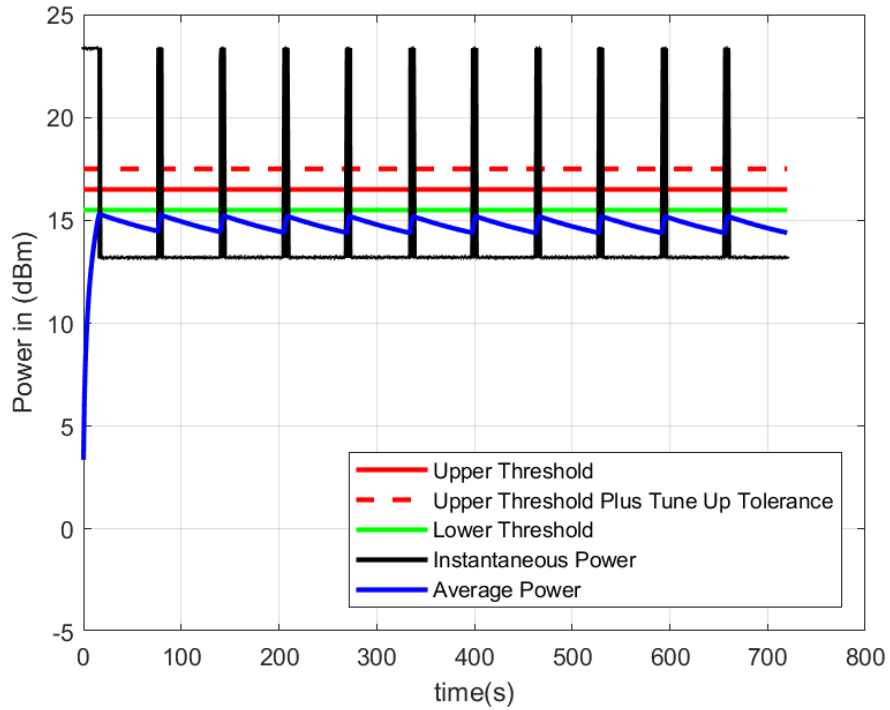
16.5

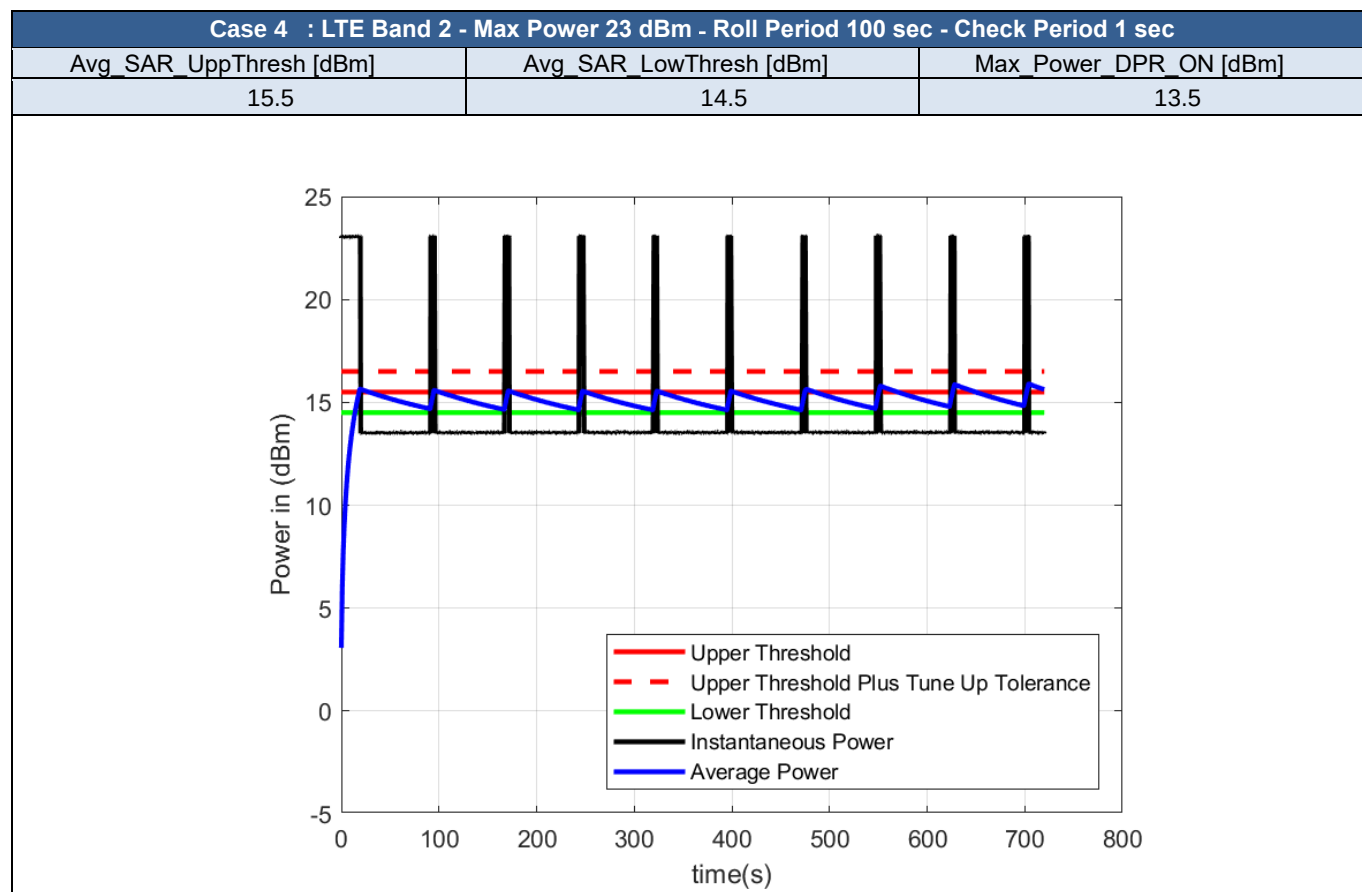
Avg_SAR_LowThresh [dBm]

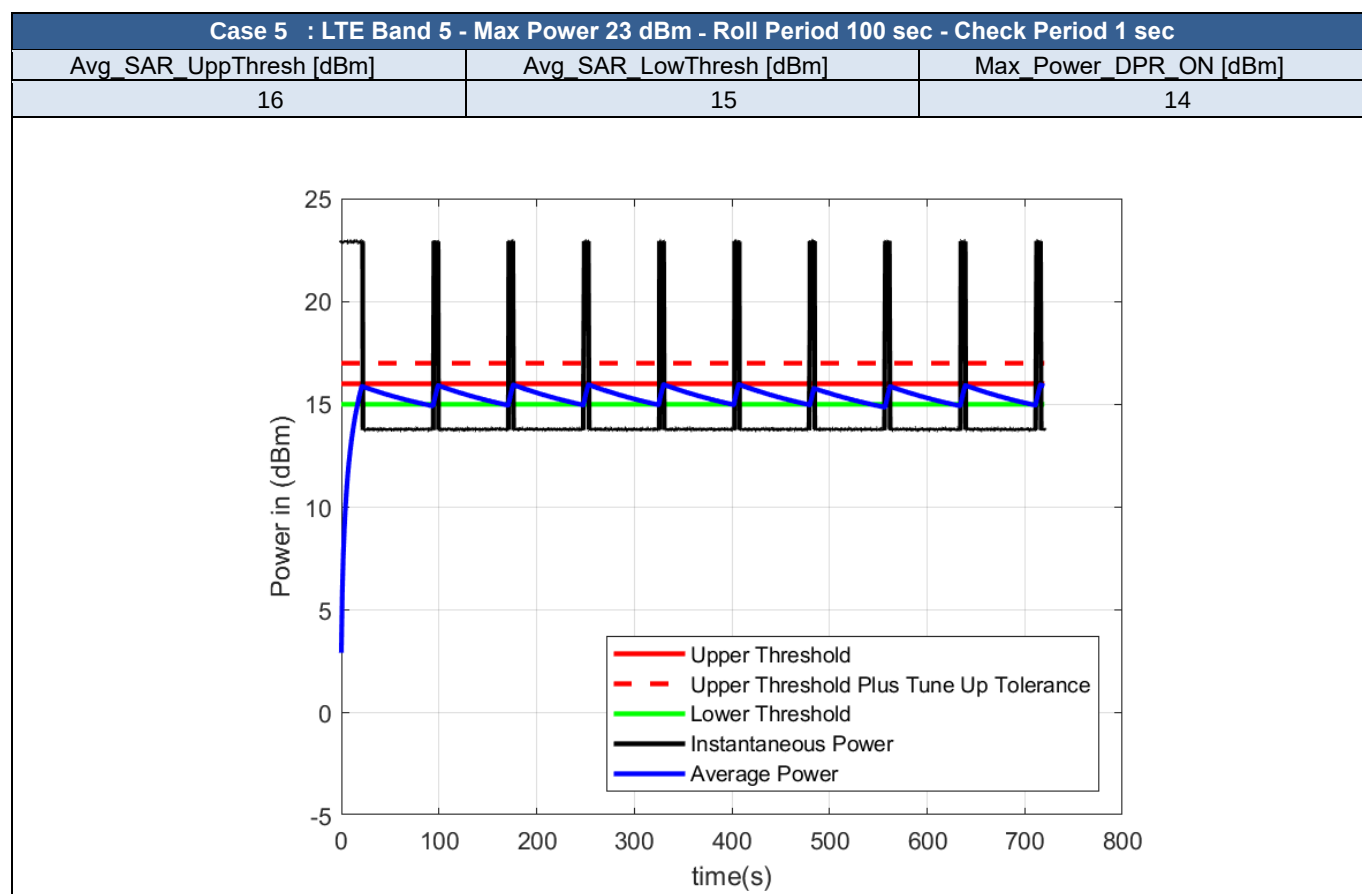
15.5

Max_Power_DPR_ON [dBm]

14.5



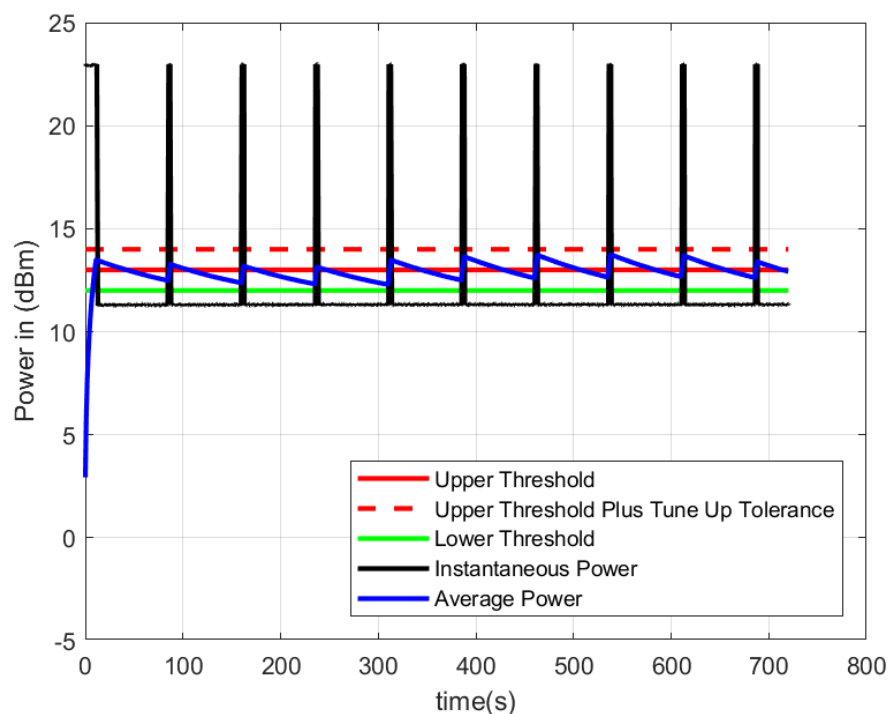


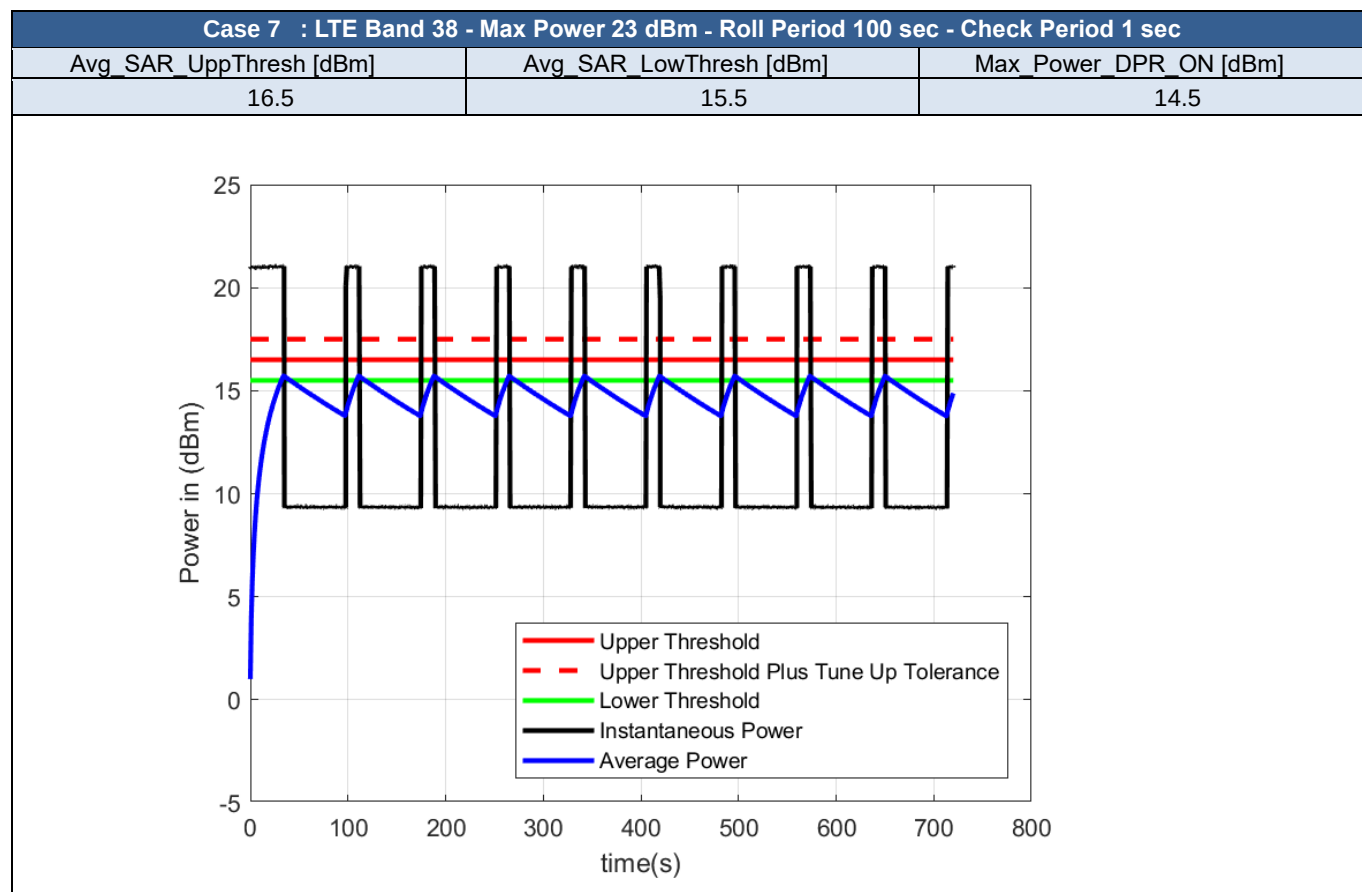


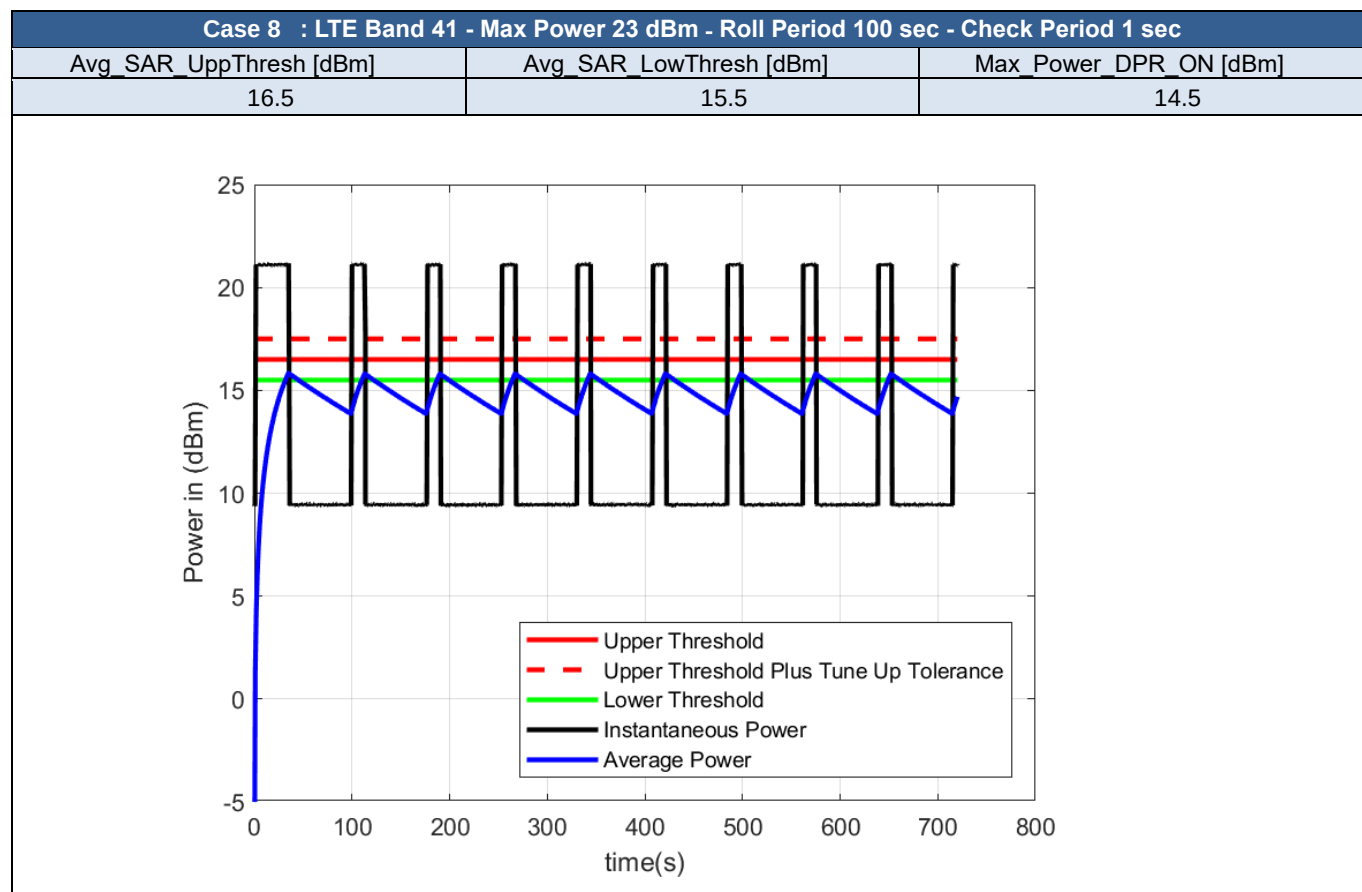


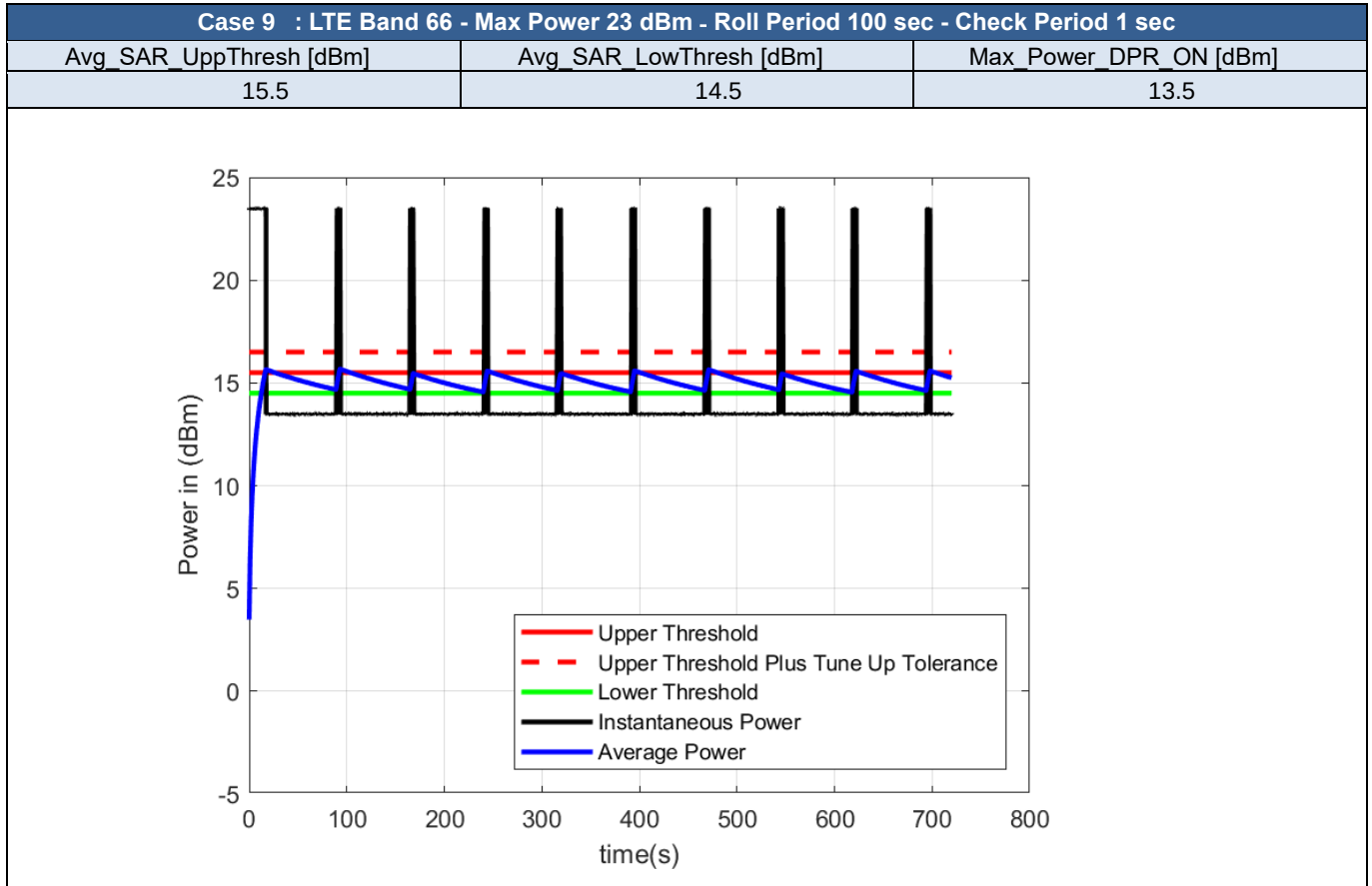
Case 6 : LTE Band 7 - Max Power 23 dBm - Roll Period 100 sec - Check Period 1 sec

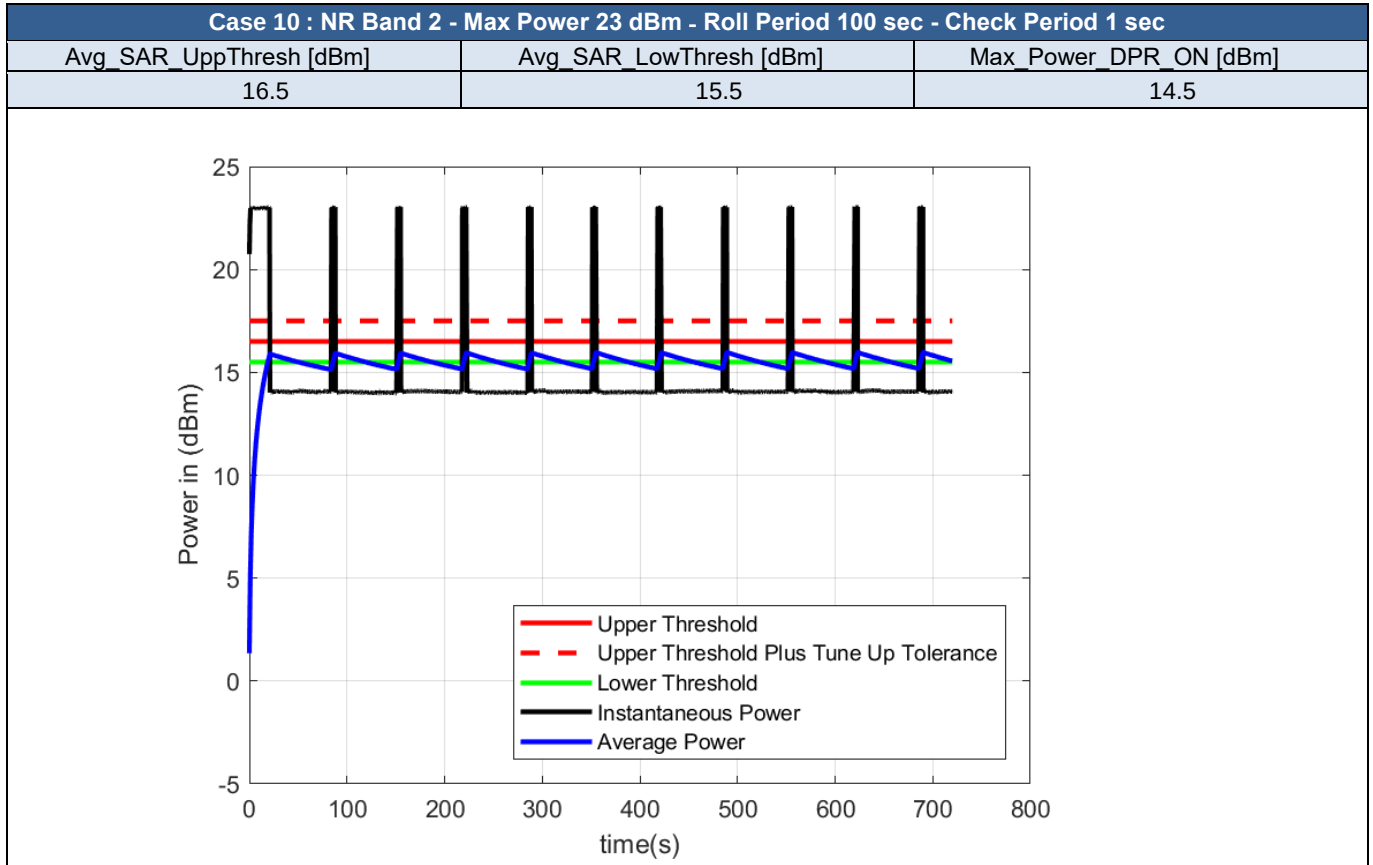
Avg_SAR_UppThresh [dBm]	Avg_SAR_LowThresh [dBm]	Max_Power_DPR_ON [dBm]
13	12	11

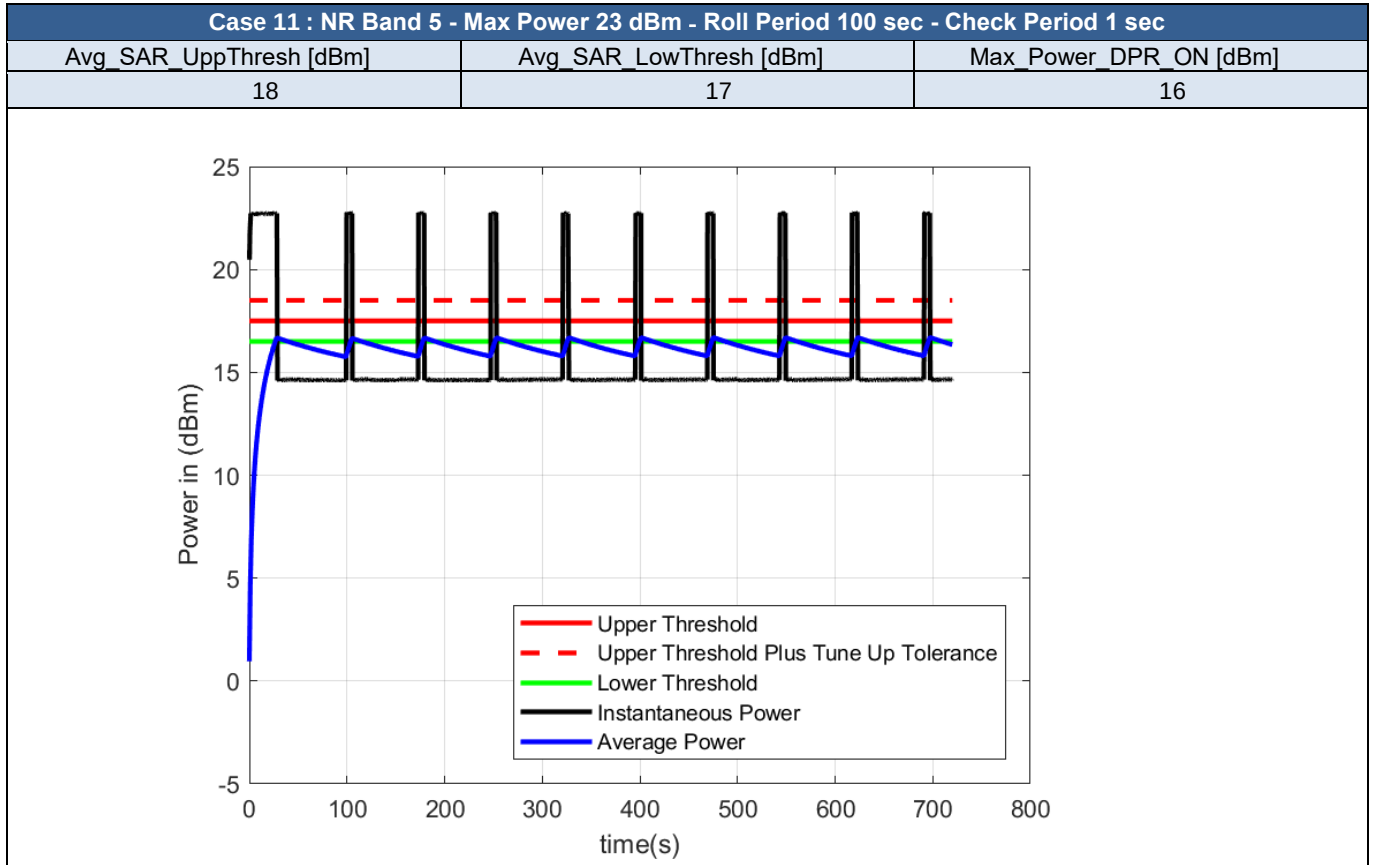


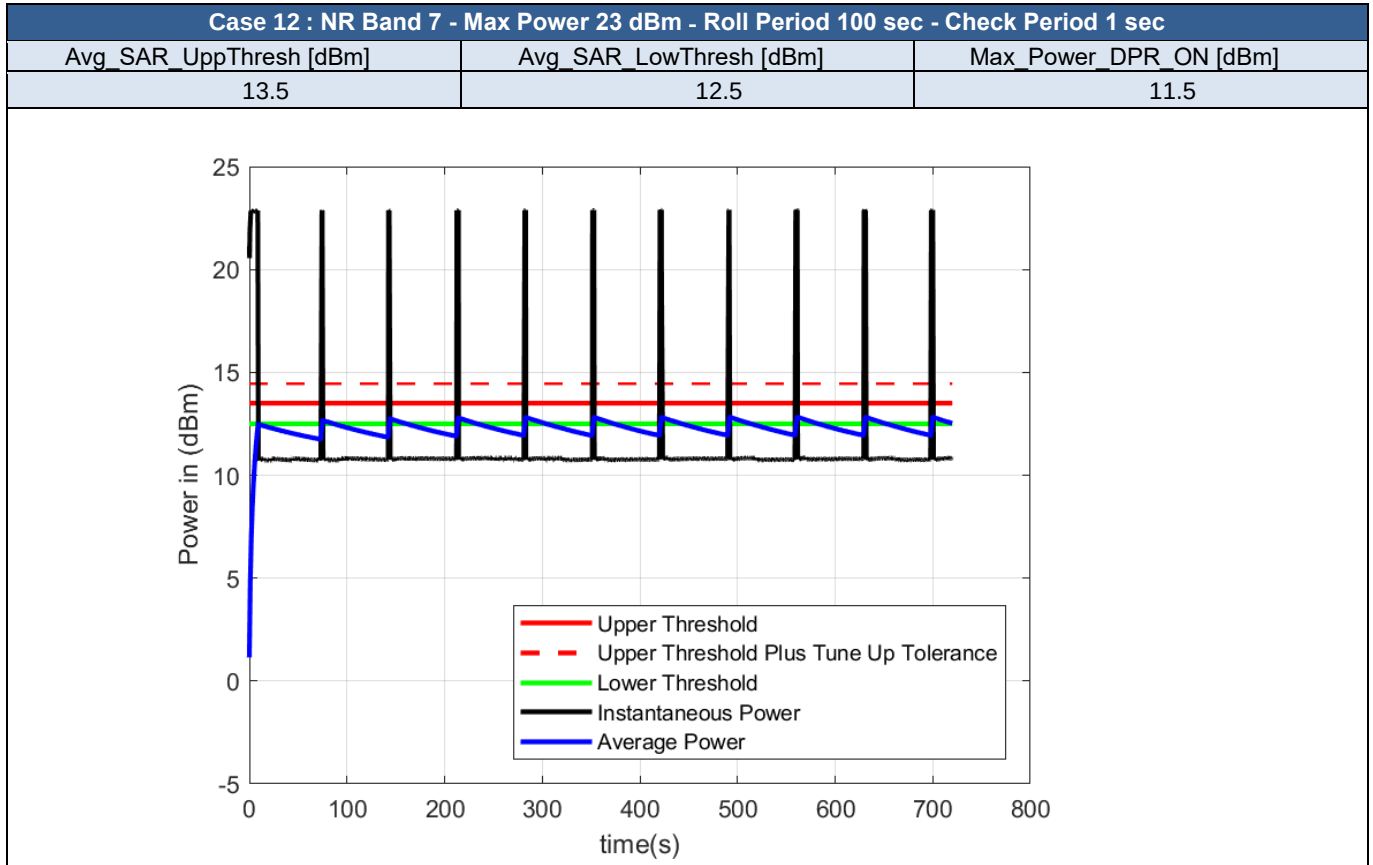


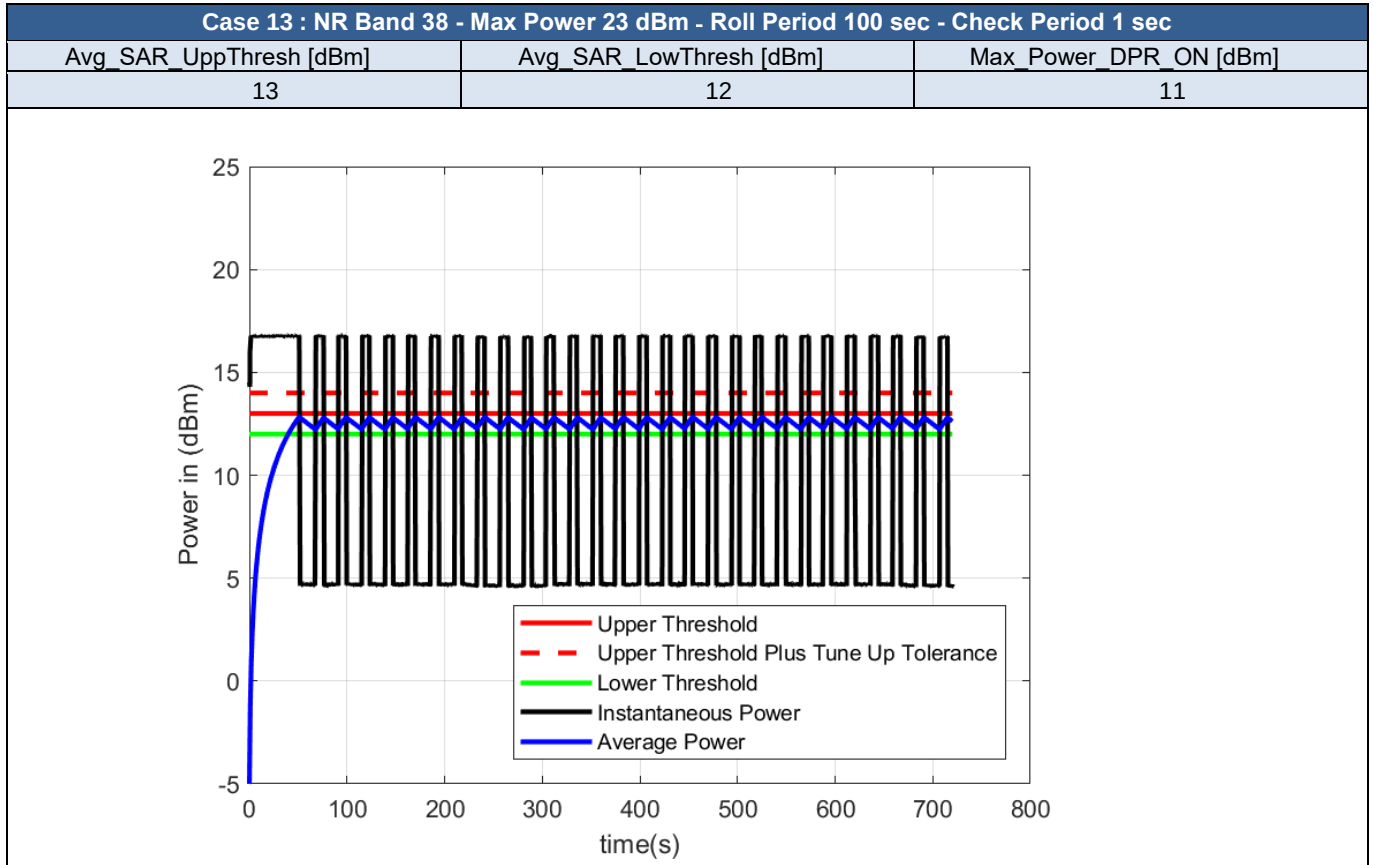


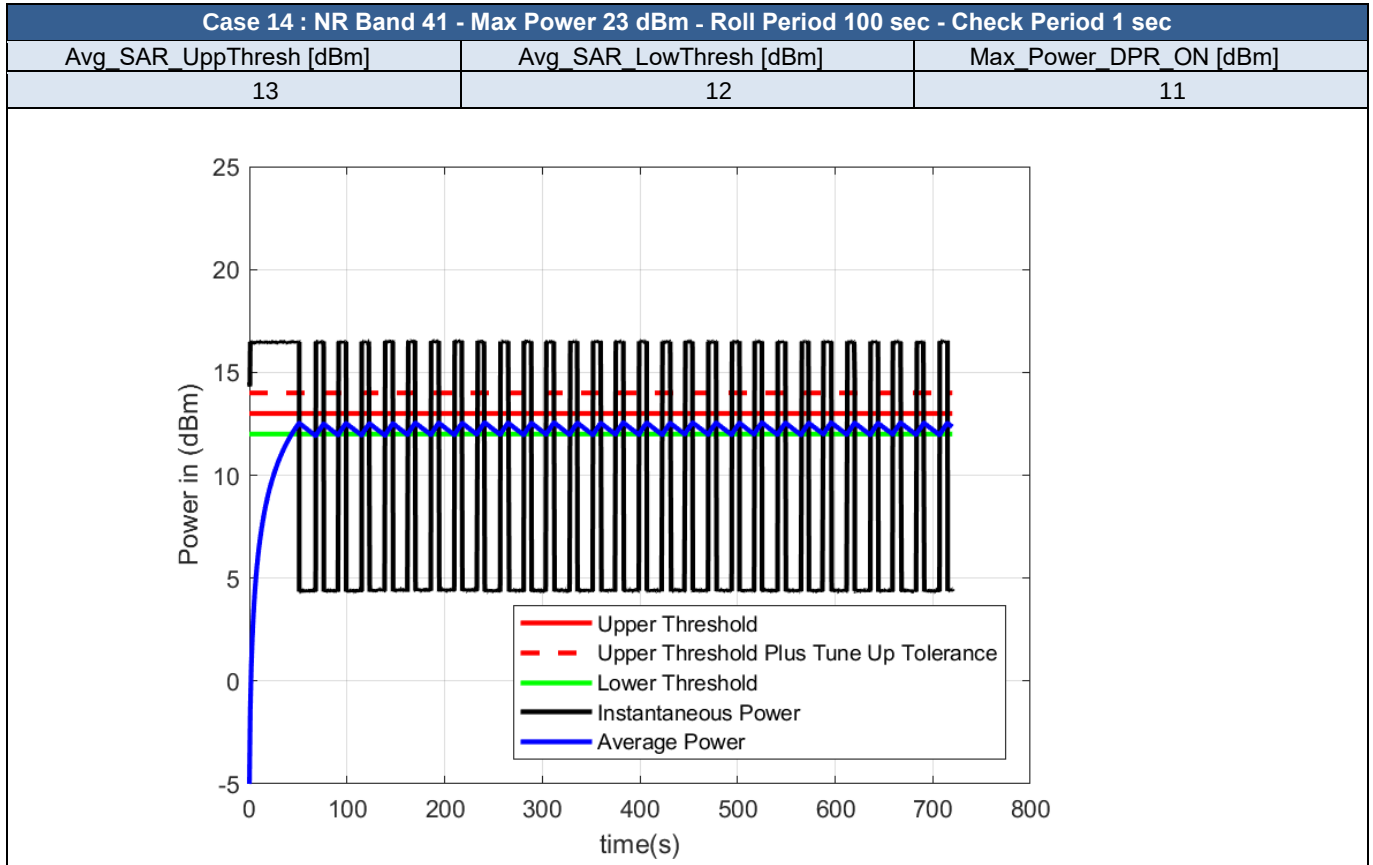












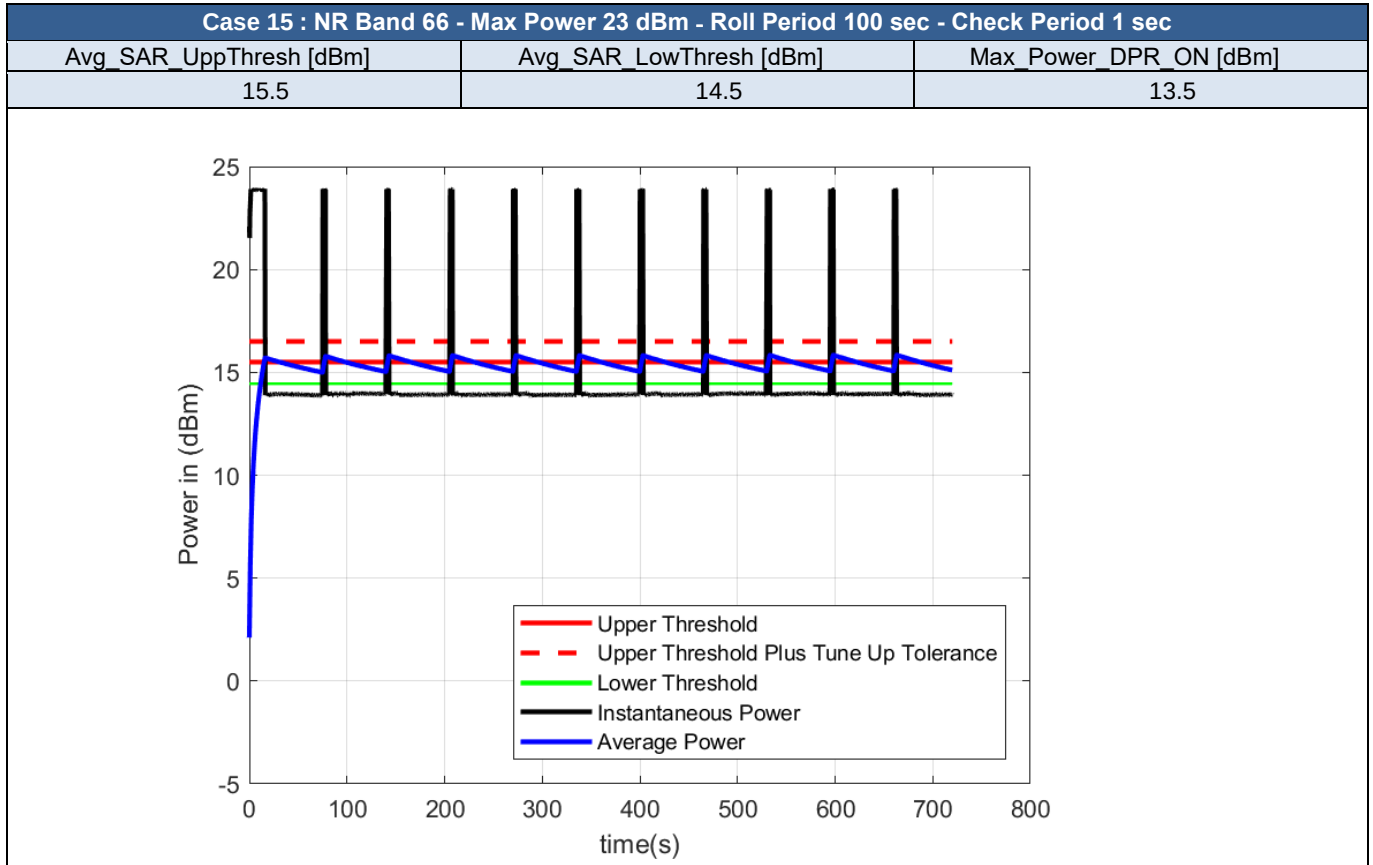
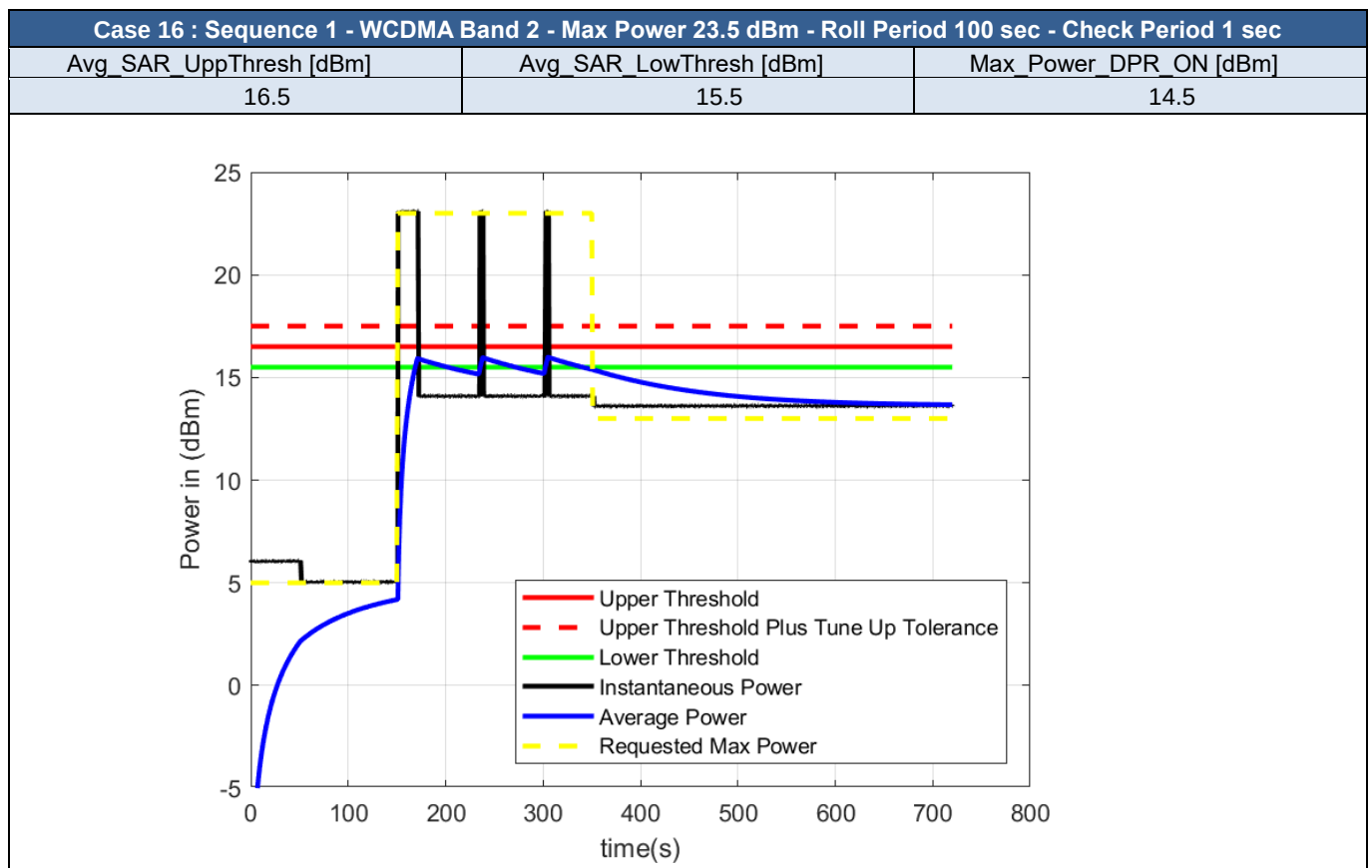


Table 2- Test cases for Time Varying Test Sequence

Test case #	Test scenario	Band	mode	Test Position	Gap (mm)	Antenna	Channel	Freq (MHz)	Max_Power DPR off Power (dBm)	Avg_SAR Upper Threshold [dBm]	Avg_SAR Low Threshold [dBm]	Max_Power DPR_ON [dBm]	Tolerance (dB)
16	Time_Varying	WCDMA B2	RMC 12.2Kbps	Top Edge	0	Ant 8	9400	1880	23.5	16.5	15.5	14.5	1
17		WCDMA B2	RMC 12.2Kbps	Top Edge	0	Ant 8	9400	1880	23.5	16.5	15.5	14.5	1
18		LTE B25/2	20M_QPSK_1_0	Top Edge	0	Ant 8	26340	1880	23	15.5	14.5	13.5	1
19		LTE B25/2	20M_QPSK_1_0	Top Edge	0	Ant 8	26340	1880	23	15.5	14.5	13.5	1
20		FR1 n26/5	20M_BPSK_1_1	Top Edge	0	Ant 5	166300	831.5	23	18	17	16	1
21		FR1 n26/5	20M_BPSK_1_1	Top Edge	0	Ant 5	166300	831.5	23	18	17	16	1

4.3 Time Varying Power Control Test Sequences Considered for Algorithm Validation





Case 17 : Sequence 2 - WCDMA Band 2 - Max Power 23.5 dBm - Roll Period 100 sec - Check Period 1 sec

Avg_SAR_UppThresh [dBm]

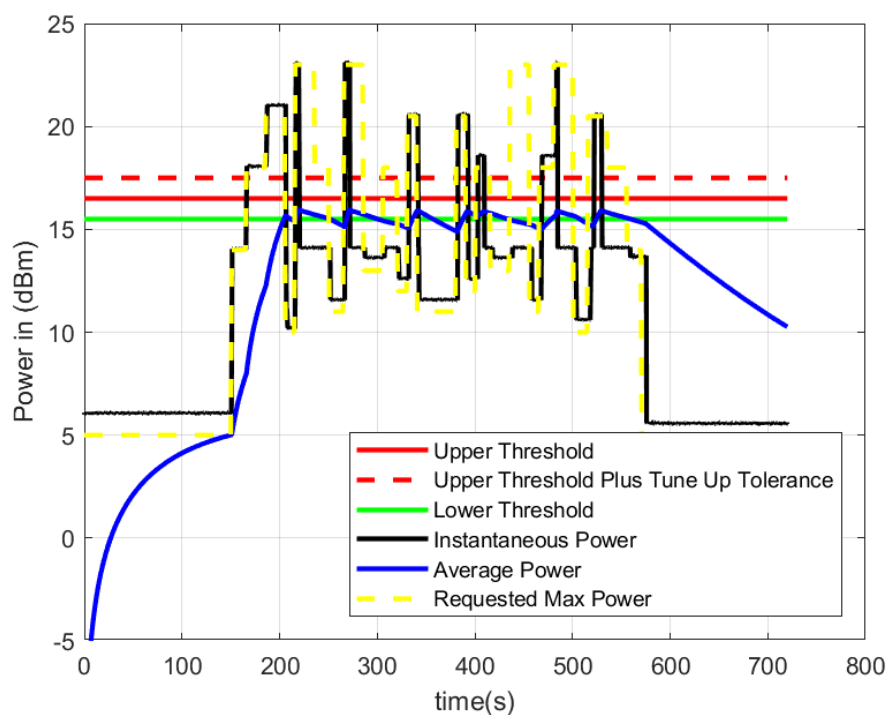
16.5

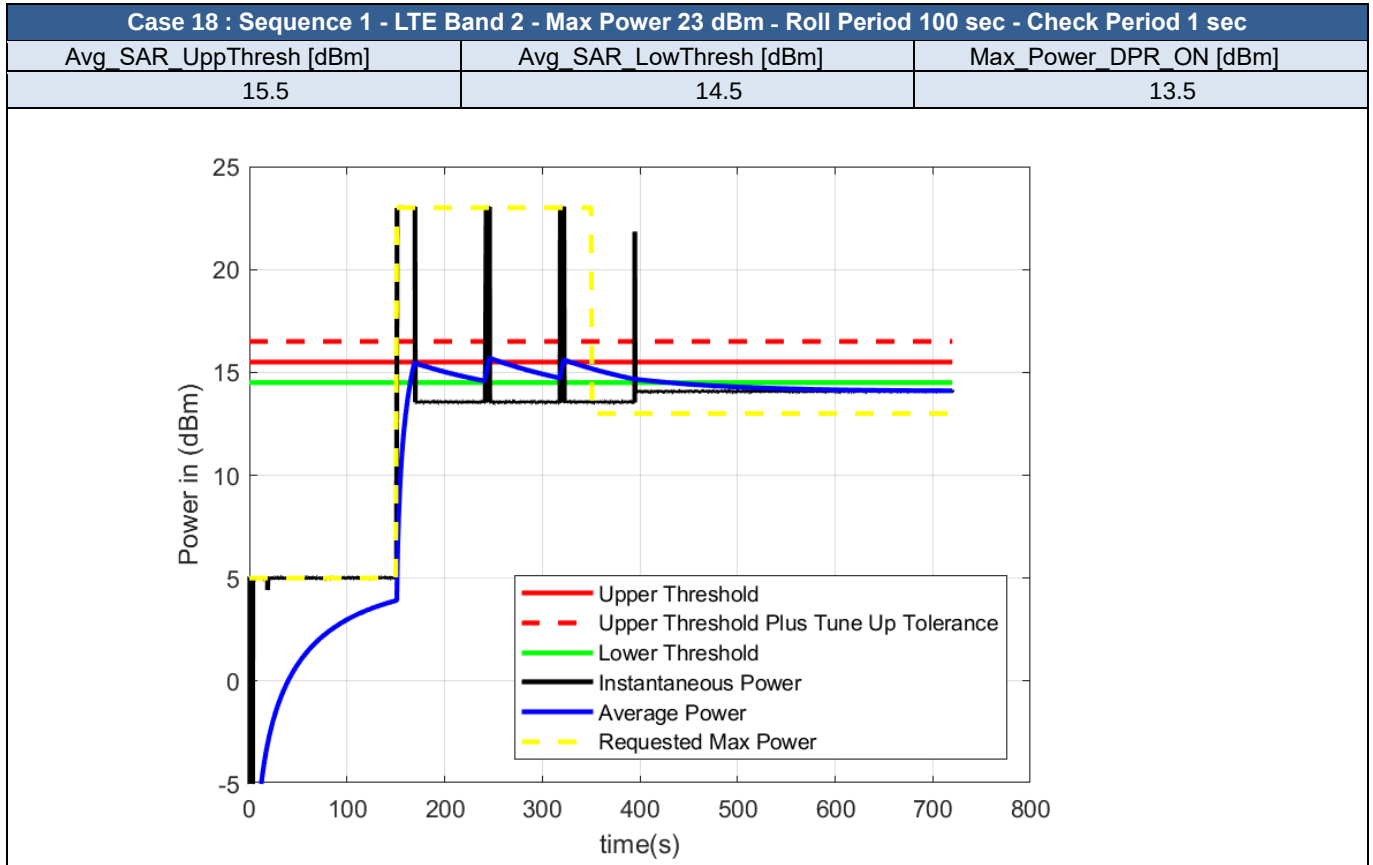
Avg_SAR_LowThresh [dBm]

15.5

Max_Power_DPR_ON [dBm]

14.5







Case 19 : Sequence 2 - LTE Band 2 - Max Power 23 dBm - Roll Period 100 sec - Check Period 1 sec

Avg_SAR_UppThresh [dBm]

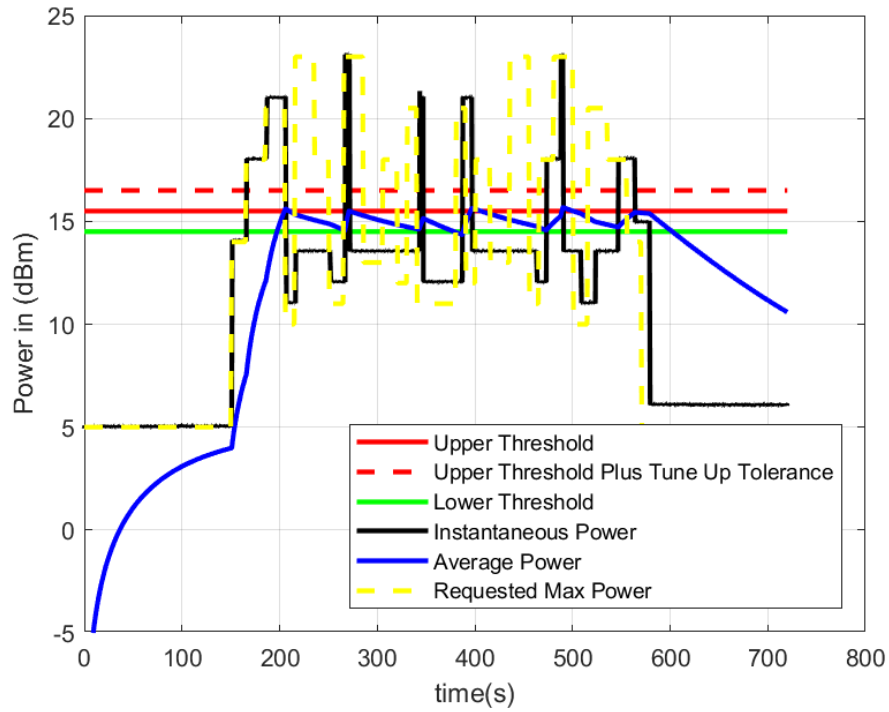
15.5

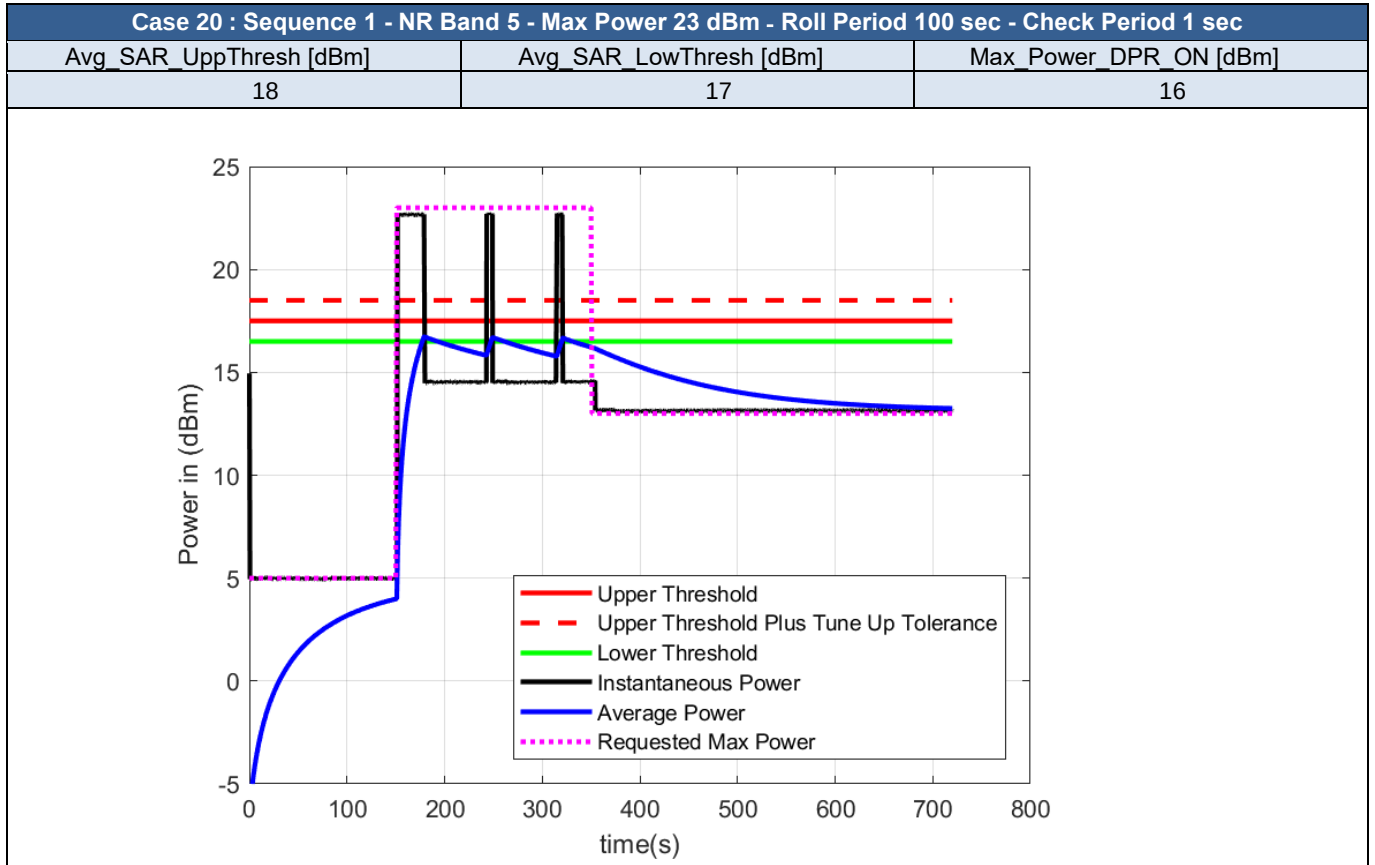
Avg_SAR_LowThresh [dBm]

14.5

Max_Power_DPR_ON [dBm]

13.5





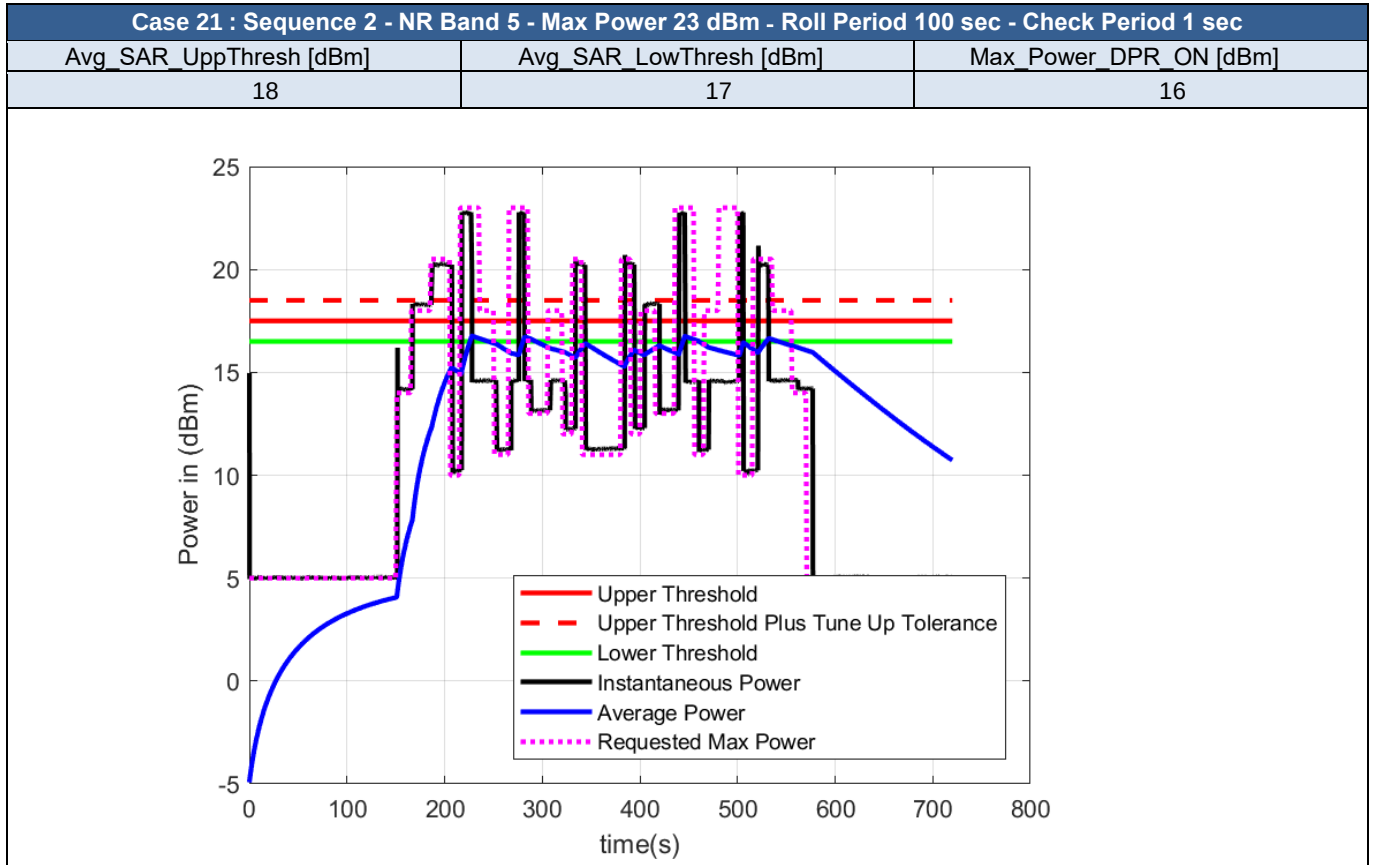
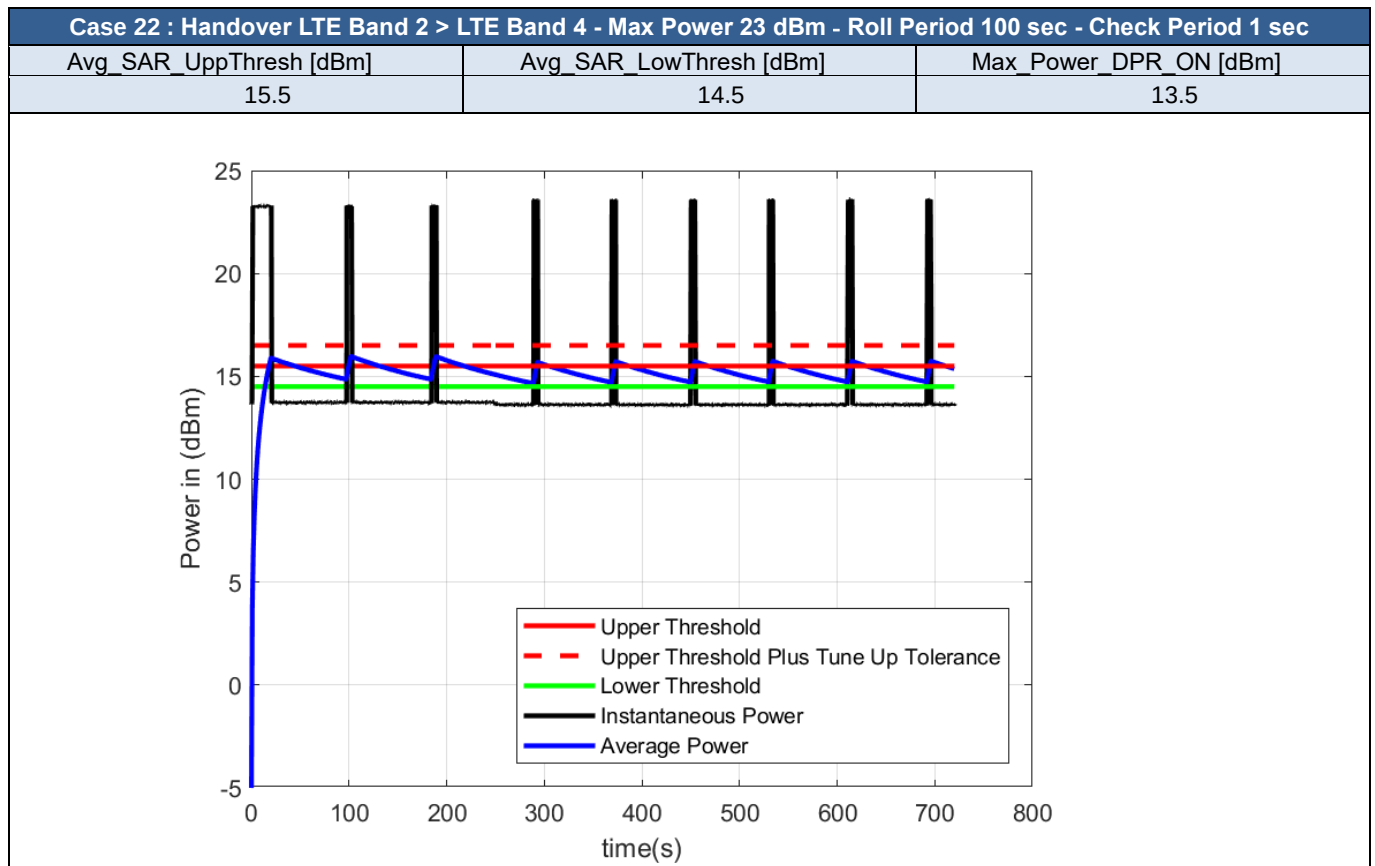


Table 3- Test cases for Handover

Test case #	Test scenario	Band	mode	Test Position	Gap (mm)	Antenna	Channel	Freq (MHz)	Max_Power DPR off Power (dBm)	Avg_SAR Upper Threshold [dBm]	Avg_SAR Low Threshold [dBm]	Max_Power DPR_ON [dBm]	Tolerance (dB)
22	Handover LTE_2_LTE_4	LTE B25/2	20M_QPSK_1_0	Top Edge	0	Ant 8	26340	1880	23	15.5	14.5	13.5	1
		LTE B/66/4	20M_QPSK_1_0	Top Edge	0	Ant 8	132322	1745	23	15.5	14.5	13.5	1
23	Handover LTE_2_WCDMA_4	LTE B25/2	20M_QPSK_1_0	Top Edge	0	Ant 8	26340	1880	23	15.5	14.5	13.5	1
		WCDMA B4	RMC 12.2Kbps	Top Edge	0	Ant 8	1413	1732.6	23.5	15.5	14.5	13.5	1

4.4 Handover Validation from- LTE-LTE



4.5 Handover Validation from- LTE-WCDMA

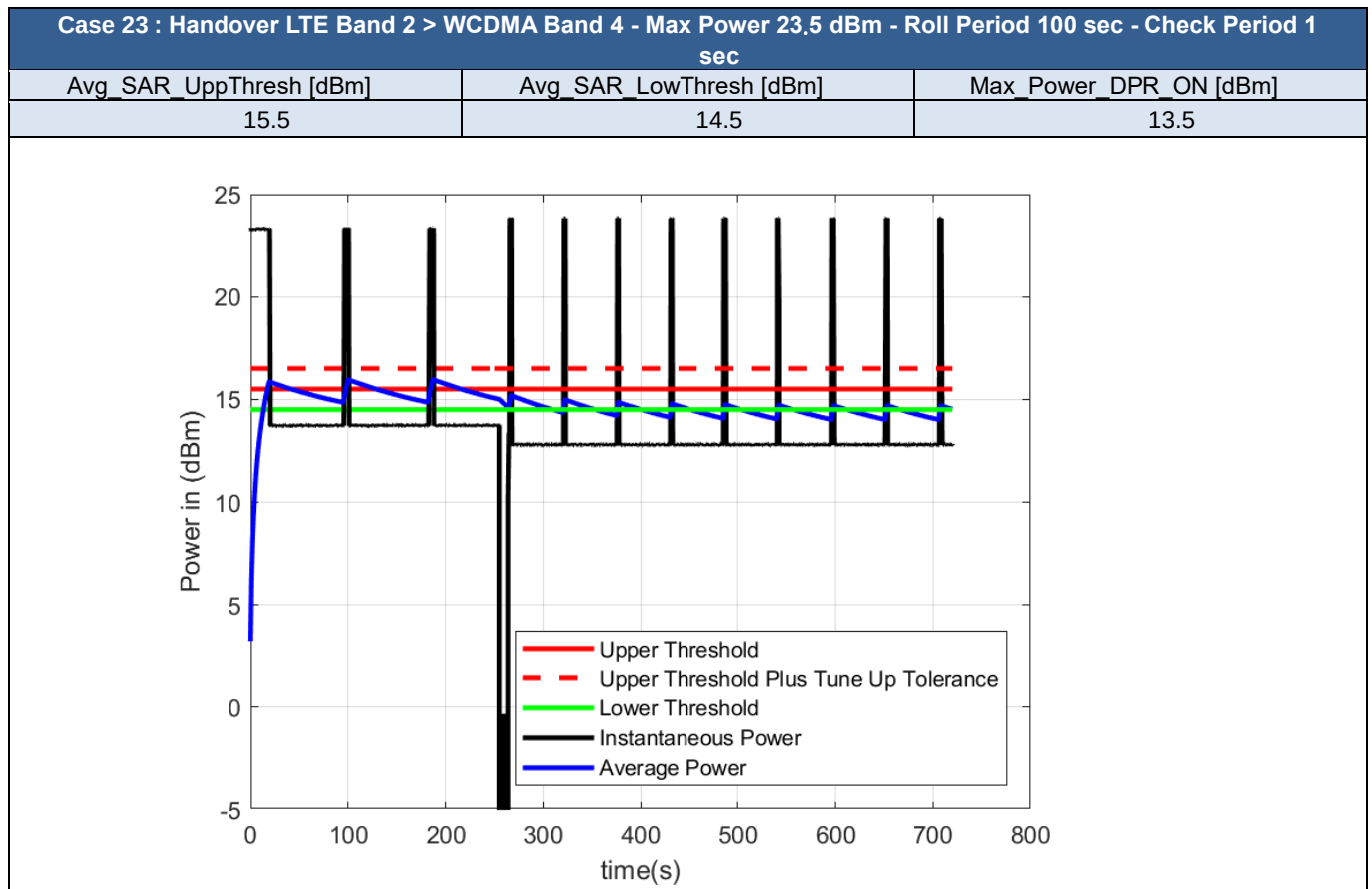
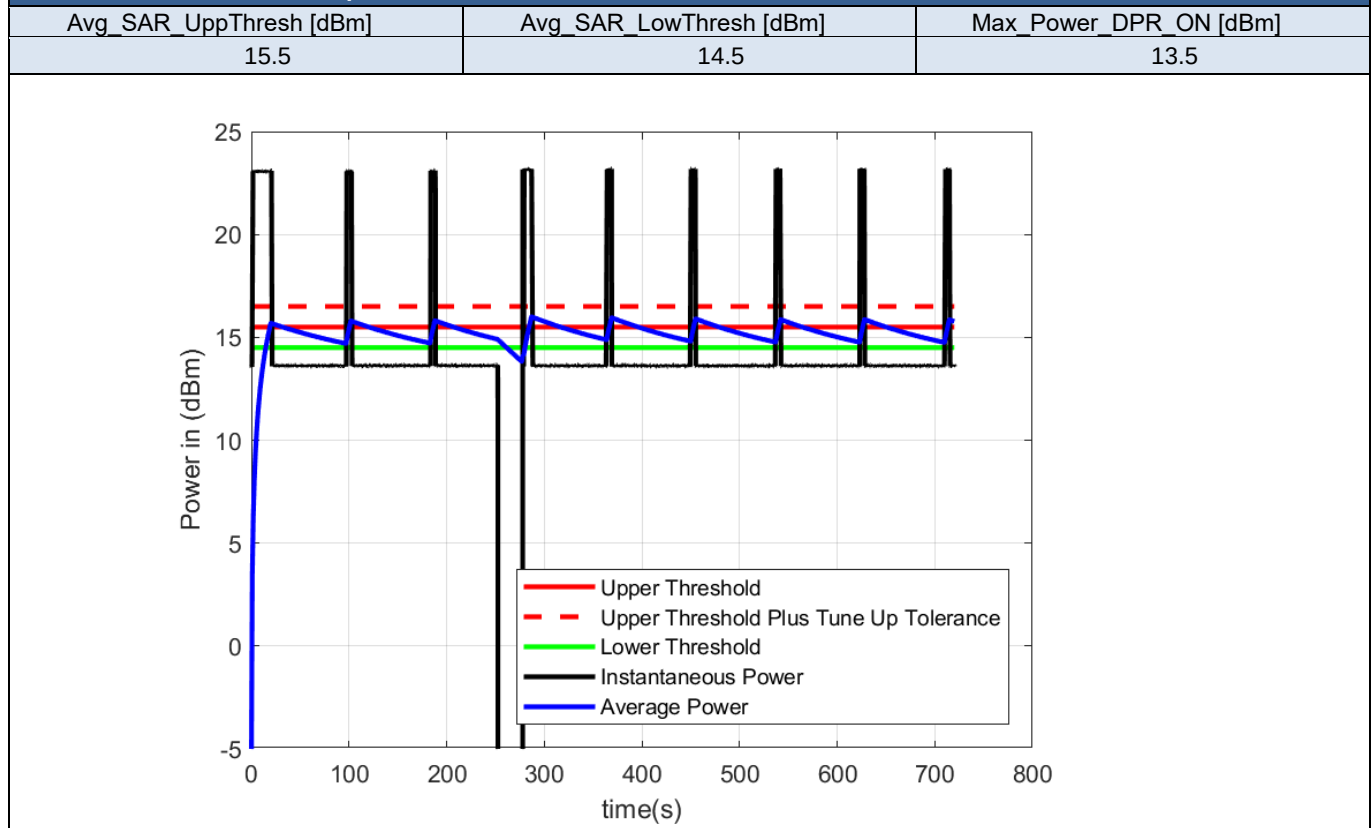


Table 4- Test cases for Call Drop and Reboot

Test case #	Test scenario	Band	mode	Test Position	Gap (mm)	Antenna	Channel	Freq (MHz)	Max_Power DPR off Power (dBm)	Avg_SAR Upper Threshold [dBm]	Avg_SAR Low Threshold [dBm]	Max_Power DPR_ON [dBm]
24	Drop	LTE B25/2	20M_QPSK_1_0	Top Edge	0	Ant 8	26340	1880	23	15.5	14.5	13.5
25		FR1 n26/5	20M_BPSK_1_1	Top Edge	0	Ant 5	166300	831.5	23	18	17	16
26	Reboot	LTE B25/2	20M_QPSK_1_0	Top Edge	0	Ant 8	26340	1880	23	15.5	14.5	13.5
27		FR1 n26/5	20M_BPSK_1_1	Top Edge	0	Ant 5	166300	831.5	23	18	17	16

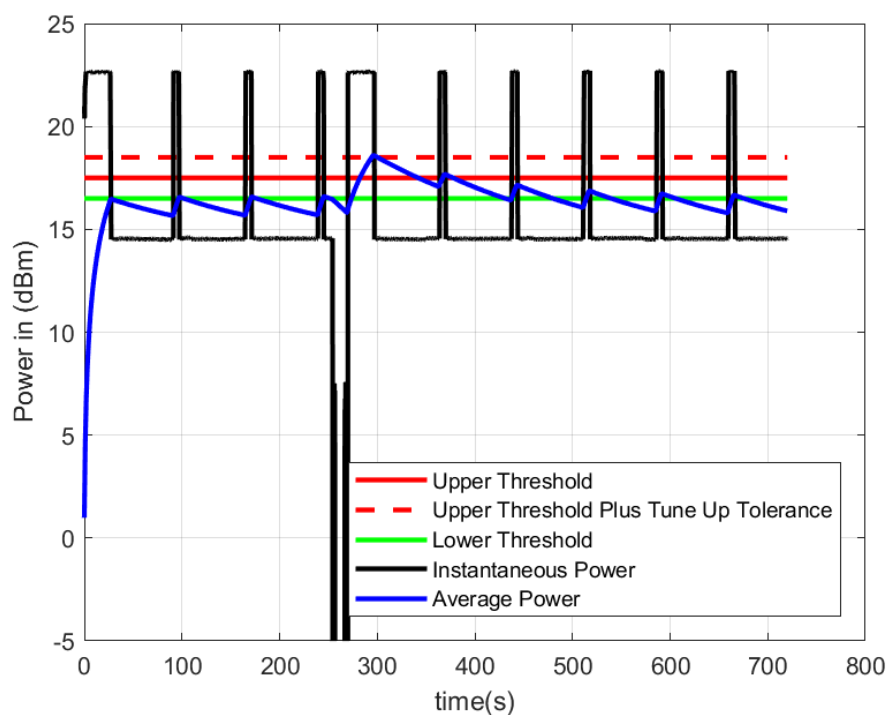
4.6 Connection Drop Scenario Validation

Case 24 : Call Drop - LTE Band 2 - Max Power 23 dBm - Roll Period 100 sec - Check Period 1 sec


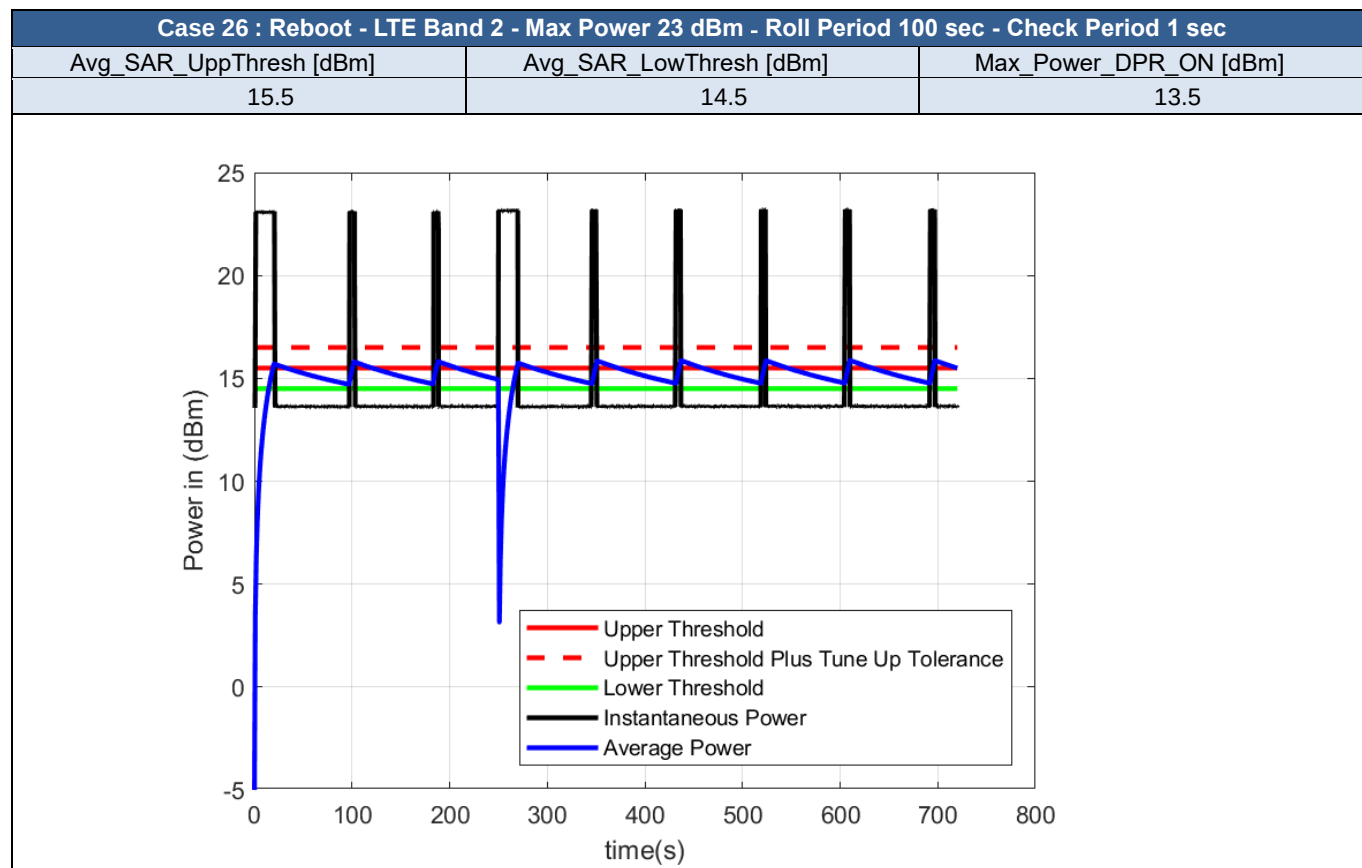


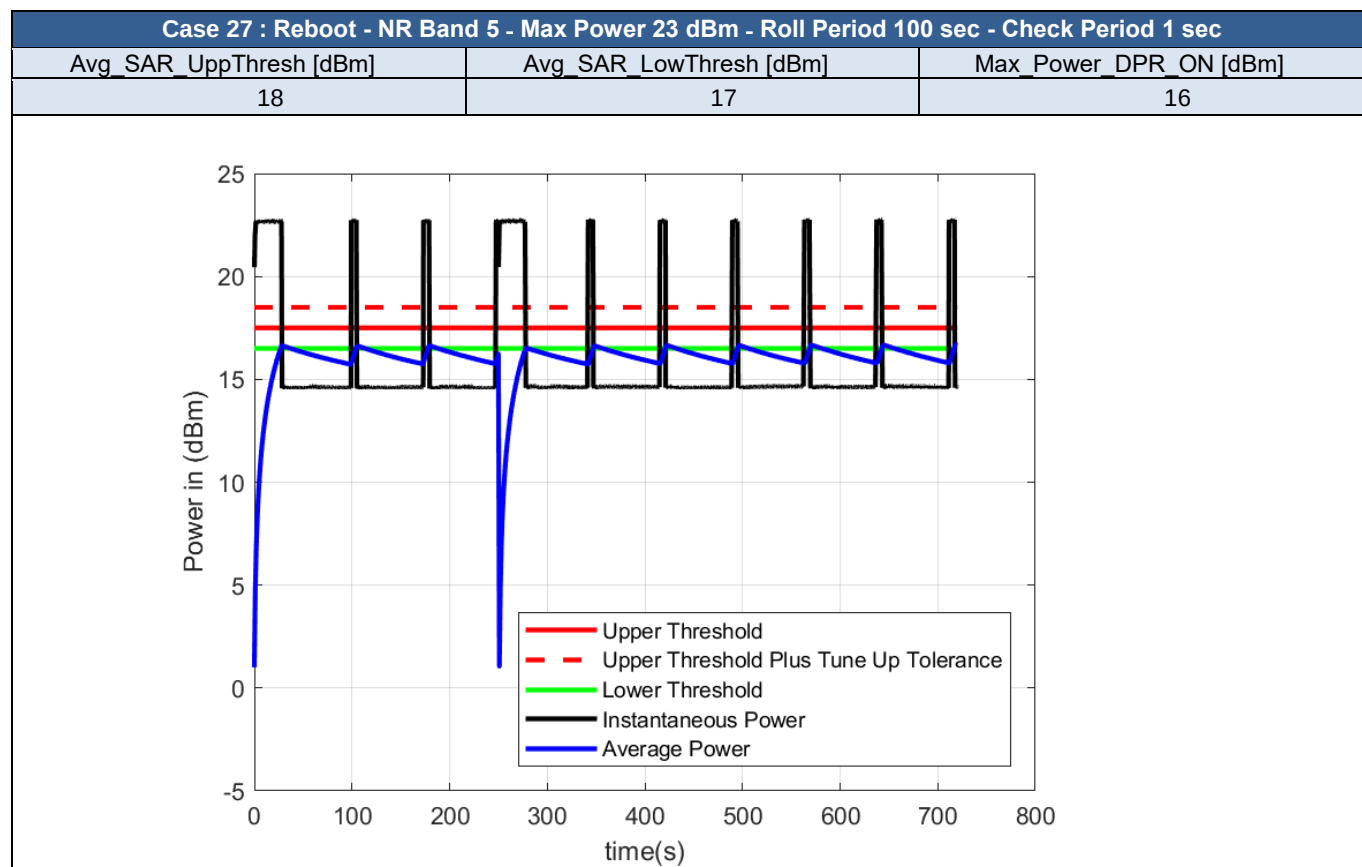
Case 25 : Call Drop - NR Band 5 - Max Power 23 dBm - Roll Period 100 sec - Check Period 1 sec

Avg_SAR_UppThresh [dBm]	Avg_SAR_LowThresh [dBm]	Max_Power_DPR_ON [dBm]
18	17	16



4.7 Connection Reboot Scenario Validation





Conclusion

The TAS functionality of RW350R-GL Module Integrated inside HP Model HSN-I61C convertible notebook is tested. All test cases and corresponding test configurations work properly.