Testing Laboratory
3787

RADIO TEST REPORT

FCC ID	:	**Z3WAIR4985**
Equipment	:	**Wi-Fi 6E Smart Mesh System**
Brand Name	:	**Airties**
Model Name	:	**Air 4985**
Applicant	:	**Airties Wireless Networks** **Sehit Mehmet Mikdat Uluunlu Sokagi No:23** **Esentepe, Sisli İstanbul, 34394 Turkey**
Manufacturer	:	**Airties Wireless Networks** **Sehit Mehmet Mikdat Uluunlu Sokagi No:23** **Esentepe, Sisli İstanbul, 34394 Turkey**
Standard	:	**47 CFR FCC Part 15.407**

The product was received on Jan. 06, 2023, and testing was started from Jan. 06, 2023 and completed on Aug. 30, 2023. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory
No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FR281911-03AC	01	Initial issue of report	Jun. 12, 2023
FR281911-03AC	02	(1) Revising test result of section 1.3 Testing Location Information (2) Revising the Performance Checking of Section 1.1.6 item 12	Jun. 15, 2023
FR281911-03AC	03	Adding section 3.4 Contention-Based Protocol of test result.	Aug. 31, 2023

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.407(a)	Peak Power Spectral Density (E.I.R.P.)	PASS	-
3.3	15.407(b)	Unwanted Emissions	PASS	-
3.4	15.407(d)	Contention-Based Protocol	PASS	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Sam Chen
Report Producer: Viola Huang

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5925-7125	ax (HEW20)	5955-7115	1-233 [59]
5925-7125	ax (HEW40)	5965-7085	3-227 [29]
5925-7125	ax (HEW80)	5985-7025	7-215 [14]
5925-7125	ax (HEW160)	6025-6985	15-207 [7]

Band	Mode	BWch (MHz)	Nant
UNII 5-8	ax (HEW20)	20	2TX
UNII 5-8	ax (HEW20)-BF	20	2TX
UNII 5-8	ax (HEW40)	40	2TX
UNII 5-8	ax (HEW40)-BF	40	2TX
UNII 5-8	ax (HEW80)	80	2TX
UNII 5-8	ax (HEW80)-BF	80	2TX
UNII 5-8	ax (HEW160)	160	2TX
UNII 5-8	ax (HEW160)-BF	160	2TX

Note:
- HEW20, HEW40, HEW80 and HEW160 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

Ant.	Port			Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz					
1	1	-	1	AirTies	ANT A00	PCB	N/A	Note1
2	2	-	2	AirTies	ANT A11	PCB	N/A	
3	-	1	-	AirTies	ANT A0X	PCB	N/A	
4	-	2	-	AirTies	ANT A1X	PCB	N/A	
5	-	3	-	AirTies	ANT A2X	PCB	N/A	
6	-	4	-	AirTies	ANT A3X	PCB	N/A	

Note1:

<Antenna Gain>

Ant.	Port			Antenna Gain (dBi)								
	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz	WLAN 2.4GHz	WLAN 5GHz				WLAN 6GHz			
					UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 6	UNII 7	UNII 8
1	1	-	1	4.21	-	-	-	-	1.32	1.46	1.76	2.61
2	2	-	2	4.42	-	-	-	-	1.62	1.98	2.47	2.12
3	-	1	-	-	3.49	3.27	2.85	2.09	-	-	-	-
4	-	2	-	-	3.58	2.61	4.52	2.72	-	-	-	-
5	-	3	-	-	2.41	2.6	3.51	5.47	-	-	-	-
6	-	4	-	-	4.45	4.89	4.53	4.93	-	-	-	-

< Directional Gain>

Item	Directional Gain (dBi)								
	WLAN 2.4GHz	WLAN 5GHz				WLAN 6GHz			
		UNII 1	UNII 2A	UNII 2C	UNII 3	UNII 5	UNII 6	UNII 7	UNII 8
2T1S	4.52	-	-	-	-	3.75	3.57	4.12	4.26
4T1S	-	4.57	4.92	5.39	5.58	-	-	-	-

Note 2: The above information (except gain) was declared by manufacturer.
The directional gain is measured which follows the procedure of KDB 662911 D03.

Note 3: The EUT has six antennas.:

For 2.4GHz function:

For 802.11 b/g/n/VHT/ax (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For 5GHz function:

For 802.11a/n/ac/ax (4TX/4RX):

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

For 6GHz function:

For 802.11ax (2TX/2RX):

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

1.1.3 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
802.11ax HEW20-BF	0.945	0.25	2.921m	1k

Note:
- DC is Duty Cycle.
- DCF is Duty Cycle Factor.

1.1.4 EUT Operational Condition

EUT Power Type	From Power Adapter			
Beamforming Function	☒	With beamforming	☐	Without beamforming
	The product has beamforming function for 11n/VHT/ax in 2.4GHz, 11n/ac/ax in 5GHz and ax in 6GHz.			
Device Type	☒	Indoor Access Point	☒	Subordinate
	☐	Indoor Client	☐	Standard Power Access Point
	☐	Dual Client	☐	Standard Client
	☐	Fixed Client		
Channel Puncturing Function	☐	Supported	☒	Unsupported
Support RU	☒	Full RU	☐	Partial RU
Test Software Version	Mtool V3.2.1.3			
Serial Number	AW2862239000027			
SW version	4.144.8.0_wltest			
HW version	PCB-4985-D01-M01-R03			
Software / Firmware Version for CBP	4.144.6.0_wltest			

Note: The above information was declared by manufacturer.

1.1.5 Table for EUT supports functions

Function	Support Band
AP Router	WLAN 2.4GHz, WLAN 5GHz UNII 1~3 and WLAN 6GHz UNII 5~8
Mesh	WLAN 5GHz UNII 1~3 and WLAN 6GHz UNII 5~8

Note 1: After evaluating, AP Router was selected to test and record in the report.
Note 2: The above information was declared by manufacturer.

1.1.6 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR281911AC

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding one adapter model name: NBS24M120200VU 2. PCB layout and P/N changed from PCB-4985-D01-M01-R02 to PCB-4985-D01-M01-R03PCB layout and P/N changed from PCB-4985-D01-M01-R02 to PCB-4985-D01-M01-R03. 3. Layout change for adding capacitors new brand: Richtek, model NO. RT6278BHGQUF, and change power inductor, old brand: TAI-TECH, model No : TMPF0402LR-1R2MN-ABD, new brand: MAGLAYERS, model NO: MNR-8040-2R0N-CP. 4. Layout changed for 3.3V DC switcher. 5. Layout change for new DC switcher design , power inductor changed, old brand: Chilisin, model NO. BMMA000606301R2MX1, new brand : MAGLAYERS, model No. MNR-8040-1R4M-BL. 6. Layout change for new 5V DC switcher design 7. The RJ45 connector changed, The old Part Number: SK01-G110060NL ,brand: CSAK, and the new part number is SK01-G110067NL, brand: CSAK. 8. MLCCs have been added to CPU Core regulator output and Radio IC Core regulator output according to Broadcom suggestion.(C1091, C1092,C1094). Brand : Taiyo Yuden , model No: JMK107BC6106MA-T. 9. Reserved MLCCs have been added according to 1.8V power rail measurements, brand :Yageo , model NO. : CC0402KRX5R6BB104. 10. JTAG_SEL function of the Radio IC has been	1. AC Conducted Emissions. 2. Unwanted Emissions Below 1GHz.

cancelled, and the component at position R178 has been removed. 11. Co-existence filters have been removed(by passed) from 2.4G RX Chains (U17, U19).	
12. 6 GHZ Co-existence filters have been removed (by passed) from 5G RX Chains (FL1, FL4, FL7, FL10). 13. MLCC capacitor packages have been removed for 6G ＆5G FEM supply circuitry, the placement is C412, C384, C356, C328.	1. AC Conducted Emissions. 2. Peak Power Spectral Density (E.I.R.P.), After evaluating, the worst case is found at 802.11ax HEW20-BF CH45 (6175MHz) CH105 (6475MHz), CH189 (6895MHz), and retest these channels only and for above 1GHz will be based on original output power to retest. 3. Unwanted Emissions Below 1GHz. 4. Unwanted Emissions Above 1GHz, After evaluating, the worst case is found at 802.11ax HEW20-BF CH233 (7115MHz), and retest these channels only and for above 1GHz will be based on original output power to retest. 5. Contention-Based Protocol.

1.2 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR FCC Part 15.407
- ANSI C63.10-2013
- FCC KDB 789033 D02 v02r01

The following reference test guidance is not within the scope of accreditation of TAF.

- FCC KDB 987594 D02 v01r01
- FCC KDB 662911 D03 v01
- FCC KDB 412172 D01 v01r01
- FCC KDB 414788 D01 v01r01

1.3 Testing Location Information

Testing Location Information	
Test Lab.：Sporton International Inc. Hsinchu Laboratory	
Hsinchu (TAF: 3787)	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.) TEL: 886-3-656-9065 FAX: 886-3-656-9085 Test site Designation No. TW3787 with FCC. Conformity Assessment Body Identifier (CABID) TW3787 with ISED.

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Radiated (E.I.R.P. PSD)	03CH04-CB	Wendy Hsu	24.4~25.5 / 55~58	Jan. 11, 2023~Jan. 17, 2023
Radiated Below 1GHz	03CH05-CB	Ederson Huang	21.5~22.9 / 64~68	Jan. 06, 2023~Jan. 18, 2023
Radiated Above 1GHz	03CH04-CB	Wendy Hsu	24.4~25.5 / 55~58	Jan. 10, 2023~Jan. 11, 2023
AC Conduction	CO01-CB	Tum Chen	23~24 / 58~59	Jan. 09, 2023~Jan. 19, 2023
RF Conducted (Contention-Based Protocol test)	DF02-CB	Sean Ku	22.2~23.5 / 63~67	Aug. 28, 2023~Aug. 30, 2023

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Test date before Jun. 02, 2023

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.6 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	5.2 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.7 dB	Confidence levels of 95%

Test date after May 31, 2023

Test Items	Uncertainty	Remark
Conducted Emission	3.1 dB	Confidence levels of 95%
Output Power Measurement	0.8 dB	Confidence levels of 95%
Power Density Measurement	3.1 dB	Confidence levels of 95%
Bandwidth Measurement	2.2%	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Channel Mode

Mode	Power Setting
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-
6175MHz	41
6475MHz	47
6875MHz Straddle 6.525-6.875GHz	45
6895MHz	47

Note:
- The EUT supports non-beamforming and beamforming modes, after evaluating, the beamforming mode has been evaluated to be the worst case, so it was selected to test.

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral Test Voltage: 120Vac / 60Hz
Operating Mode	Normal Link
1	AP Router Mode: EUT + Adapter 1
2	AP Router Mode: EUT + Adapter 2
For operating mode 2 is the worst case and it was record in this test report.	

The Worst Case Mode for Following Conformance Tests	
Tests Item	Contention Based Protocol
Test Condition	Conducted measurement at transmit chains

The Worst Case Mode for Following Conformance Tests	
Tests Item	Peak Power Spectral Density (E.I.R.P.)
Test Condition	Radiated measurement
	The EUT was performed at X axis, Y axis and Z axis position. The worst case was found at Y axis, thus the measurement will follow this same test
1	EUT in Y axis

The Worst Case Mode for Following Conformance Tests	
Tests Item	Unwanted Emissions
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
Operating Mode < 1GHz	Normal Link
1	AP Router Mode: EUT in X axis + Adapter 1
2	AP Router Mode: EUT in Y axis + Adapter 1
3	AP Router Mode: EUT in Z axis + Adapter 1
Mode 2 has been evaluated to be the worst case among Mode 1~3, thus measurement for Mode 4 will follow this same test mode.	
4	AP Router Mode: EUT in Y axis + Adapter 2
For operating mode 4 is the worst case and it was record in this test report.	
Operating Mode > 1GHz	CTX
1	EUT in X axis

2.3 EUT Operation during Test

beamforming mode:

For Radiated Mode:

During the test, the following programs under WIN 7 were executed.
The program was executed as follows:
1. During the test, the EUT operation to normal function.
2. Executed command fixed test channel under DOS.
3. Executed "Lantest.exe" to link with the remote workstation to transmit and receive packet by WLAN module and transmit duty cycle no less than 98%.

For Normal Link:

During the test, the EUT operation to normal function.

2.4 Accessories

Accessories			
Equipment Name	**Brand Name**	**Model Name**	**Rating**
Adapter 1	MOSO	MS-V2000R120-024H0-US	Input: 100-240V~50/60Hz, 0.7A max. Output: 12.0V, 2.0A
Adapter 2	NetBit	NBS24M120200VU	Input: 100-120V~50/60Hz, 0.6A Output: 12.0V, 2.0A
Others			
RJ-45 cable*1: Non-shielded, 1.5m			

2.5 Support Equipment

For AC Conduction:

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	2.5G WAN NB	DELL	E6430	N/A
B	LAN NB	DELL	E6430	N/A
C	2.4G NB	DELL	E6430	N/A
D	5G NB	DELL	E6430	N/A
E	6G NB	DELL	E6430	N/A
F	6G Client	INTEL	AX210	N/A

For Radiated (below 1GHz):

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook(LAN)	DELL	E4300	N/A
B	2.5G PC(WAN)	DELL	T3400	N/A
C	Notebook(WIFI 2.4G)	DELL	E4300	N/A
D	Notebook(WIFI 5G)	DELL	E4300	N/A
E	Notebook(WIFI 6E)	DELL	E4300	N/A
F	WLAN module	Intel	AX210NGW	PD9AX210NG

For Radiated (above 1GHz):
For Beamforming mode

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A
B	WLAN module	Intel	AX210	N/A
C	Notebook	DELL	E4300	N/A

For RF Radiated (E.I.R.P PSD)

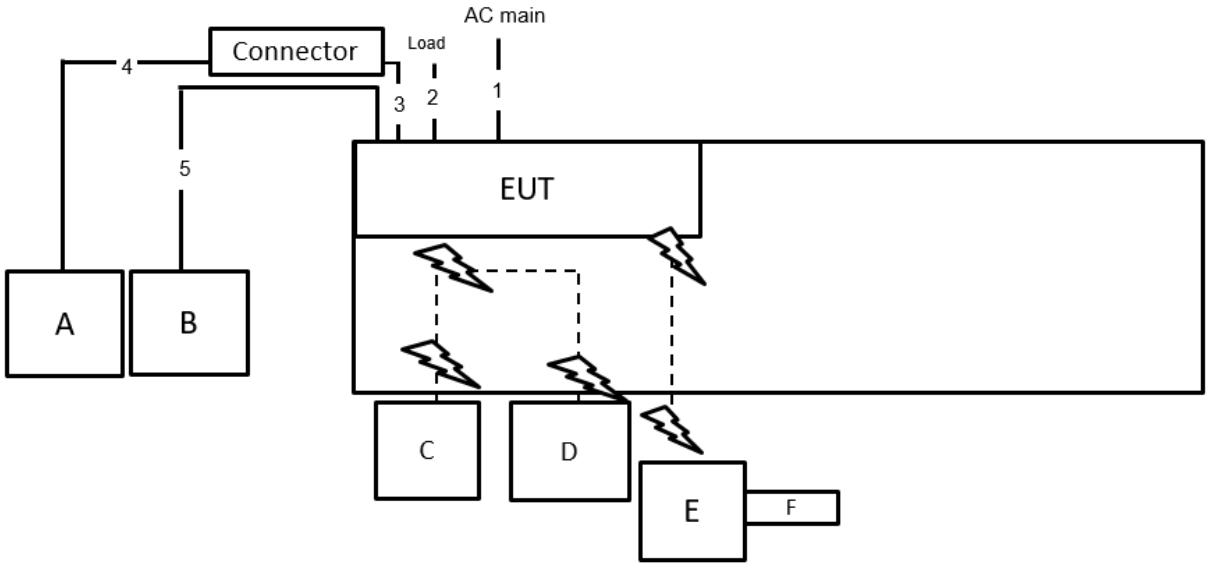
Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A

For RF Conducted (Contention Based Protocol test):

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A
B	Notebook	DELL	E6430	N/A
C	WLAN module	Intel	AX210NGW	N/A

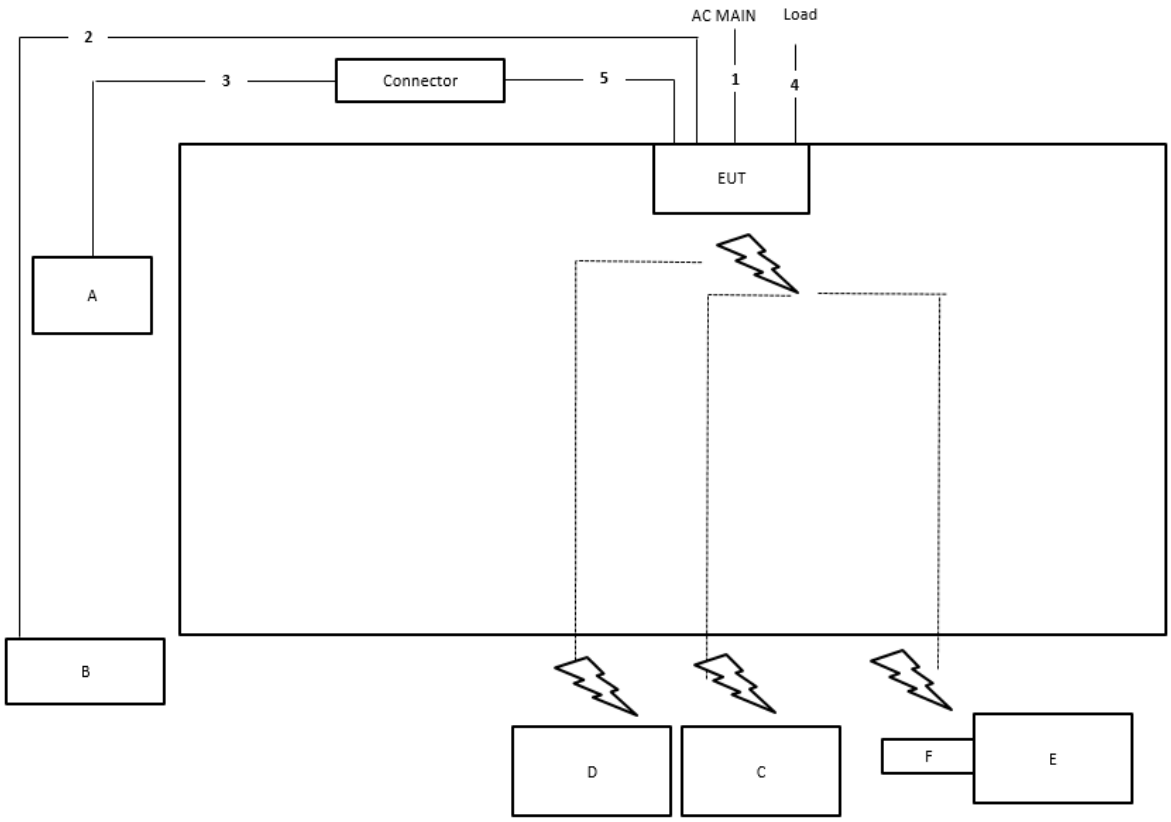
2.6 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



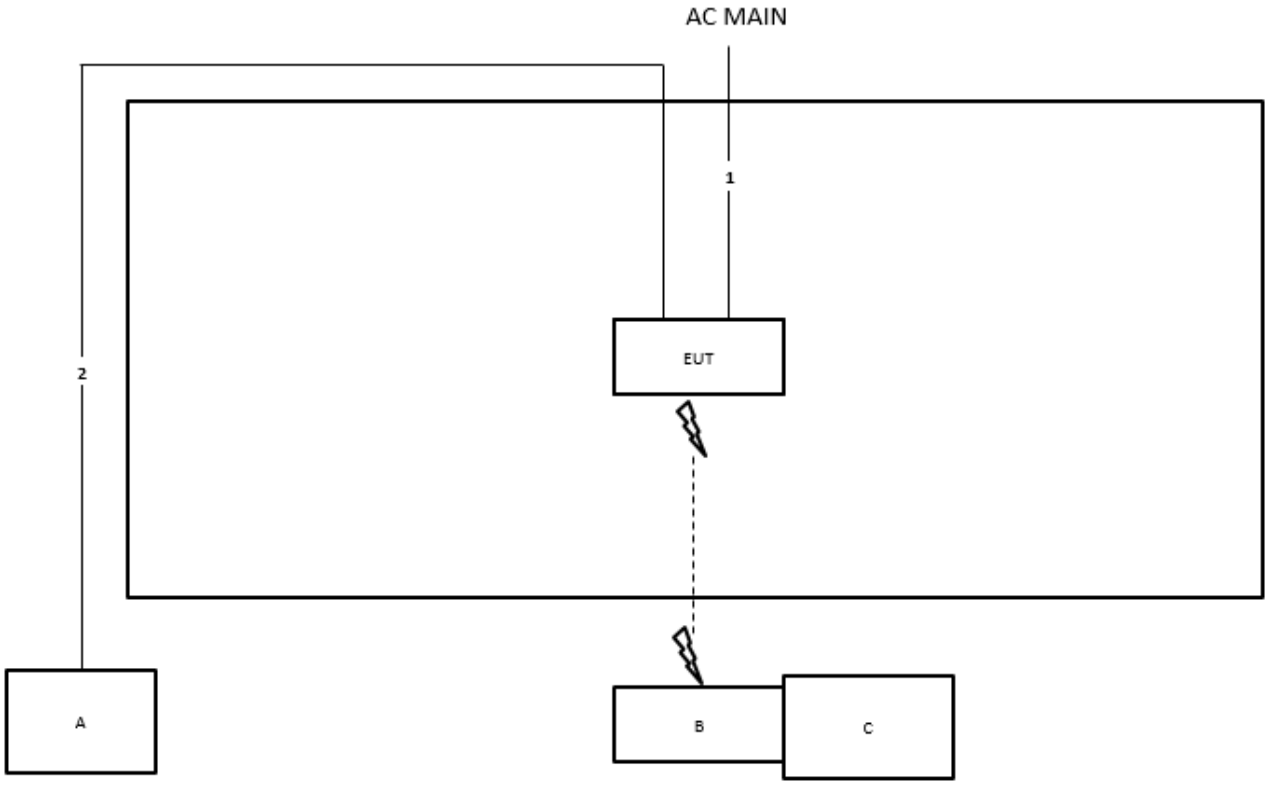
Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	1.5m
3	RJ-45 cable	No	1.5m
4	RJ-45 cable	No	10m
5	RJ-45 cable	No	10m

Test Setup Diagram - Radiated Test < 1GHz



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	10m
4	RJ-45 cable	No	1.0m
5	RJ-45 cable	No	1.5m

Test Setup Diagram - Radiated Test > 1GHz / For beamforming mode



Item	Connection	Shielded	Length
1	Power cable	No	1.5m
2	RJ-45 cable	No	10m

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Measuring Instruments

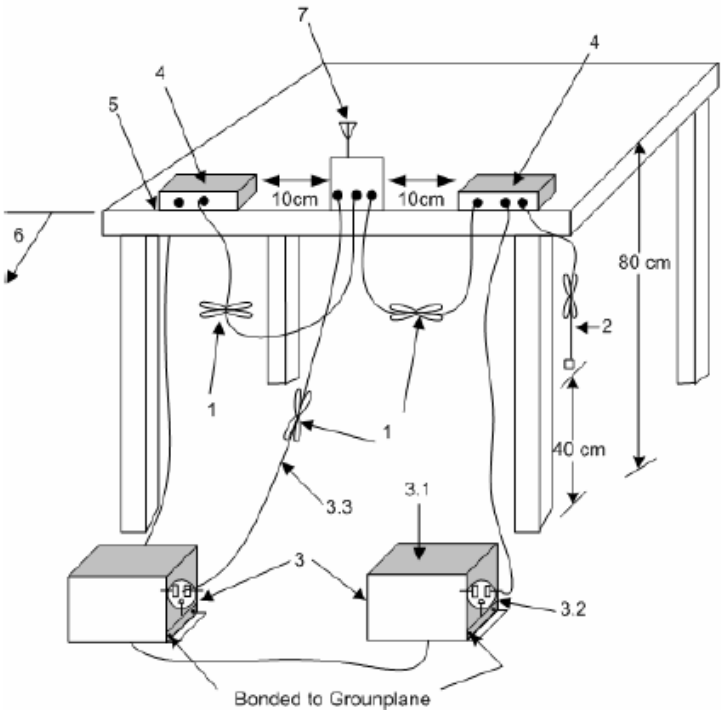
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
☒ Refer as ANSI C63.10-2013, clause 6.2 for AC power-line conducted emissions.

3.1.4 Test Setup

AC Power-line Conducted Emissions



1—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 cm to 40 cm long.
2—The I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
3—EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω loads. LISN may be placed on top of, or immediately beneath, reference ground plane.
3.1—All other equipment powered from additional LISN(s).
3.2—A multiple-outlet strip may be used for multiple power cords of non-EUT equipment.
3.3—LISN at least 80 cm from nearest part of EUT chassis.
4—Non-EUT components of EUT system being tested.
5—Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
6—Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
7—Antenna can be integral or detachable. If detachable, then the antenna shall be attached for this test.

3.1.5 Measurement Results Calculation

The measured Level is calculated using:

a. Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level

b. Margin = - Limit + (Read Level + LISN Factor + Cable Loss)

3.1.6 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 Peak Power Spectral Density (E.I.R.P.)

3.2.1 Peak Power Spectral Density (E.I.R.P.) Limit

Peak Power Spectral Density (E.I.R.P.) Limit	
UNII Devices	
☒	For the 5.925 ~ 6.425 GHz band:
	▪ For standard power access point and fixed client device : e.i.r.p PSD < 23 dBm/MHz.
	▪ For indoor access point : e.i.r.p PSD < 5 dBm/MHz.
	▪ For subordinate device control of an indoor access point : e.i.r.p PSD < 5 dBm/MHz.
	▪ For client device control of a standard power access point : e.i.r.p PSD < 17 dBm/MHz.
	▪ For client device control of an indoor access point : e.i.r.p PSD < -1 dBm/MHz.
☒	For the 6.425 ~ 6.525 GHz band:
	▪ For indoor access point : e.i.r.p PSD < 5 dBm/MHz.
	▪ For client device control of an indoor access point : e.i.r.p PSD < -1 dBm/MHz.
☒	For the 6.525 ~ 6.875 GHz band:
	▪ For standard power access point and fixed client device : e.i.r.p PSD < 23 dBm/MHz.
	▪ For indoor access point : e.i.r.p PSD < 5 dBm/MHz.
	▪ For subordinate device control of an indoor access point : e.i.r.p PSD < 5 dBm/MHz.
	▪ For client device control of a standard power access point : e.i.r.p PSD < 17 dBm/MHz.
	▪ For client device control of an indoor access point : e.i.r.p PSD < -1 dBm/MHz.
☒	For the 6.875 ~ 7.125 GHz band:
	▪ For indoor access point : e.i.r.p PSD < 5 dBm/MHz.
	▪ For client device control of an indoor access point : e.i.r.p PSD < -1 dBm/MHz.
RLAN Devices	
☐	For the 5.925 ~ 7.125 GHz band:
	▪ For low-power indoor access-points & indoor subordinate devices < 5 dBm / MHz.
	▪ For low-power client devices < -1 dBm / MHz.
☐	For the 5.925 ~ 6.875 GHz band:
	▪ For standard-power access points & fixed client devices < 23 dBm / MHz.
	▪ For standard client devices < 17 dBm / MHz.

3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
▪ According to FCC KDB 987594 D02 clause II.F, the measurement procedure shall refer to KDB 789033. Peak power spectral density procedures that the same method as used to determine the conducted output power shall be used to determine the peak power spectral density and use the peak search function on the spectrum analyzer to find the peak of the spectrum. For the peak power spectral density shall be measured using below options:	
	☐ Refer as FCC KDB 789033 D02, F)5) power spectral density can be measured using resolution bandwidths < 1 MHz provided that the results are integrated over 1 MHz bandwidth
	[duty cycle ≥ 98% or external video / power trigger]
	☒ Refer as FCC KDB 789033 D02, clause E Method SA-1 (spectral trace averaging).
	☐ Refer as FCC KDB 789033 D02, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)
	duty cycle < 98% and average over on/off periods with duty factor
	☒ Refer as FCC KDB 789033 D02, clause E Method SA-2 (spectral trace averaging).
	☐ Refer as FCC KDB 789033 D02, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)
☐ For conducted measurement.	
	▪ If the EUT supports multiple transmit chains using options given below:
	☐ Option 1: Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.
	☐ Option 2: Measure and sum spectral maxima across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The maximum value (peak) of each spectrum is determined. These maximum values are then summed mathematically in linear power units across the outputs. These operations shall be performed separately over frequency spans that have different out-of-band or spurious emission limits,
	☐ Option 3: Measure and add 10 log(N) dB, where N is the number of transmit chains. Refer as FCC KDB 662911, In-band power spectral density (PSD). Performed at each transmit chains and each transmit chains shall be compared with the limit have been reduced with 10 log(N). Or each transmit chains shall be add 10 log(N) to compared with the limit.
	▪ If multiple transmit chains, EIRP PPSD calculation could be following as methods: $PPSD_{total} = PPSD_1 + PPSD_2 + \ldots + PPSD_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = PPSD_{total} + DG$
☒ For radiated measurement.	
	▪ Refer as FCC KDB 789033 D02 clause II A.1.F ”Antenna-port Conducted versus Radiated Testing”
	▪ Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.

Test Method	
	▪ Refer as FCC KDB 412172 D01 clause 2.2 for EIRP calculation.

Note :
The test is the final test result, It includes antenna /cable loss factor & FSL factor.
The EIRP PSD calculation refer to "KDB 412172 D01 Determining ERP and EIRP v01r01"
EIRP PSD Formula :
EIRP PSD(dBm/MHz) = PR(dBm/MHz) + LP(FSL factor)
where;
PR(dBm/MHz) : Power measurement level include antenna/cable loss
LP : Free Space Loss(dB)

PR Formula :
PR(dBm/MHz) = P Meas(dBm/MHz) – GR(dBi) + LC(dB)
where;
P Meas(dBm/MHz) : PSD measurement level
GR(dBi) : Gain of the receive(measurement) antenna (dBi)
LC(dB) : Measurement cable loss (dB)

LP(FSL factor) Formula :
LP(dB)= 20 logF + 20 logD-27.54
where;
F(MHz) : EUT center frequency
D(m) : Measurement distance

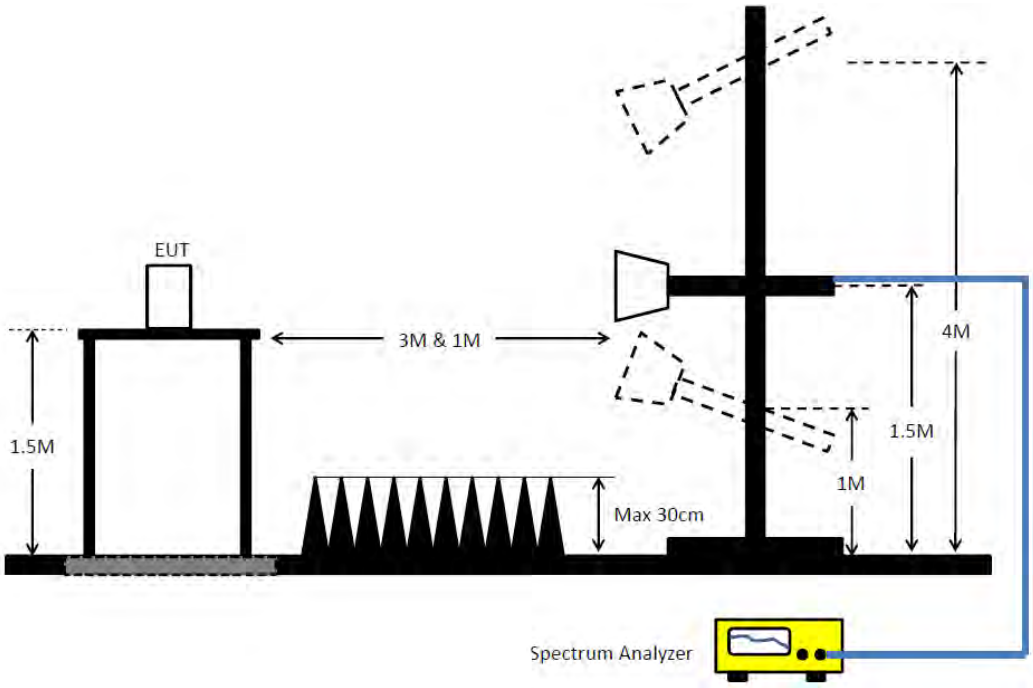
For Example:
Test mode HE20 BF 4T1S 6175MHz EIRP PSD measurement
PR Formula :
PR(dBm/MHz)= -47.36 - 11.47 + 5.08 = -53.76

LP(FSL factor) Formula :
LP(dB) = 20log(5953.5) + 20log(3) -27.5 = 57.85

EIRP PSD Formula
EIRP PSD(dBm/MHz) = -53.76 + 57.58 = 4.09

3.2.4 Test Setup

Radiated Measurement



3.2.5 Test Result of Peak Power Spectral Density (E.I.R.P.)

Refer as Appendix B

3.3 Unwanted Emissions

3.3.1 Transmitter Unwanted Emissions Limit

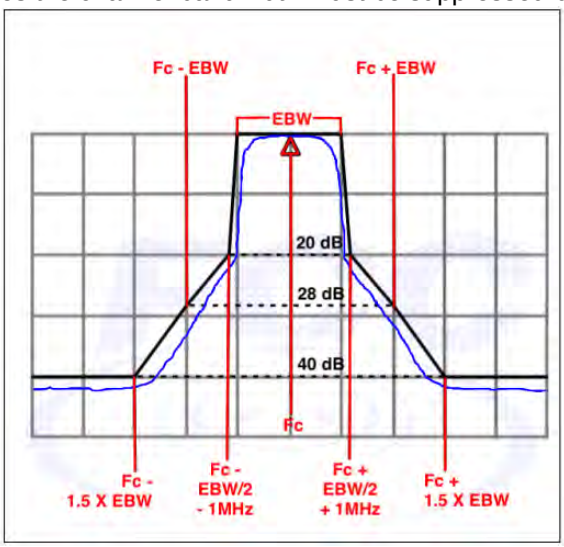
Unwanted emissions below 1 GHz and restricted band emissions above 1GHz limit			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m(20 x log (standard distance/ test distance) = 20log(3/1) = 9.54dB.
EX. Above 18GHz emission limit calculation (3m to 1m) = 54dBuV/m at 3m + 9.54dB = 63.54 dBuV/m at 1m.

Un-restricted band emissions above 1GHz Limit	
Frequency	**Limit**
Any outside the 5.945 – 7.125 GHz emission	e.i.r.p. -27 dBm [68.2 dBuV/m@3m]
	Note 1: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m(20 x log (standard distance/ test distance) = 20log(3/1) = 9.54dB. EX. Above 18GHz emission limit calculation (3m to 1m) = 68.2dBuV/m at 3m + 9.54dB = 77.74 dBuV/m at 1m. Note 2:-27 dBm EIRP OOBE is measured RMS which is a deviation from the current 15E rules for 5 GHz bands. In addition, 15.35(b) applies where the peak emissions must be limited to no more than 20 dB above the average limit.
Frequency	**Emission MASK Limit**

5.945 – 7.125 GHz	Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB. 

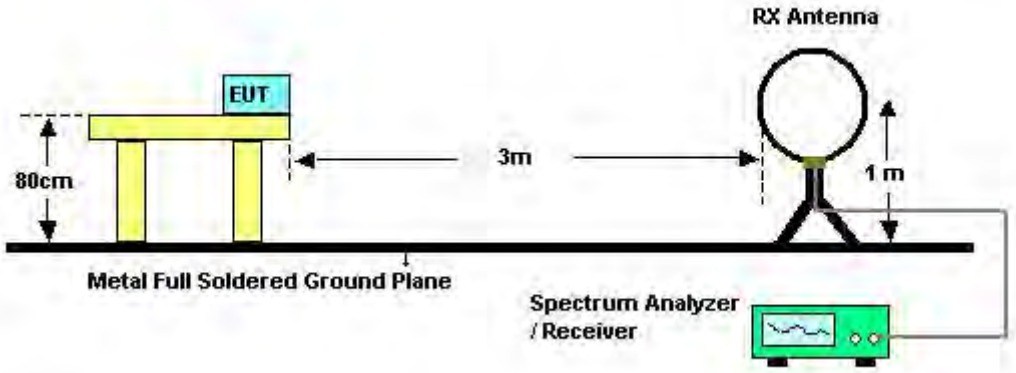
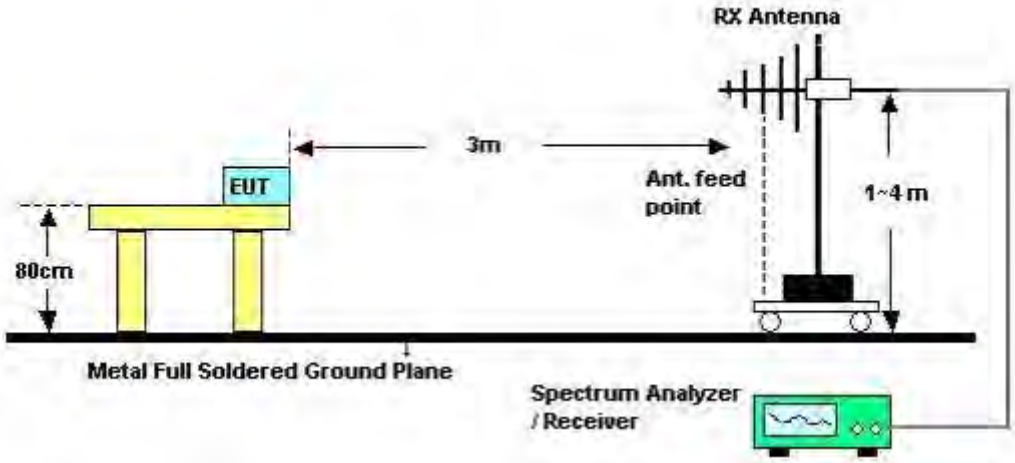
3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

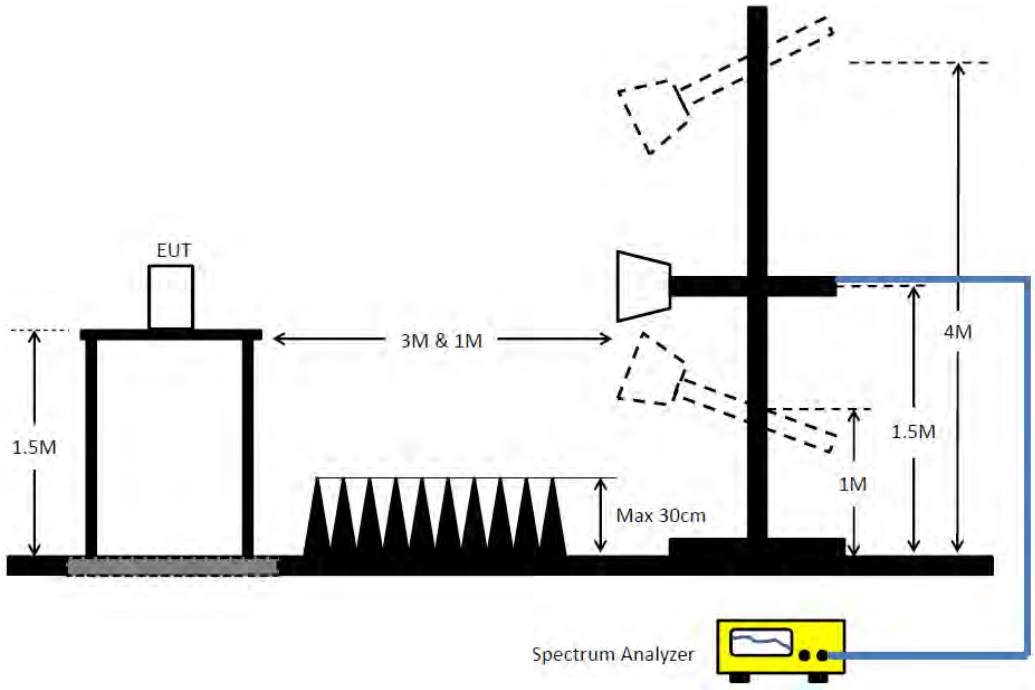
3.3.3 Test Procedures

Test Method		
▪ According to FCC KDB 987594 D02 II.G. the unwanted emission measurement procedure shall refer to KDB 789300(except emission MASK). Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 m for frequencies above 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).		
▪ The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].		
▪ For the transmitter unwanted emissions shall be measured using following options below:		
	▪ Refer as FCC KDB 789033 D02, clause G)2) for unwanted emissions into non-restricted bands.	
	▪ Refer as FCC KDB 789033 D02, clause G)1) for unwanted emissions into restricted bands.	
		☒ Refer as FCC KDB 789033 D02, G)6) Method AD (Trace Averaging). (For unrestricted band measurement)
		☐ Refer as FCC KDB 789033 D02, G)6) Method VB (Reduced VBW).
		☒ Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). VBW ≥ 1/T, where T is pulse time.(For restricted band average measurement)
		☐ Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.
		☒ Refer as FCC KDB 789033 D02, clause G)5) measurement procedure peak limit.
		☐ Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.
	▪ Refer as FCC KDB 789033 D02, clause G)3)d)ii) for Band edge Integration measurements.	
▪ For emission MASK shall be measured using following options below:		
		☒ Refer as FCC KDB 987594 D02, J) In-Band Emissions
▪ For radiated measurement.		
	▪ Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.	
	▪ Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.	
	▪ Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.	
▪ The any unwanted emissions level shall not exceed the fundamental emission level.		
▪ All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.		

3.3.4 Test Setup

Transmitter Radiated Unwanted Emissions
9kHz ~30MHz

30MHz~1GHz


Above 1GHz



3.3.5 Measurement Results Calculation

The measured Level is calculated using:

Corrected Reading: Antenna factor (AF) + Cable loss (CL) + Read level (Raw) - Preamp factor (PA)(if applicable) = Level

3.3.6 Transmitter Unwanted Emissions (Below 30MHz)

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to KDB414788 Radiated Test Site, and the result came out very similar.
All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.
The radiated emissions were investigated from 9 kHz or the lowest frequency generated within the device, up to the 10th harmonic or 40 GHz, whichever is appropriate.

3.3.7 Test Result of Transmitter Unwanted Emissions

Refer as Appendix C

3.4 Contention Based Protocol

3.4.1 Contention Based Protocol Limit

EUT can detect an AWGN signal with 90% (or better) level of certainty.

3.4.2 Measuring Instruments

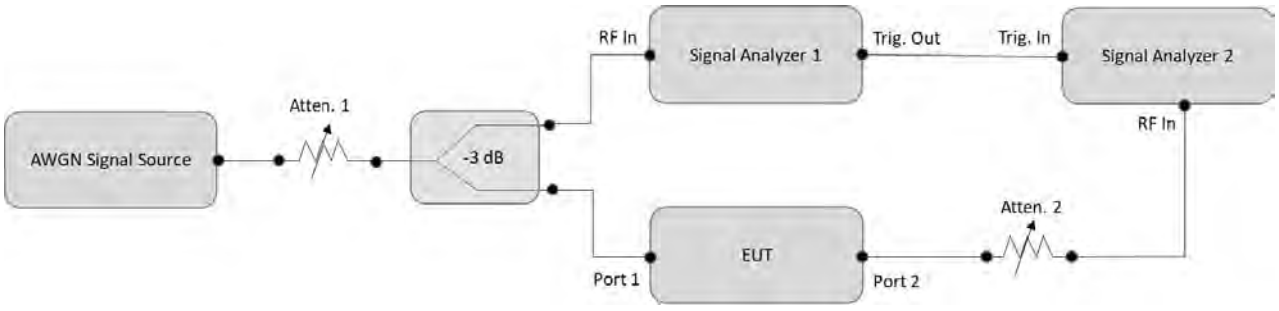
Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method	
▪	For Contention Based Protocol shall be measured using following options below:
☒	Refer as FCC KDB 987594 D02, I) Contention Based Protocol.

3.4.4 Test Setup

Contention Based Protocol



3.4.5 Test Result of Contention Based Protocol

Refer as Appendix D

4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 22, 2022	Feb. 21, 2023	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Feb. 09, 2022	Feb. 08, 2023	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Apr. 12, 2022	Apr. 11, 2023	Conduction (CO01-CB)
Pulse Limiter	Rohde& Schwarz	ESH3-Z2	100430	9kHz ~ 30MHz	Feb. 10, 2022	Feb. 09, 2023	Conduction (CO01-CB)
COND Cable	Woken	Cable	Low cable-CO01	9kHz ~ 30MHz	Oct. 18, 2022	Oct. 17, 2023	Conduction (CO01-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	May 14, 2022	May 13, 2023	Radiation (05CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Mar. 14, 2022	Mar. 13, 2023	Radiation (05CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 26, 2022	Apr. 25, 2023	Radiation (05CH05-CB)
Bilog Antenna with 6dB Attenuator	TESEQ & EMCI	CBL 6112D & N-6-06	35236 & AT-N0610	30MHz ~ 2GHz	Mar. 25, 2022	Mar. 24, 2023	Radiation (05CH05-CB)
CABLE	Woken	N/A	Low Cable-06	25MHz ~ 1GHz	Dec. 13, 2022	Dec. 12, 2023	Radiation (05CH05-CB)
RF Cable-high	Woken	RG402	High Cable-28	1GHz~18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (05CH05-CB)
RF Cable-high	Woken	RG402	High Cable-04+28	1GHz~18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (05CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH04-CB	1GHz ~18GHz 3m	Feb. 24, 2022	Feb. 23, 2023	Radiation (03CH04-CB)
Horn Antenna	ETS·Lindgren	3115	00143147	750MHz~18GHz	Oct. 12, 2022	Oct. 11, 2023	Radiation (03CH04-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 22, 2022	Aug. 21, 2023	Radiation (03CH04-CB)
Pre-Amplifier	Agilent	83017A	MY53270063	0.5GHz ~ 26.5GHz	Jul. 01, 2022	Jun. 30, 2023	Radiation (03CH04-CB)
Pre-Amplifier	SGH	SGH184	20221107-3	18GHz ~ 40GHz	Nov. 16, 2022	Nov. 15, 2023	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSP40	100142	9kHz~40GHz	Mar. 28, 2022	Mar. 27, 2023	Radiation (03CH04-CB)
RF Cable-high	Woken	RG402	High Cable-21	1GHz - 18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH04-CB)

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
RF Cable-high	Woken	RG402	High Cable-21+67	1GHz - 18GHz	Oct. 03, 2022	Oct. 02, 2023	Radiation (03CH04-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH04-CB)
High Cable	Woken	WCA0929M	40G#5+6	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH04-CB)
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH04-CB)
High Cable	Woken	WCA0929M	40G#6	1GHz ~ 40 GHz	Dec. 07, 2022	Dec. 06, 2023	Radiation (03CH04-CB)
Spectrum Analyzer	R&S	FSV40	101025	9kHz ~ 40GHz	Oct. 28, 2022	Oct. 27, 2023	Conducted (DF02-CB)
Vector Signal generator	R&S	SMW200A	109426	100kHz- 7.5GHz	Dec. 29, 2022	Dec. 28, 2023	Conducted (DF02-CB)
RF Power Divider	STI	2 Way	DV-2way -05	1GHz ~ 8GHz	Oct. 04, 2022	Oct. 03, 2023	Conducted (DF02-CB)
RF Power Divider	STI	2 Way	DV-2way -06	1GHz ~ 8GHz	Oct. 04, 2022	Oct. 03, 2023	Conducted (DF02-CB)
RF Power Divider	STI	2 Way	DV-2way -07	1GHz ~ 8GHz	Oct. 04, 2022	Oct. 03, 2023	Conducted (DF02-CB)
RF Power Divider	STI	2 Way	DV-2way -08	1GHz ~ 8GHz	Oct. 04, 2022	Oct. 03, 2023	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	High Cable-60	1 GHz –18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	High Cable-61	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	High Cable-62	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	High Cable-63	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	High Cable-66	1 GHz – 18 GHz	Oct. 03, 2022	Oct. 02, 2023	Conducted (DF02-CB)

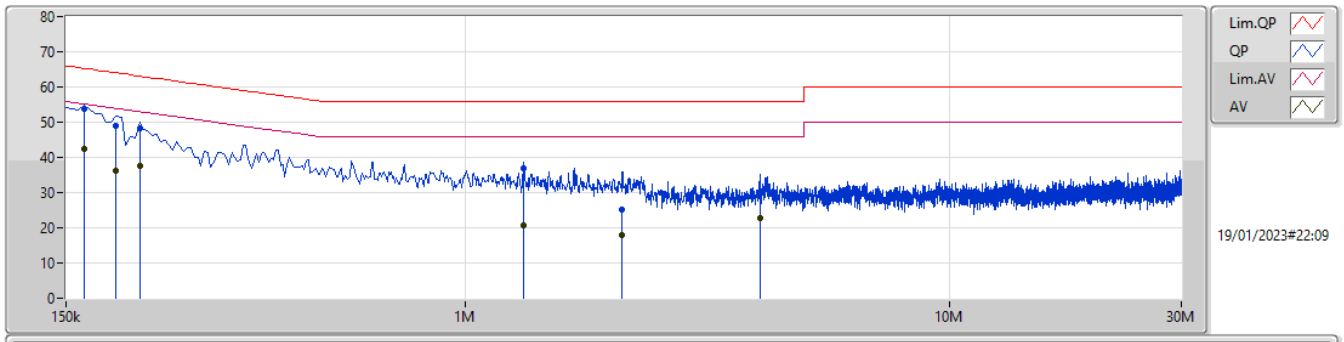
Note: Calibration Interval of instruments listed above is one year.

N.C.R. means Non-Calibration required.

Summary

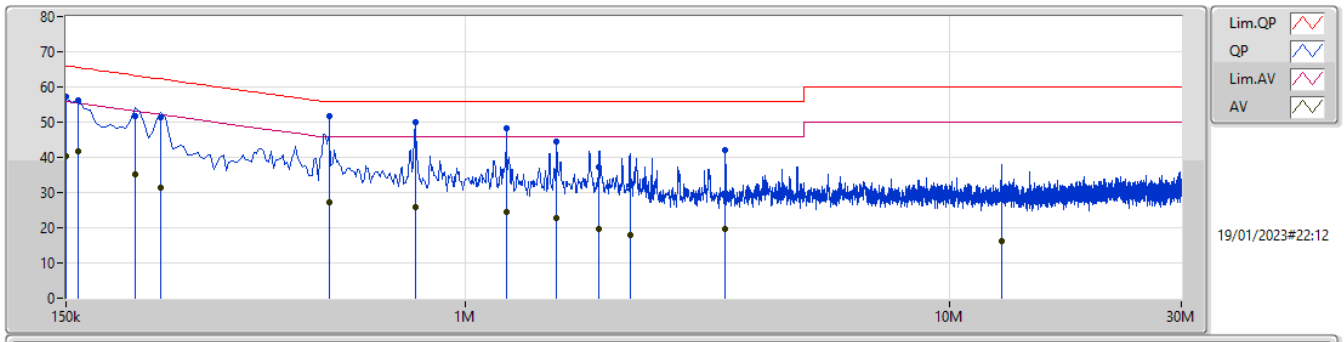
Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 2	Pass	QP	523.5k	51.66	56.00	-4.34	Neutral

Mode 2



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	163.5k	53.84	65.27	-11.43	9.99	Line	"Worst"	43.85	0.06	0.04	9.89
AV	163.5k	42.55	55.27	-12.72	9.99	Line	-	32.56	0.06	0.04	9.89
QP	190.5k	48.97	64.01	-15.04	9.99	Line	-	38.98	0.06	0.04	9.89
AV	190.5k	36.16	54.01	-17.85	9.99	Line	-	26.17	0.06	0.04	9.89
QP	213k	48.20	63.09	-14.89	9.99	Line	-	38.21	0.06	0.04	9.89
AV	213k	37.69	53.09	-15.40	9.99	Line	-	27.70	0.06	0.04	9.89
QP	1.32M	36.78	56.00	-19.22	10.03	Line	-	26.75	0.08	0.06	9.89
AV	1.32M	20.83	46.00	-25.17	10.03	Line	-	10.80	0.08	0.06	9.89
QP	2.108M	25.12	56.00	-30.88	10.07	Line	-	15.05	0.09	0.09	9.89
AV	2.108M	17.92	46.00	-28.08	10.07	Line	-	7.85	0.09	0.09	9.89
QP	4.052M	29.66	56.00	-26.34	10.11	Line	-	19.55	0.12	0.10	9.89
AV	4.052M	22.90	46.00	-23.10	10.11	Line	-	12.79	0.12	0.10	9.89

Mode 2



Type	Freq	Level	Limit	Margin	Factor	Condition	Comment	Raw	LISN	CL	AT
	(Hz)	(dBuV)	(dBuV)	(dB)	(dB)			(dBuV)	(dB)	(dB)	(dB)
QP	150k	57.27	66.00	-8.73	10.00	Neutral	-	47.27	0.07	0.04	9.89
AV	150k	40.26	56.00	-15.74	10.00	Neutral	-	30.26	0.07	0.04	9.89
QP	159k	56.31	65.52	-9.21	10.00	Neutral	-	46.31	0.07	0.04	9.89
AV	159k	41.78	55.52	-13.74	10.00	Neutral	-	31.78	0.07	0.04	9.89
QP	208.5k	51.63	63.27	-11.64	10.00	Neutral	-	41.63	0.07	0.04	9.89
AV	208.5k	35.04	53.27	-18.23	10.00	Neutral	-	25.04	0.07	0.04	9.89
QP	235.5k	51.35	62.25	-10.90	10.00	Neutral	-	41.35	0.07	0.04	9.89
AV	235.5k	31.25	52.25	-21.00	10.00	Neutral	-	21.25	0.07	0.04	9.89
QP	523.5k	51.66	56.00	-4.34	10.01	Neutral	"Worst"	41.65	0.07	0.05	9.89
AV	523.5k	27.24	46.00	-18.76	10.01	Neutral	-	17.23	0.07	0.05	9.89
QP	789k	50.10	56.00	-5.90	10.02	Neutral	-	40.08	0.08	0.05	9.89
AV	789k	25.75	46.00	-20.25	10.02	Neutral	-	15.73	0.08	0.05	9.89
QP	1.217M	48.14	56.00	-7.86	10.03	Neutral	-	38.11	0.09	0.05	9.89
AV	1.217M	24.51	46.00	-21.49	10.03	Neutral	-	14.48	0.09	0.05	9.89
QP	1.541M	44.57	56.00	-11.43	10.05	Neutral	-	34.52	0.09	0.07	9.89
AV	1.541M	22.90	46.00	-23.10	10.05	Neutral	-	12.85	0.09	0.07	9.89
QP	1.887M	37.08	56.00	-18.92	10.08	Neutral	-	27.00	0.10	0.09	9.89
AV	1.887M	19.51	46.00	-26.49	10.08	Neutral	-	9.43	0.10	0.09	9.89
QP	2.184M	31.91	56.00	-24.09	10.08	Neutral	-	21.83	0.10	0.09	9.89
AV	2.184M	17.98	46.00	-28.02	10.08	Neutral	-	7.90	0.10	0.09	9.89
QP	3.435M	42.14	56.00	-13.86	10.11	Neutral	-	32.03	0.12	0.10	9.89
AV	3.435M	19.63	46.00	-26.37	10.11	Neutral	-	9.52	0.12	0.10	9.89
QP	12.764M	29.63	60.00	-30.37	10.36	Neutral	-	19.27	0.26	0.17	9.93
AV	12.764M	16.12	50.00	-33.88	10.36	Neutral	-	5.76	0.26	0.17	9.93

Summary

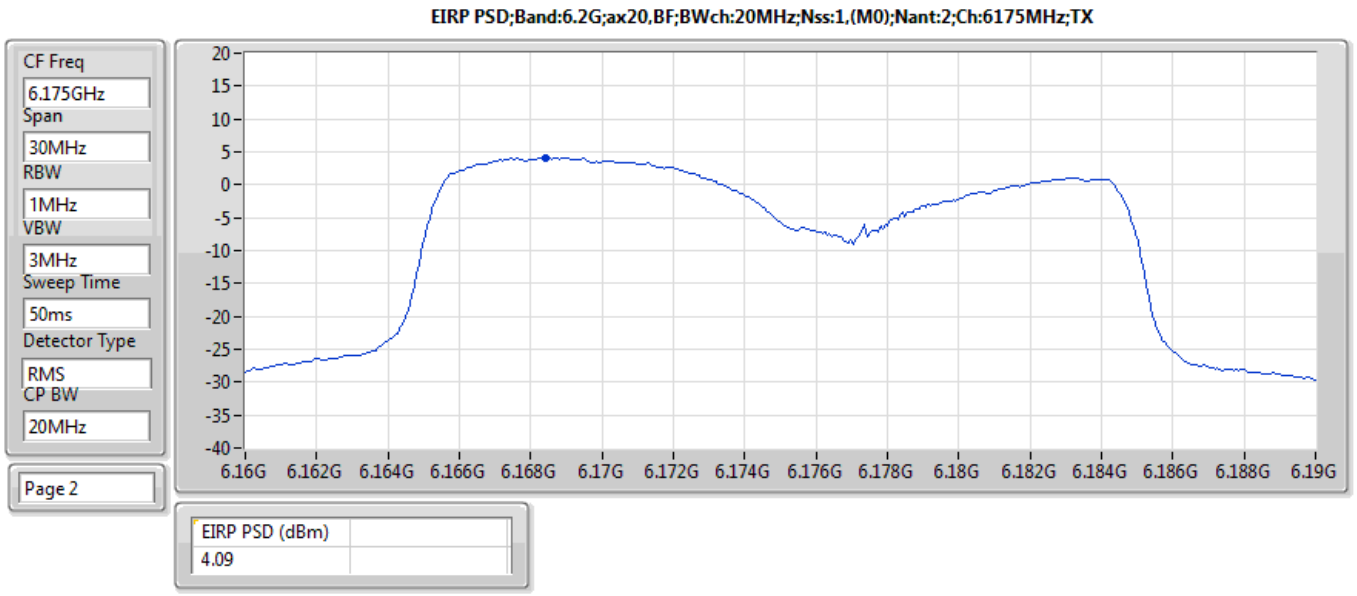
Mode	EIRP PD (dBm/RBW)
5.925-6.425GHz	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	4.09
6.425-6.525GHz	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	4.23
6.525-6.875GHz	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	4.28
6.875-7.125GHz	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	4.33

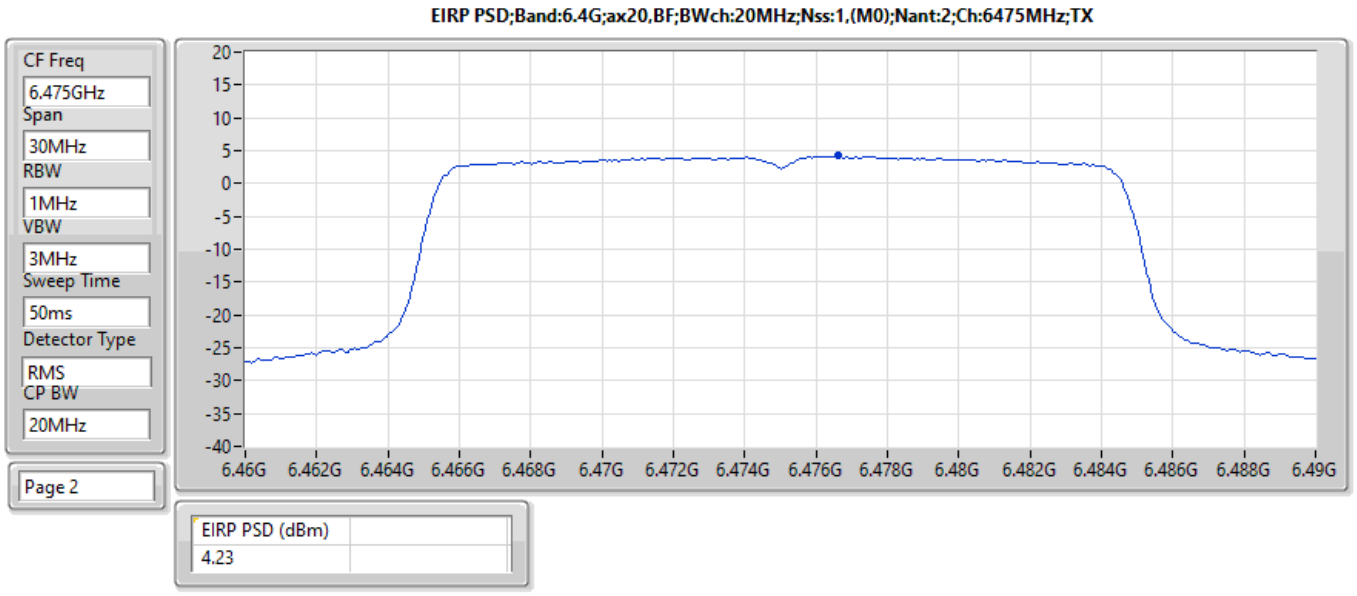
RBW = 500kHz for 5.725-5.85GHz band / 1MHz for other band;

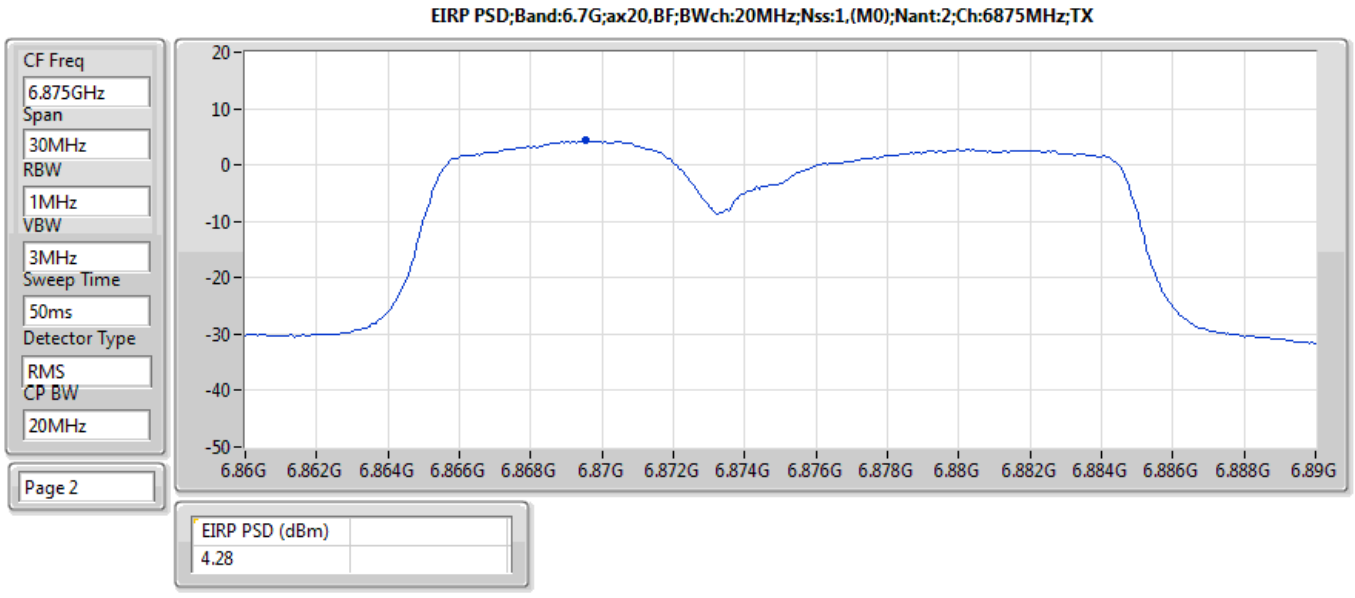
Result

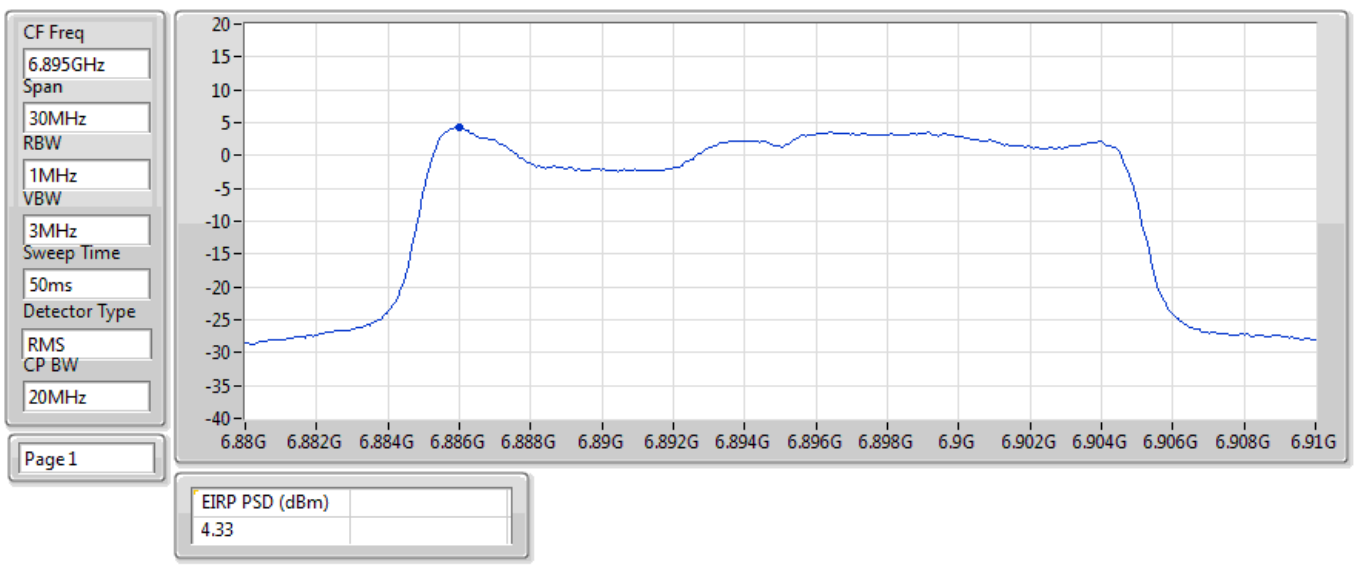
Mode	Result	EIRP PD (dBm/RBW)	EIRP PD Limit (dBm/RBW)
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	-	-	-
6175MHz	Pass	4.09	5.00
6475MHz	Pass	4.23	5.00
6875MHz Straddle 6.525-6.875GHz	Pass	4.28	5.00
6895MHz	Pass	4.33	5.00

DG = Directional Gain; RBW = 500kHz for 5.725-5.85GHz band / 1MHz for other band;
PD = trace bin-by-bin of each transmits port summing can be performed maximum power density; Port X = Port X Power Density;


EIRP PSD;Band:6.2G;ax20,BF;BWch:20MHz;Nss:1,(M0);Nant:2;Ch:6175MHz;TX
CF Freq
6.175GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
50ms
Detector Type
RMS
CP BW
20MHz
Page 2
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
6.16G 6.162G 6.164G 6.166G 6.168G 6.17G 6.172G 6.174G 6.176G 6.178G 6.18G 6.182G 6.184G 6.186G 6.188G 6.19G
EIRP PSD (dBm)
4.09


EIRP PSD;Band:6.4G;ax20,BF;BWch:20MHz;Nss:1,(M0);Nant:2;Ch:6475MHz;TX
CF Freq
6.475GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
50ms
Detector Type
RMS
CP BW
20MHz
Page 2
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
6.46G 6.462G 6.464G 6.466G 6.468G 6.47G 6.472G 6.474G 6.476G 6.478G 6.48G 6.482G 6.484G 6.486G 6.488G 6.49G
EIRP PSD (dBm)
4.23

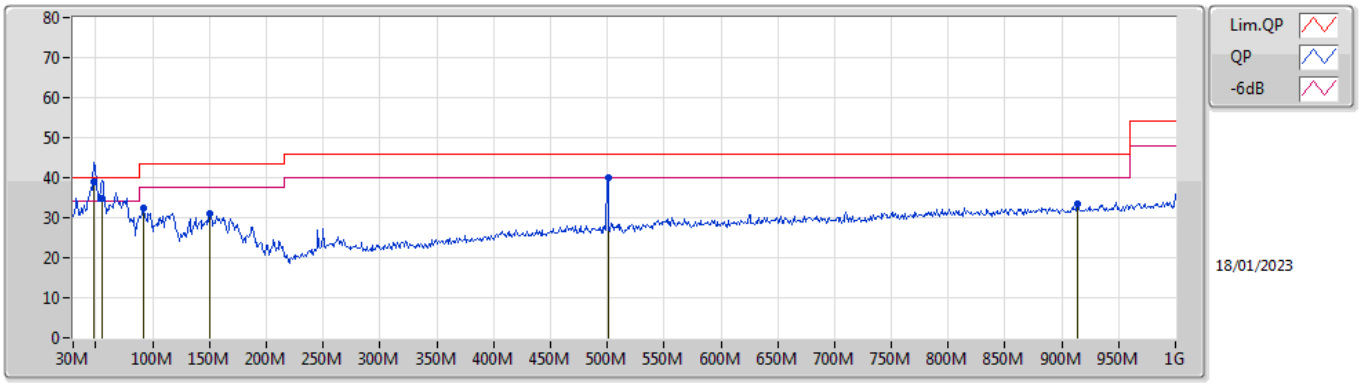

EIRP PSD;Band:6.7G;ax20,BF;BWch:20MHz;Nss:1,(M0);Nant:2;Ch:6875MHz;TX
CF Freq
6.875GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
50ms
Detector Type
RMS
CP BW
20MHz
Page 2
20
10
0
-10
-20
-30
-40
-50
6.86G 6.862G 6.864G 6.866G 6.868G 6.87G 6.872G 6.874G 6.876G 6.878G 6.88G 6.882G 6.884G 6.886G 6.888G 6.89G
EIRP PSD (dBm)
4.28


EIRP PSD;Band:7.0G;ax20,BF;BWch:20MHz;Nss:1,(M0);Nant:2;Ch:6895MHz;TX
CF Freq
6.895GHz
Span
30MHz
RBW
1MHz
VBW
3MHz
Sweep Time
50ms
Detector Type
RMS
CP BW
20MHz
Page 1
20
15
10
5
0
-5
-10
-15
-20
-25
-30
-35
-40
6.88G 6.882G 6.884G 6.886G 6.888G 6.89G 6.892G 6.894G 6.896G 6.898G 6.9G 6.902G 6.904G 6.906G 6.908G 6.91G
EIRP PSD (dBm)
4.33

Summary

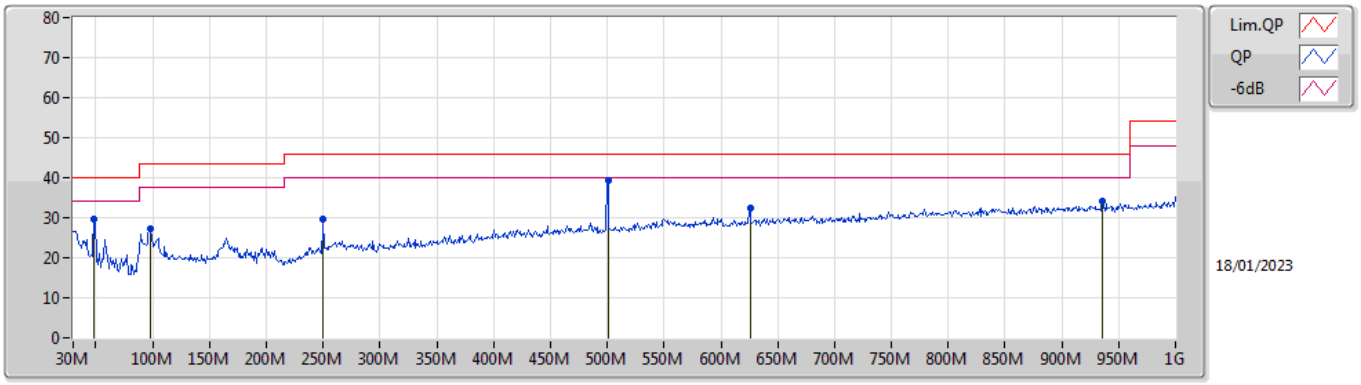
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 4	Pass	QP	48.43M	39.08	40.00	-0.92	Vertical

Mode 4



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
QP	48.43M	39.08	40.00	-0.92	-16.02	3	Vertical	346	1.50	"Worst"	55.10	14.59	1.24	31.85
QP	55.22M	34.71	40.00	-5.29	-17.89	3	Vertical	112	1.25	-	52.60	12.69	1.31	31.89
PK	92.08M	32.34	43.50	-11.16	-15.18	3	Vertical	336	1.25	-	47.52	15.14	1.64	31.96
PK	150.28M	30.87	43.50	-12.63	-13.74	3	Vertical	170	1.00	-	44.61	16.18	2.08	32.00
PK	500.45M	40.14	46.00	-5.86	-5.21	3	Vertical	1	1.25	-	45.35	23.20	3.99	32.40
PK	913.67M	33.55	46.00	-12.45	-0.61	3	Vertical	29	2.00	-	34.16	26.20	5.68	32.49

Mode 4



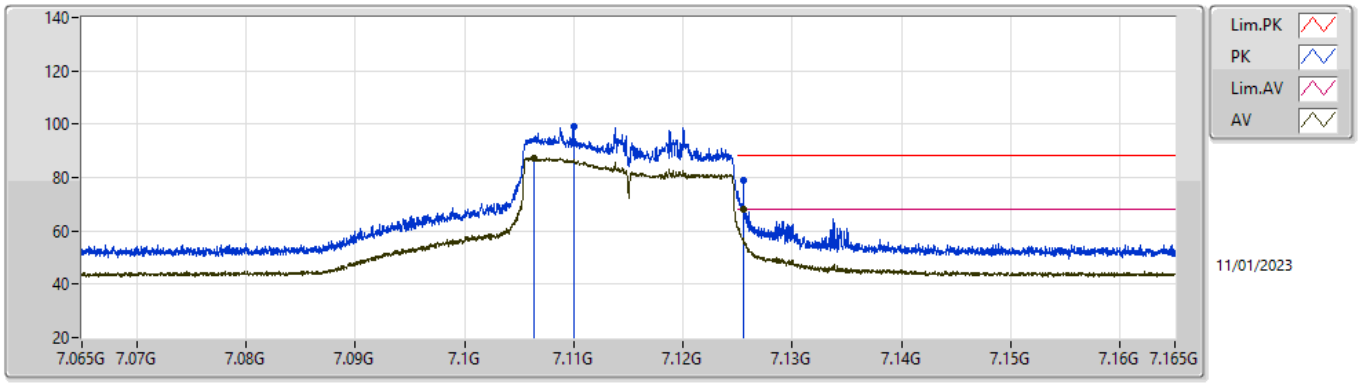
Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comment	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB/m)	(m)		(°)	(m)		(dBuV/m)	(dB/m)	(dB)	(dB)
PK	48.43M	29.53	40.00	-10.47	-16.02	3	Horizontal	216	1.00	-	45.55	14.59	1.24	31.85
PK	97.9M	27.29	43.50	-16.21	-13.99	3	Horizontal	30	1.50	-	41.28	16.28	1.69	31.96
PK	250.19M	29.50	46.00	-16.50	-11.06	3	Horizontal	222	1.00	-	40.56	18.22	2.72	32.00
PK	500.45M	39.34	46.00	-6.66	-5.21	3	Horizontal	59	2.00	"Worst"	44.55	23.20	3.99	32.40
PK	625.58M	32.45	46.00	-13.55	-3.47	3	Horizontal	251	1.00	-	35.92	24.53	4.52	32.52
PK	935.98M	34.01	46.00	-11.99	-0.47	3	Horizontal	308	1.50	-	34.48	26.33	5.68	32.48

Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
6.875-7.125GHz	-	-	-	-	-	-	-	-	-	-	-
802.11ax HEW20-BF_Nss1,(MCS0)_2TX	Pass	RMS	7.1255G	67.97	68.20	-0.23	3	Vertical	288	1.72	BP 1MHz

6.875-7.125GHz_802.11ax HEW20-BF_Nss1,(MCS0)_2TX

7115MHz_TX

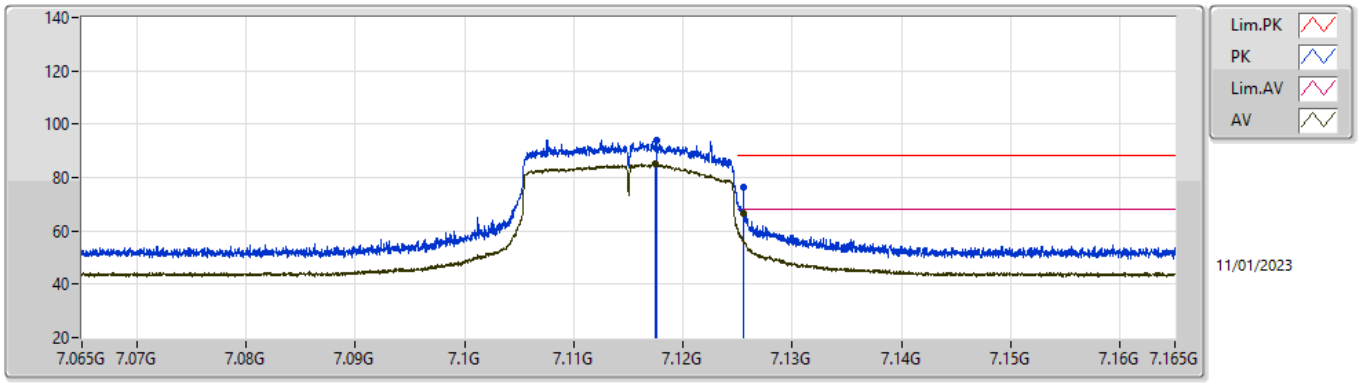


EUT X_2TX
Setting 37
04-K-R-7

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	7.11G	99.11	Inf	-Inf	88.63	3	Vertical	288	1.72	-	36.92	6.71	33.15
RMS	7.10638G	87.31	Inf	-Inf	76.84	3	Vertical	288	1.72	-	36.91	6.71	33.15
PK	7.1255G	79.07	88.20	-9.13	68.54	3	Vertical	288	1.72	BP 1MHz	36.95	6.73	33.15
RMS	7.1255G	67.97	68.20	-0.23	57.44	3	Vertical	288	1.72	BP 1MHz	36.95	6.73	33.15

6.875-7.125GHz_802.11ax HEW20-BF_Nss1,(MCS0)_2TX

7115MHz_TX

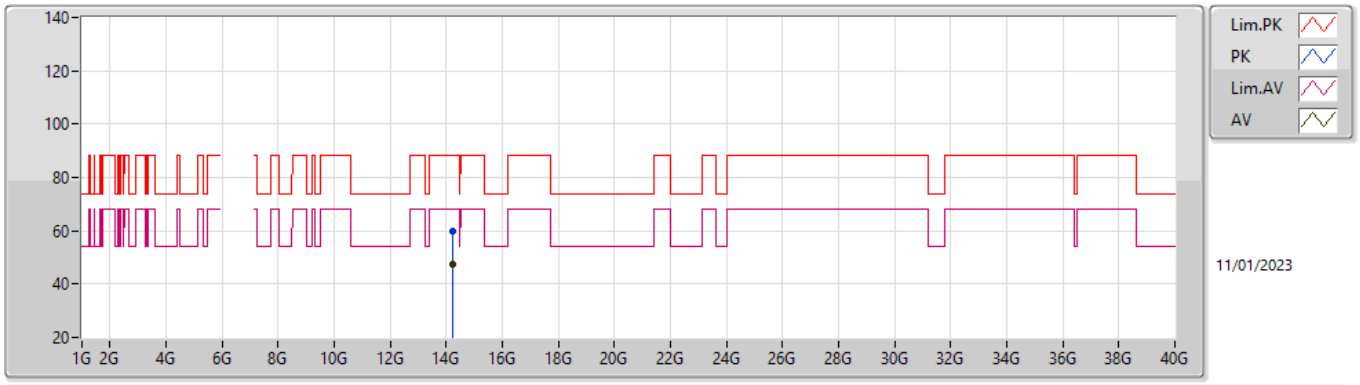


EUT X_2TX
Setting 37
04-K-R-7

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	7.11753G	94.22	Inf	-Inf	83.71	3	Horizontal	266	1.86	-	36.94	6.72	33.15
RMS	7.11748G	85.03	Inf	-Inf	74.53	3	Horizontal	266	1.86	-	36.93	6.72	33.15
PK	7.1255G	76.61	88.20	-11.59	66.08	3	Horizontal	266	1.86	BP 1MHz	36.95	6.73	33.15
RMS	7.1255G	66.45	68.20	-1.75	55.92	3	Horizontal	266	1.86	BP 1MHz	36.95	6.73	33.15

6.875-7.125GHz_802.11ax HEW20-BF_Nss1,(MCS0)_2TX

7115MHz_TX

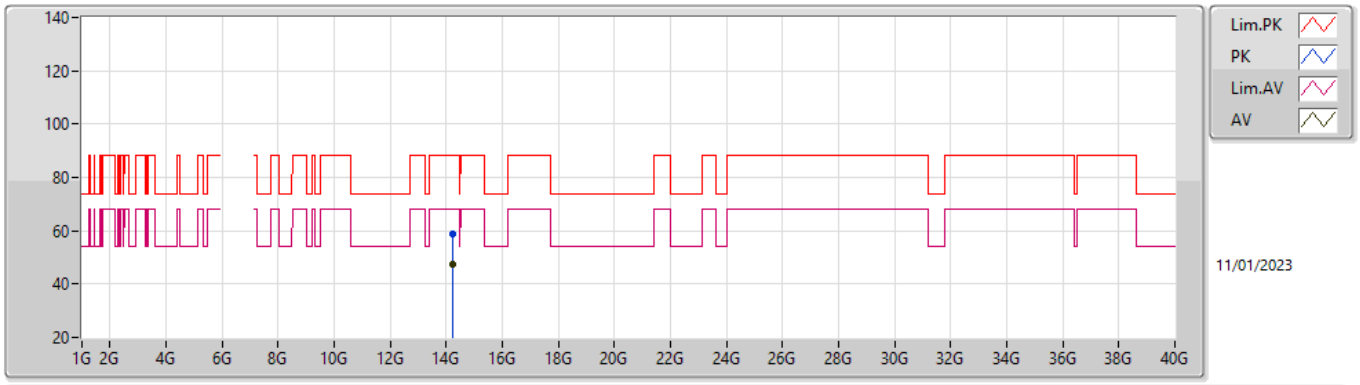


EUT X_2TX
Setting 37
04-K-R-7

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	14.2291G	59.80	88.20	-28.40	43.20	3	Vertical	352	1.49	-	40.60	9.68	33.68
RMS	14.22562G	47.26	68.20	-20.94	30.66	3	Vertical	352	1.49	-	40.60	9.68	33.68

6.875-7.125GHz_802.11ax HEW20-BF_Nss1,(MCS0)_2TX

7115MHz_TX

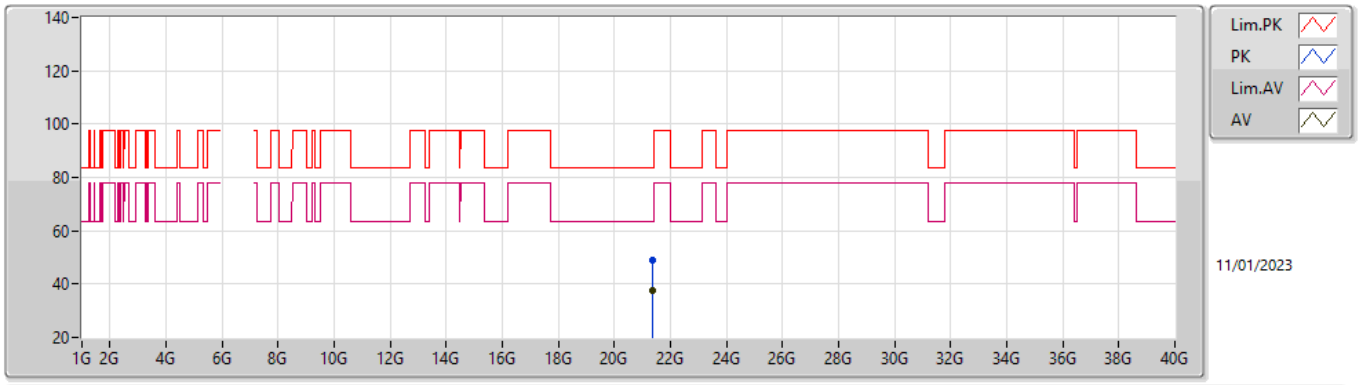


EUT X_2TX
Setting 37
04-K-R-7

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	14.23864G	58.68	88.20	-29.52	42.08	3	Horizontal	129	2.36	-	40.60	9.68	33.68
RMS	14.218G	47.21	68.20	-20.99	30.62	3	Horizontal	129	2.36	-	40.60	9.68	33.69

6.875-7.125GHz_802.11ax HEW20-BF_Nss1,(MCS0)_2TX

7115MHz_TX

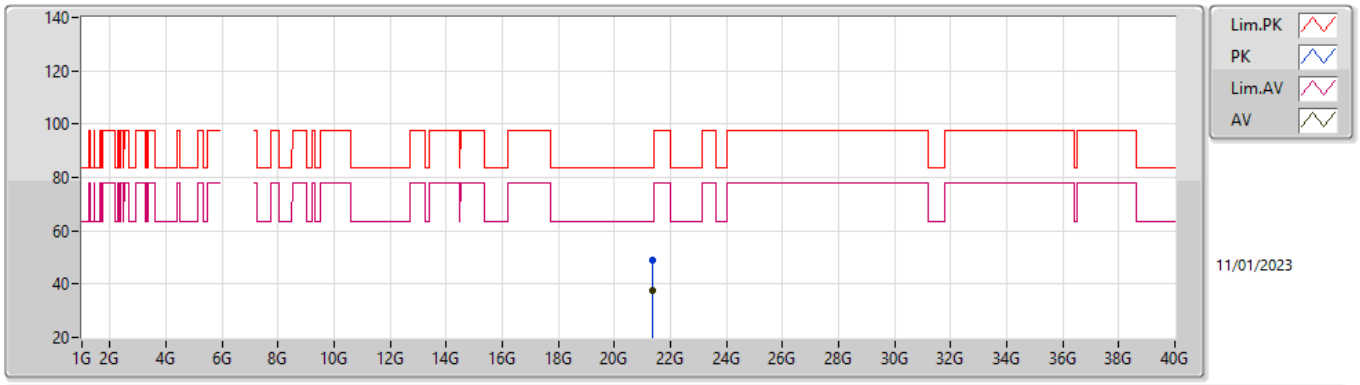


EUT X_2TX
Setting 37
04-K-R-7

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	21.35742G	49.11	83.54	-34.43	45.35	1	Vertical	4	2.14	-	38.01	17.85	52.10
AV	21.35094G	37.41	63.54	-26.13	33.64	1	Vertical	4	2.14	-	38.02	17.85	52.10

6.875-7.125GHz_802.11ax HEW20-BF_Nss1,(MCS0)_2TX

7115MHz_TX



EUT X_2TX
Setting 37
04-K-R-7

Type	Freq	Level	Limit	Margin	Raw	Dist	Condition	Azimuth	Height	Comment	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dBuV)	(m)		(°)	(m)		(dB)	(dB)	(dB)
PK	21.3462G	48.79	83.54	-34.75	45.02	1	Horizontal	310	2.52	-	38.02	17.85	52.10
AV	21.35604G	37.46	63.54	-26.08	33.69	1	Horizontal	310	2.52	-	38.02	17.85	52.10

Contention Based Protocol Threshold Level 802.11ax HEW20										
UNII Band	**Channel**	**Bandwidth (MHz)**	**Frequency (MHz)**	**Interference frequency (MHz)**		**EUT Status**	**Injected AWGN Power (dBm)**	**Ant Gain (dBi)**	**Detection Power(dBm)**	**Detection Limit (dBm)**
5	**53**	**20**	**6215**	Center	6215	OFF	-71.68	1.32	-73.02	≤ -62
						Minimal	-72.68	1.32	-74.00	≤ -62
						ON	-80.68	1.32	-82.00	≤ -62
6	**101**	**20**	**6455**	Center	6455	OFF	-72.54	1.46	-74.08	≤ -62
						Minimal	-73.54	1.46	-75.00	≤ -62
						ON	-80.54	1.46	-82.00	≤ -62
7	**149**	**20**	**6695**	Center	6695	OFF	-69.24	1.76	-71.02	≤ -62
						Minimal	-70.24	1.76	-72.00	≤ -62
						ON	-80.24	1.76	-82.00	≤ -62
8	**213**	**20**	**7015**	Center	7015	OFF	-64.88	2.12	-67.03	≤ -62
						Minimal	-65.88	2.12	-68.00	≤ -62
						ON	-79.88	2.12	-82.00	≤ -62

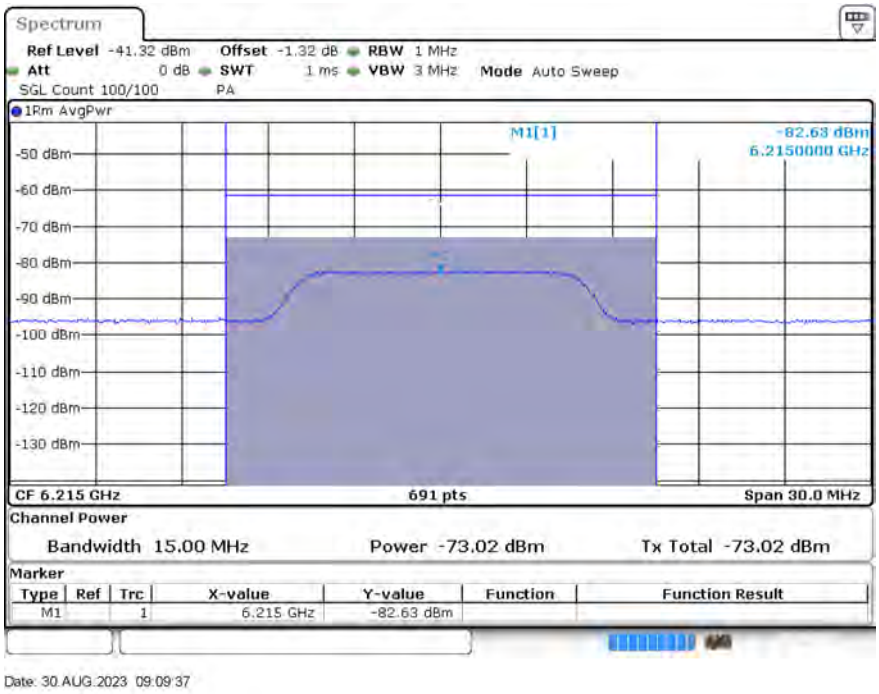
Contention Based Protocol Threshold Level 802.11ax HEW160										
UNII Band	**Channel**	**Bandwidth (MHz)**	**Frequency (MHz)**	**Interference frequency (MHz)**		**EUT Status**	**Injected AWGN Power (dBm)**	**Ant Gain (dBi)**	**Detection Power(dBm)**	**Detection Limit (dBm)**
5	**47**	**160**	**6185**	Low edge	6110	OFF	-67.68	1.32	-69.02	≤ -62
						Minimal	-68.68	1.32	-70.00	≤ -62
						ON	-80.68	1.32	-82.00	≤ -62
				Center	6185	OFF	-68.68	1.32	-70.02	≤ -62
						Minimal	-69.68	1.32	-71.00	≤ -62
						ON	-80.68	1.32	-82.00	≤ -62
				High edge	6260	OFF	-68.68	1.32	-70.04	≤ -62
						Minimal	-69.68	1.32	-71.00	≤ -62
						ON	-80.68	1.32	-82.00	≤ -62
6	**111**	**160**	**6505**	Low edge	6430	OFF	-67.54	1.46	-69.07	≤ -62
						Minimal	-68.54	1.46	-70.00	≤ -62
						ON	-80.54	1.46	-82.00	≤ -62
				Center	6505	OFF	-66.54	1.46	-68.04	≤ -62
						Minimal	-67.54	1.46	-69.00	≤ -62
						ON	-80.54	1.46	-82.00	≤ -62
				High edge	6580	OFF	-70.54	1.46	-72.08	≤ -62
						Minimal	-71.54	1.46	-73.00	≤ -62
						ON	-80.54	1.46	-82.00	≤ -62
7	**143**	**160**	**6665**	Low edge	6590	OFF	-69.24	1.76	-71.09	≤ -62
						Minimal	-70.24	1.76	-72.00	≤ -62
						ON	-80.24	1.76	-82.00	≤ -62
				Center	6665	OFF	-67.24	1.76	-69.05	≤ -62
						Minimal	-68.24	1.76	-70.00	≤ -62
						ON	-80.24	1.76	-82.00	≤ -62
				High edge	6740	OFF	-68.24	1.76	-70.01	≤ -62
						Minimal	-69.24	1.76	-71.00	≤ -62
						ON	-80.24	1.76	-82.00	≤ -62

8	**207**	**160**	**6985**	Low edge	6910	OFF	-66.88	2.12	-69.03	≤ -62
						Minimal	-67.88	2.12	-70.00	≤ -62
						ON	-79.88	2.12	-82.00	≤ -62
				Center	6985	OFF	-64.88	2.12	-67.02	≤ -62
						Minimal	-65.88	2.12	-68.00	≤ -62
						ON	-79.88	2.12	-82.00	≤ -62
				High edge	7060	OFF	-64.88	2.12	-67.04	≤ -62
						Minimal	-65.88	2.12	-68.00	≤ -62
						ON	-79.88	2.12	-82.00	≤ -62

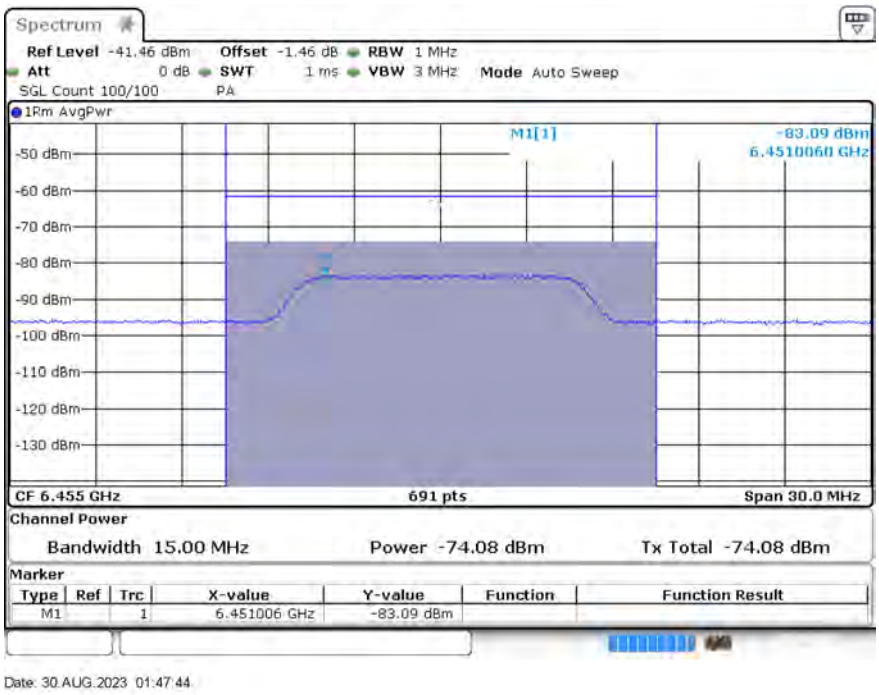
Contention Based protocol 802.11ax HEW20											
UNII Band	**Channel**	**Bandwidth (MHz)**	**Frequency (MHz)**	**Interference frequency (MHz)**		**AWGN Threshold Level (dBm)**	**EUT Status**	**Number of Detected (out of 10 times)**	**Detection Probability (%)**	**Limit (%)**	**Test Result**
5	53	20	6215	Center	6215	-73.02	OFF	10	100	90	**PASS**
6	101	20	6455	Center	6455	-74.08	OFF	10	100	90	**PASS**
7	149	20	6695	Center	6695	-71.02	OFF	10	100	90	**PASS**
8	213	20	7015	Center	7015	-67.03	OFF	10	100	90	**PASS**

Contention Based protocol 802.11ax HEW160											
UNII Band	**Channel**	**Bandwidth (MHz)**	**Frequency (MHz)**	**Interference frequency (MHz)**		**AWGN Threshold Level (dBm)**	**EUT Status**	**Number of Detected (out of 10 times)**	**Detection Probability (%)**	**Limit (%)**	**Test Result**
5	**47**	**160**	**6185**	Low edge	6110	-69.02	OFF	10	100	90	**PASS**
				Center	6185	-70.02	OFF	9	90	90	**PASS**
				High edge	6260	-70.04	OFF	10	100	90	**PASS**
6	**111**	**160**	**6505**	Low edge	6430	-69.07	OFF	10	100	90	**PASS**
				Center	6505	-68.04	OFF	10	100	90	**PASS**
				High edge	6580	-72.08	OFF	9	90	90	**PASS**
7	**143**	**160**	**6665**	Low edge	6590	-71.09	OFF	9	90	90	**PASS**
				Center	6665	-69.05	OFF	10	100	90	**PASS**
				High edge	6740	-70.01	OFF	10	100	90	**PASS**
8	**207**	**160**	**6985**	Low edge	6910	-69.03	OFF	9	90	90	**PASS**
				Center	6985	-67.02	OFF	9	90	90	**PASS**
				High edge	7060	-67.04	OFF	10	100	90	**PASS**

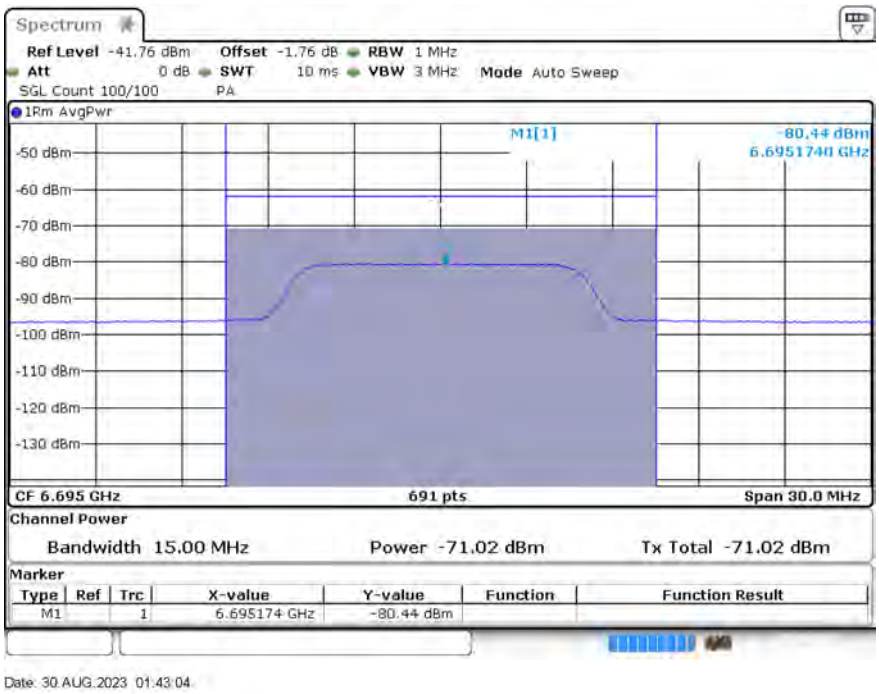
Incumbent signal (AWGN) Plot
Bandwidth: 20MHz
Frequency (MHz): 6215 MHz



Frequency (MHz): 6455 MHz

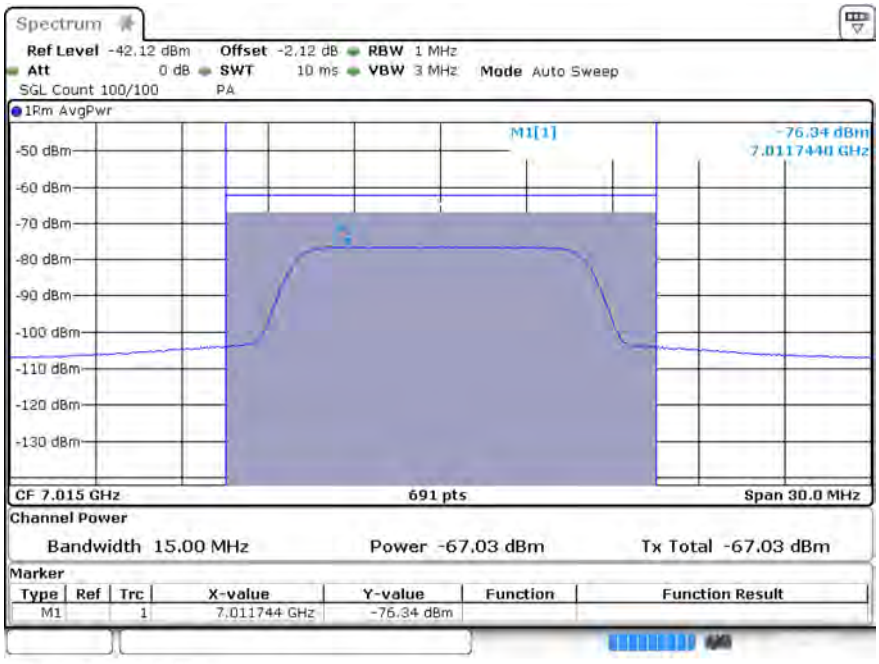


Frequency (MHz): 6695 MHz



Date: 30.AUG.2023 01:43:04

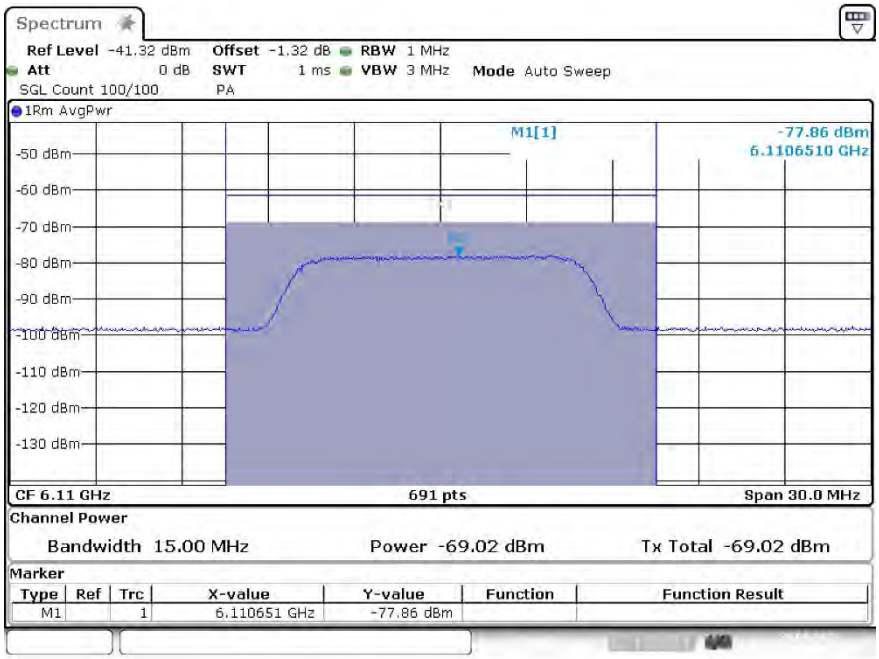
Frequency (MHz): 7015 MHz



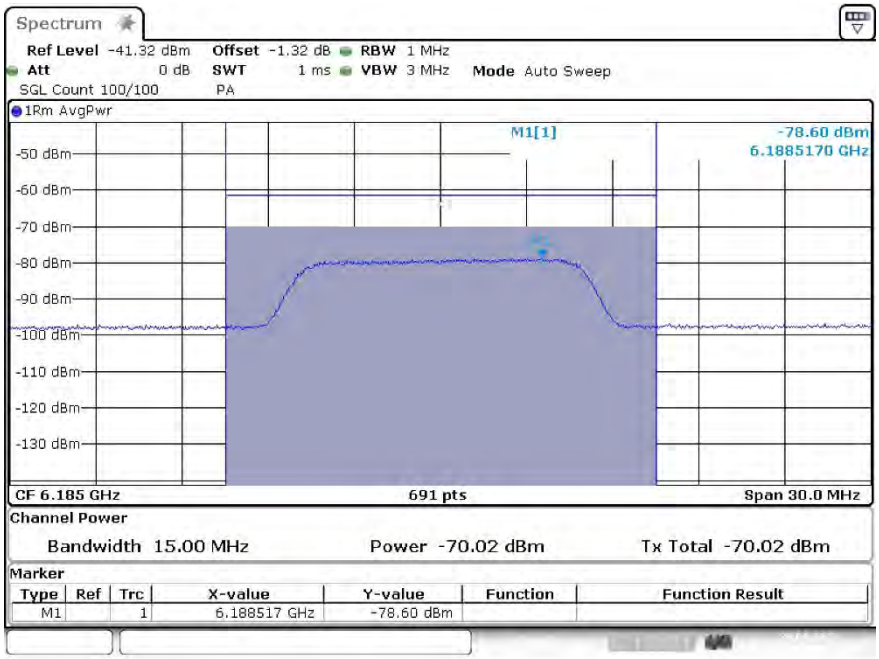
Date: 30.AUG.2023 01:41:44

Bandwidth: 160MHz

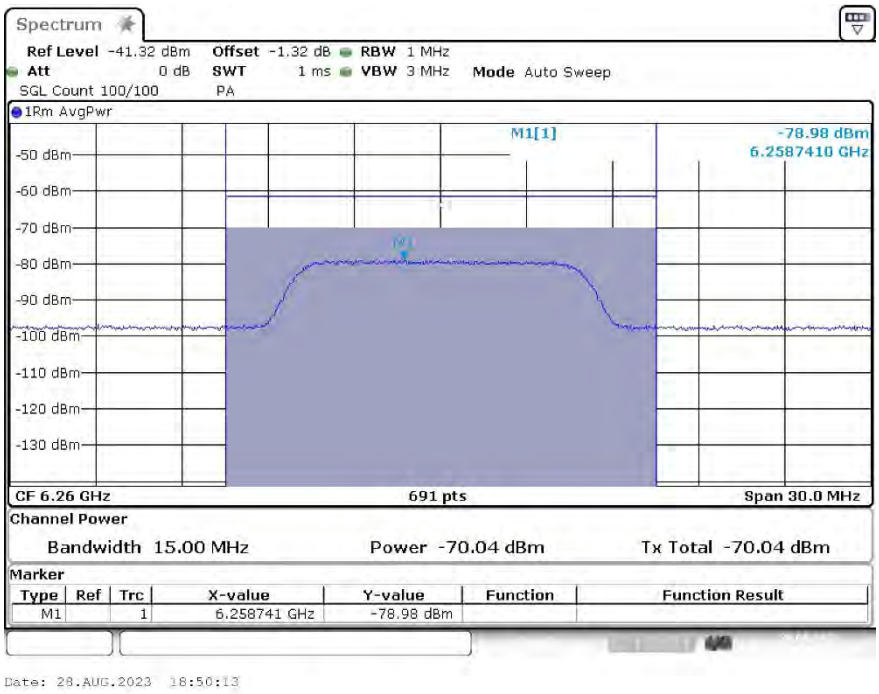
Frequency (MHz): 6110 MHz



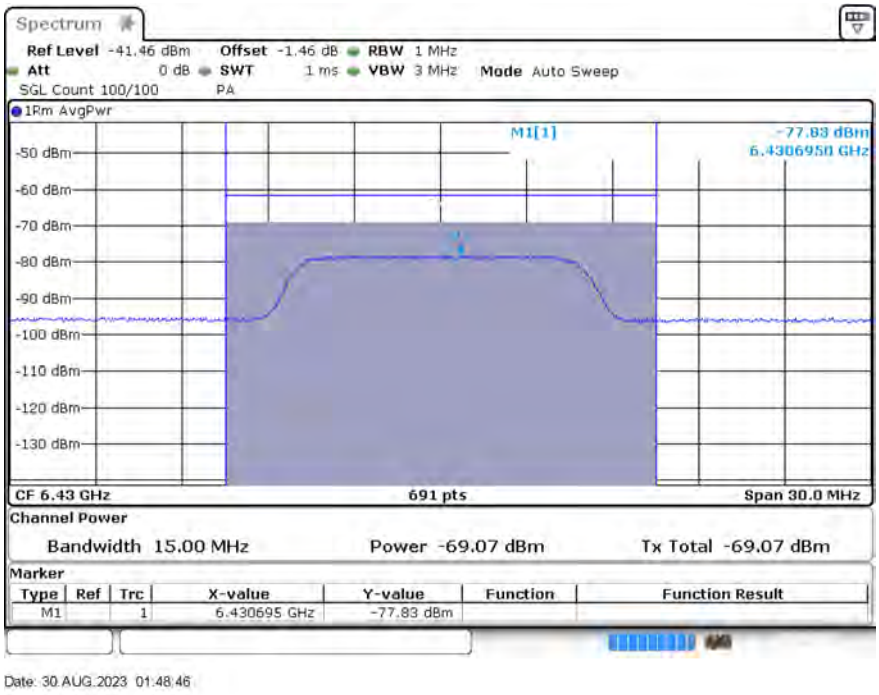
Frequency (MHz): 6185 MHz



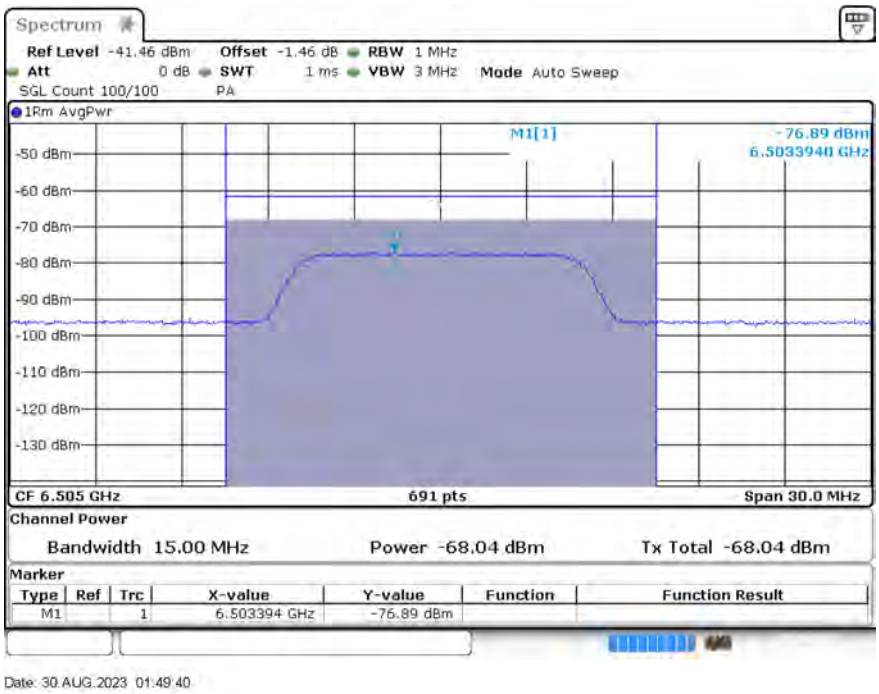
Frequency (MHz): 6260 MHz



Frequency (MHz): 6430 MHz

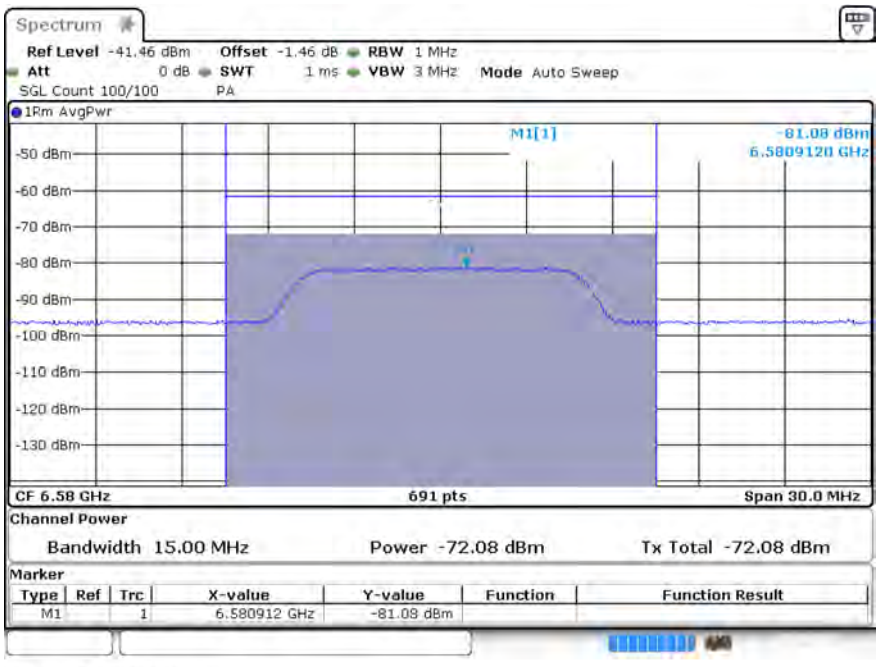


Frequency (MHz): 6505 MHz



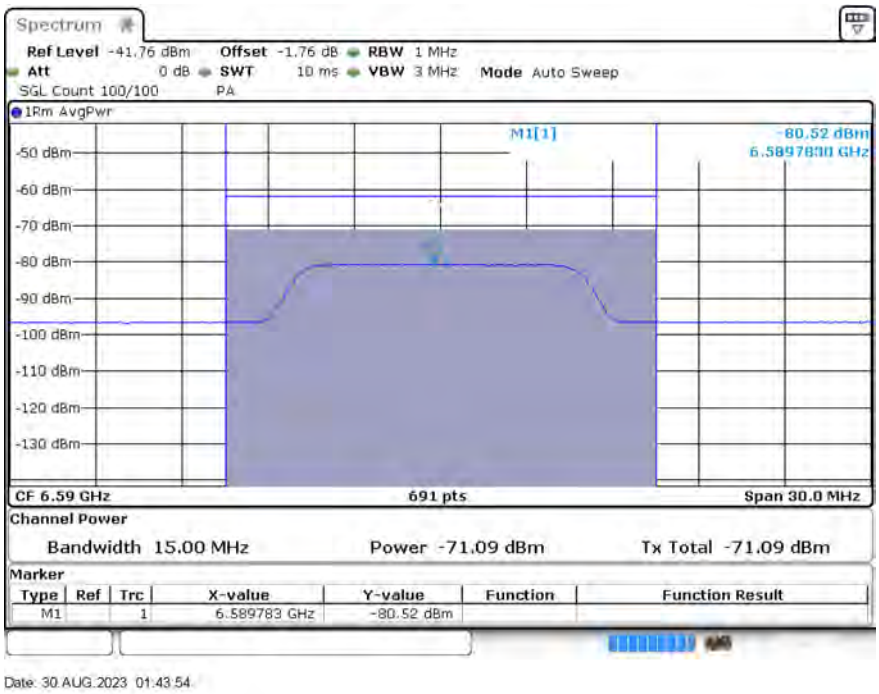
Date: 30.AUG.2023 01:49:40

Frequency (MHz): 6580 MHz



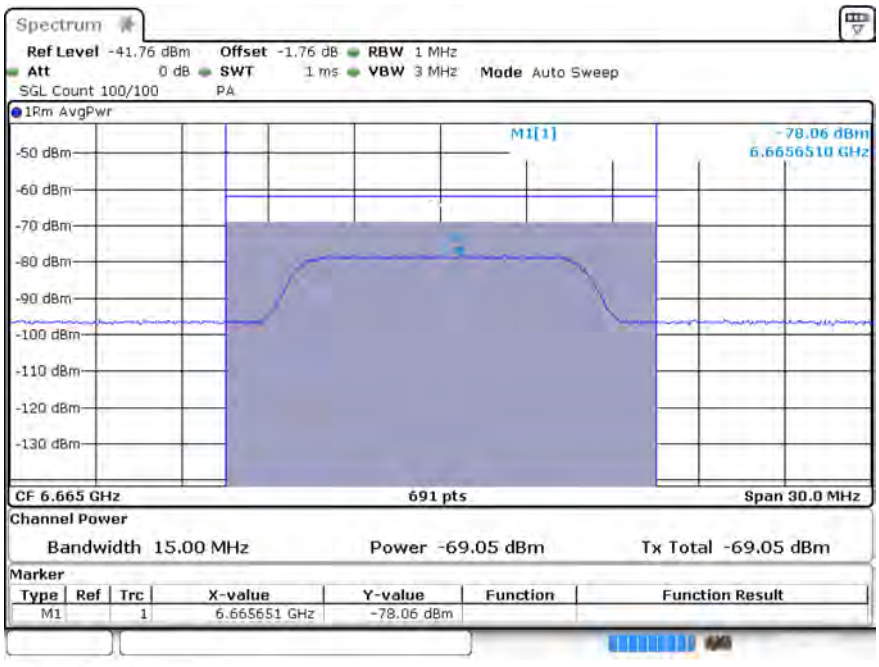
Date: 30.AUG.2023 01:50:27

Frequency (MHz): 6590 MHz



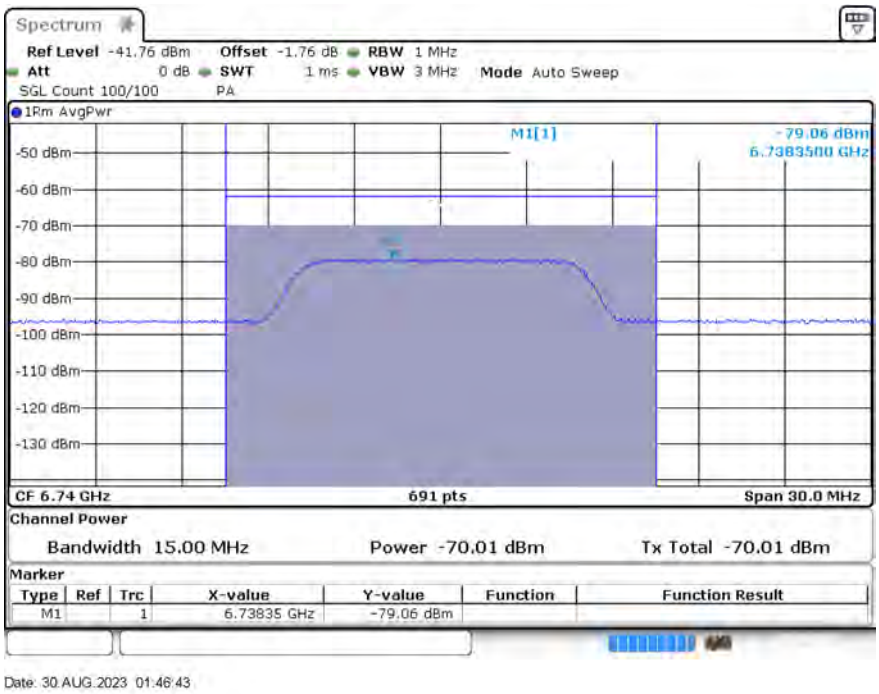
Date: 30.AUG.2023 01:43:54

Frequency (MHz): 6665 MHz



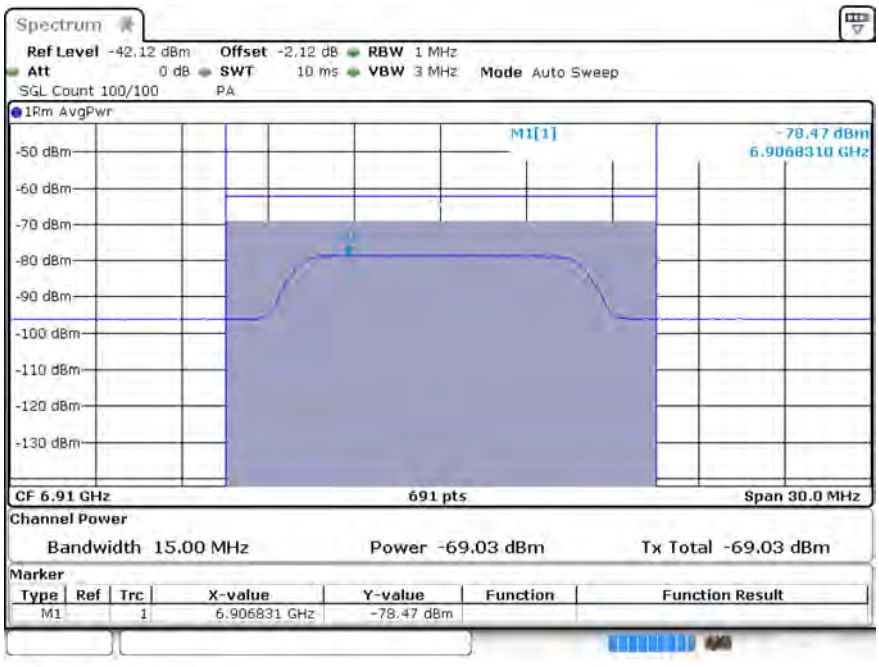
Date: 30.AUG.2023 01:45:58

Frequency (MHz): 6740 MHz



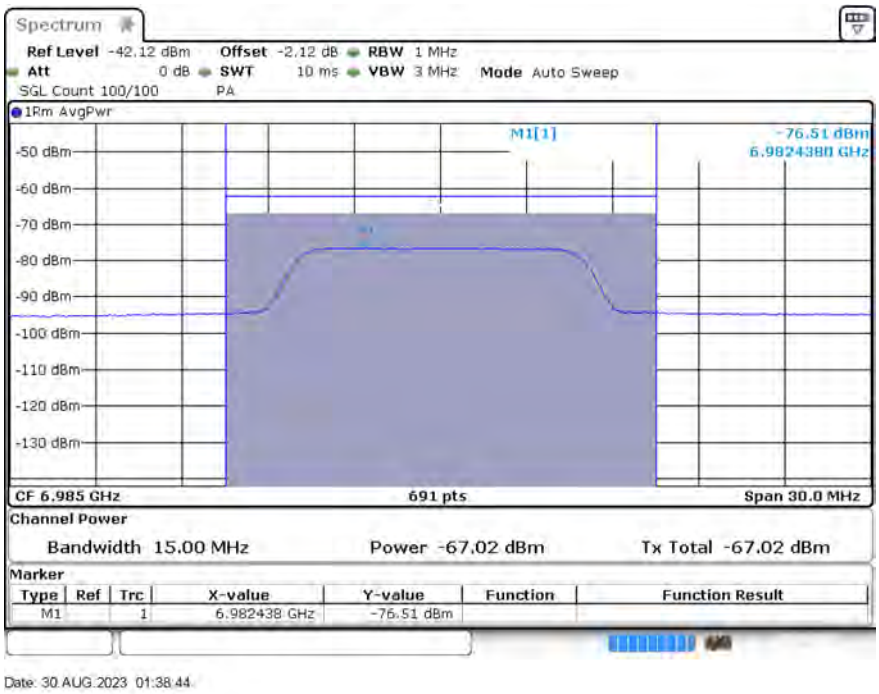
Date: 30.AUG.2023 01:46:43

Frequency (MHz): 6910 MHz



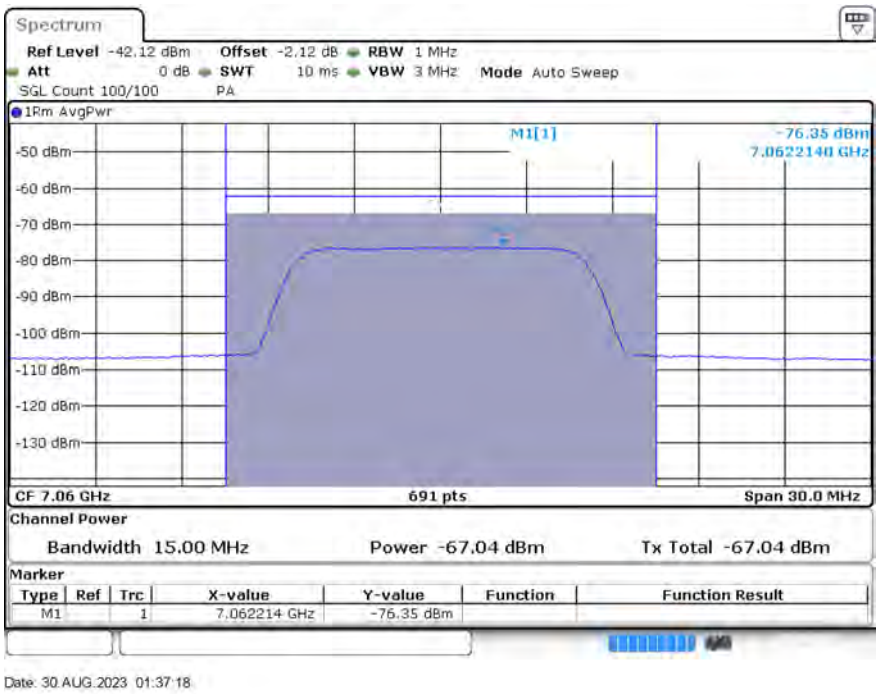
Date: 30.AUG.2023 01:39:45

Frequency (MHz): 6985 MHz



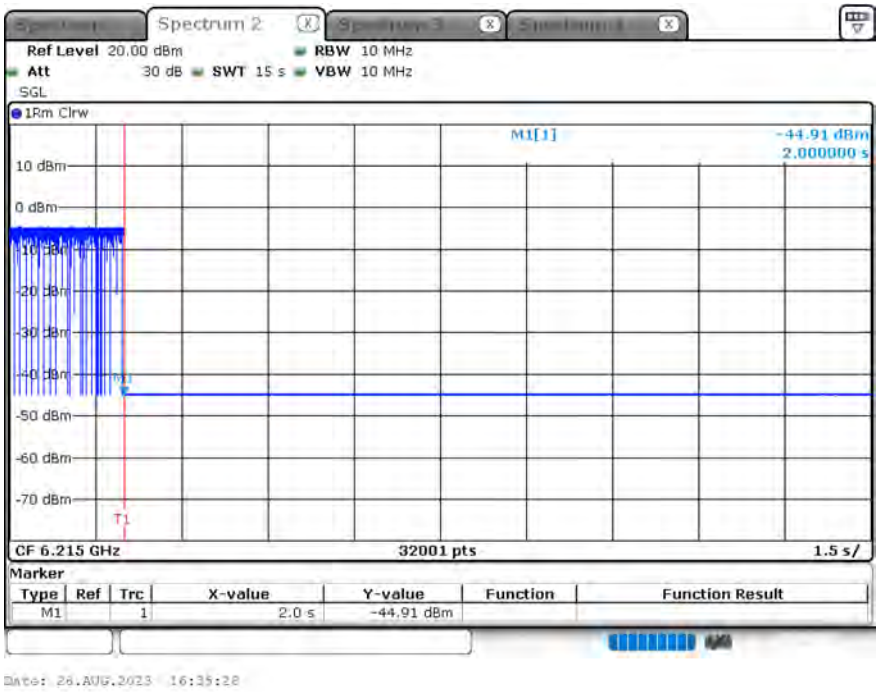
Date: 30.AUG.2023 01:38:44

Frequency (MHz): 7060 MHz

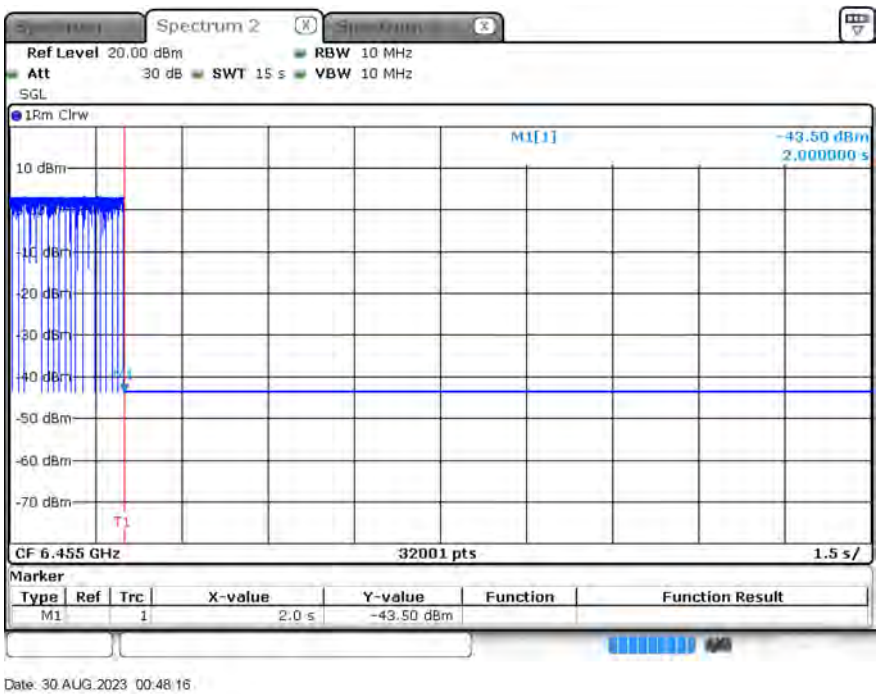


Date: 30.AUG.2023 01:37:18

Contention-Based Protocol Plot
Bandwidth: 20MHz
Test CH 53 ; Incumbent signal 6215 MHz

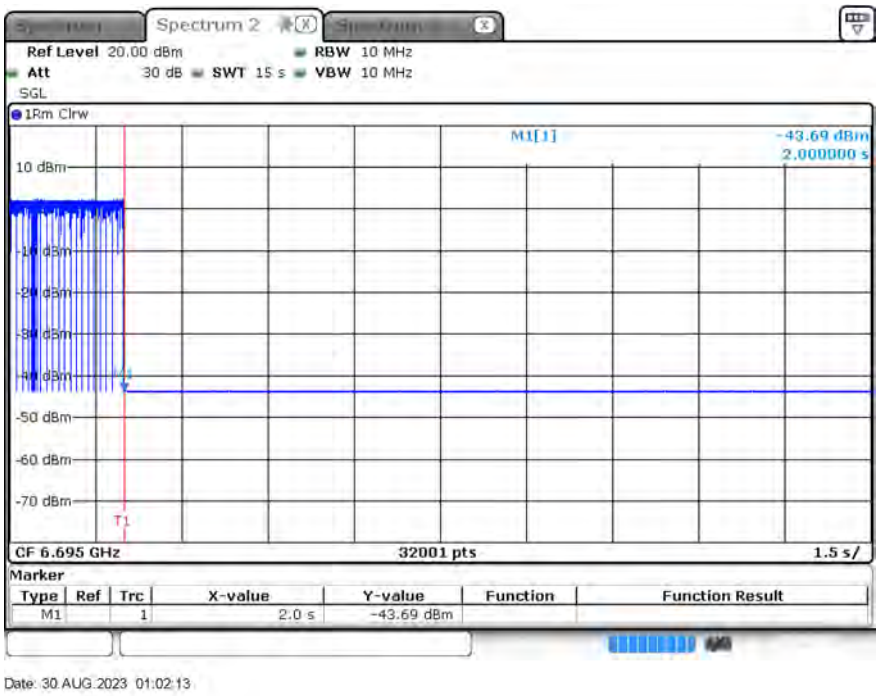


Note : M1 : Inject AWGN signal
Test CH 101 ; Incumbent signal 6455 MHz



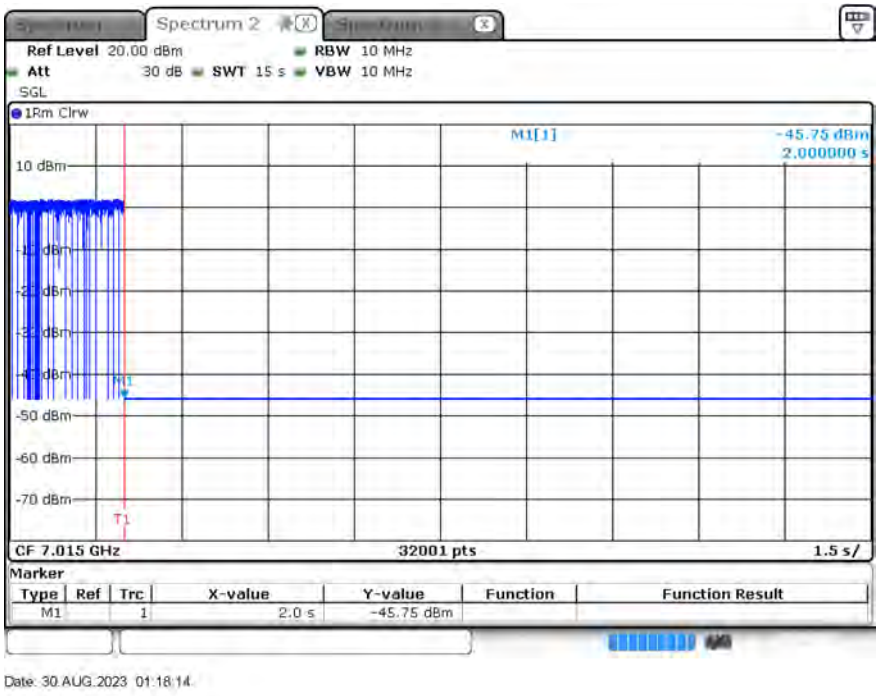
Note : M1 : Inject AWGN signal

Test CH 149 ; Incumbent signal 6695 MHz



Note : M1 : Inject AWGN signal

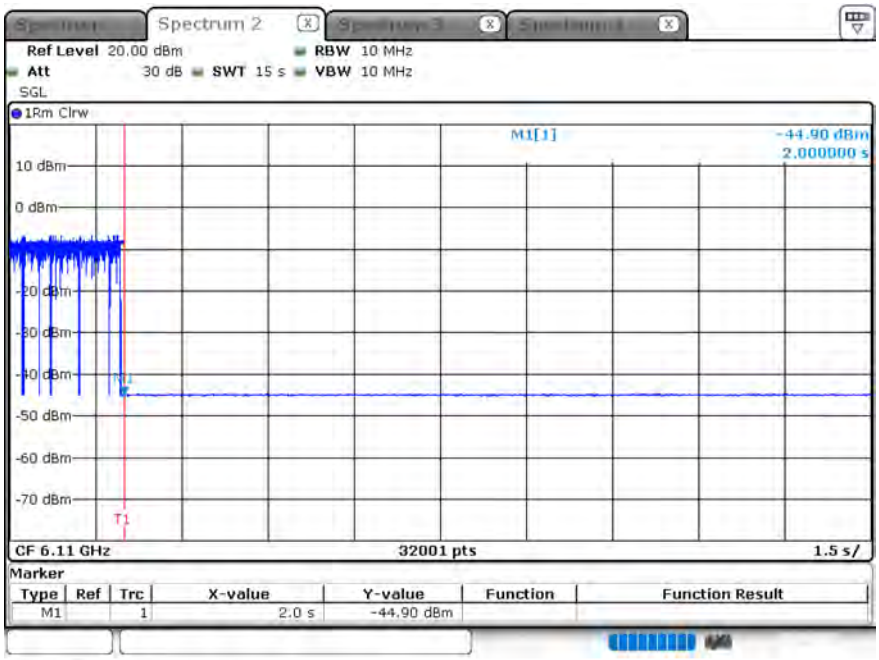
Test CH 213 ; Incumbent signal 7015 MHz



Note : M1 : Inject AWGN signal

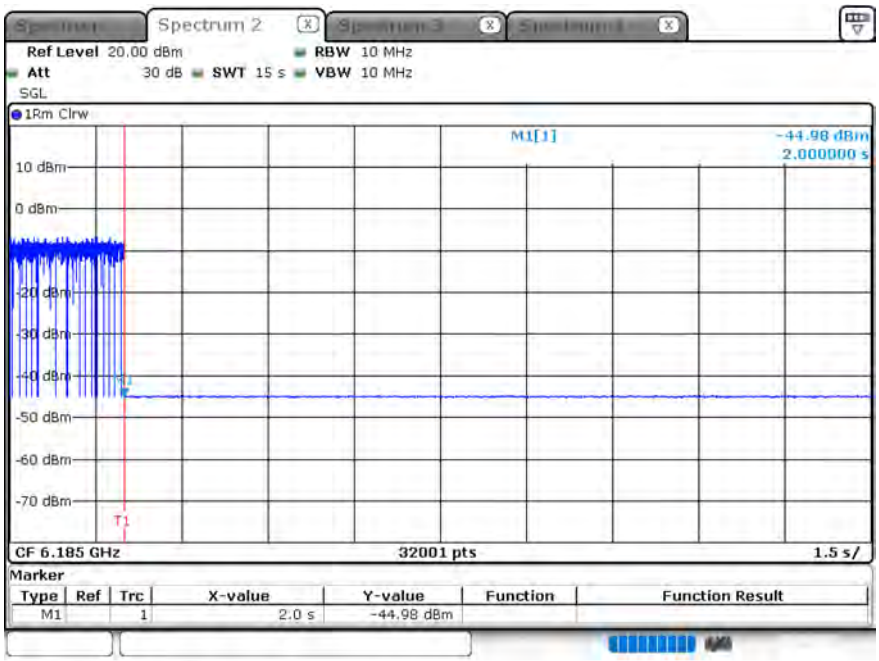
Bandwidth: 160MHz

Test CH 47 ; Incumbent signal 6110 MHz



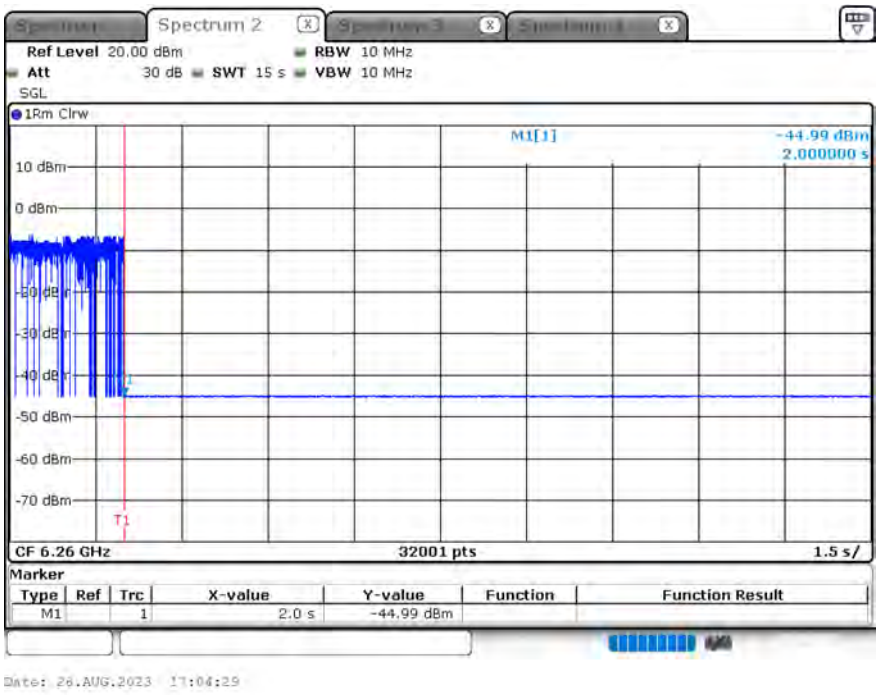
Note : M1 : Inject AWGN signal

Test CH 47 ; Incumbent signal 6185 MHz



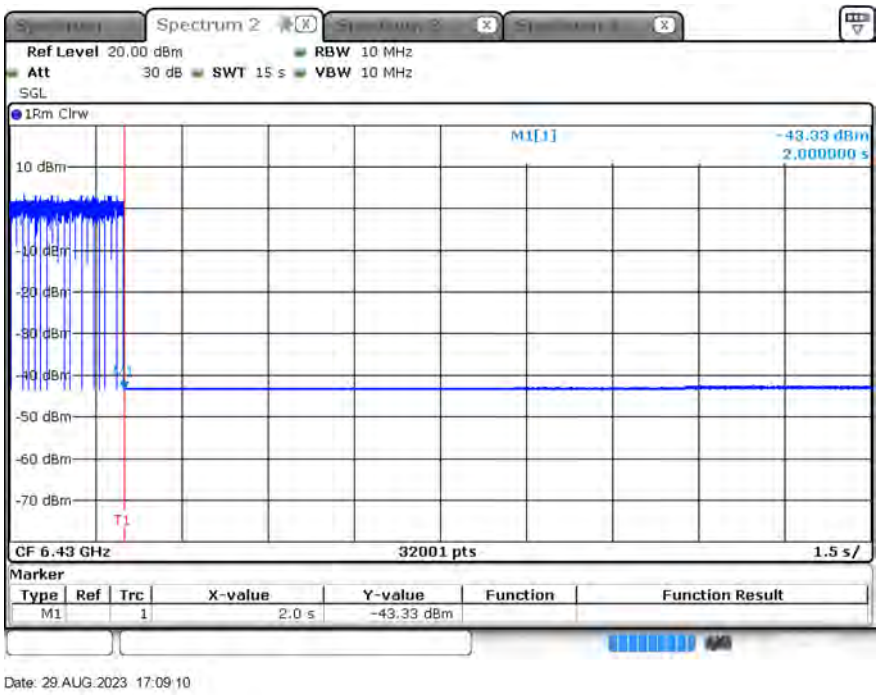
Note : M1 : Inject AWGN signal

Test CH 47 ; Incumbent signal 6260 MHz



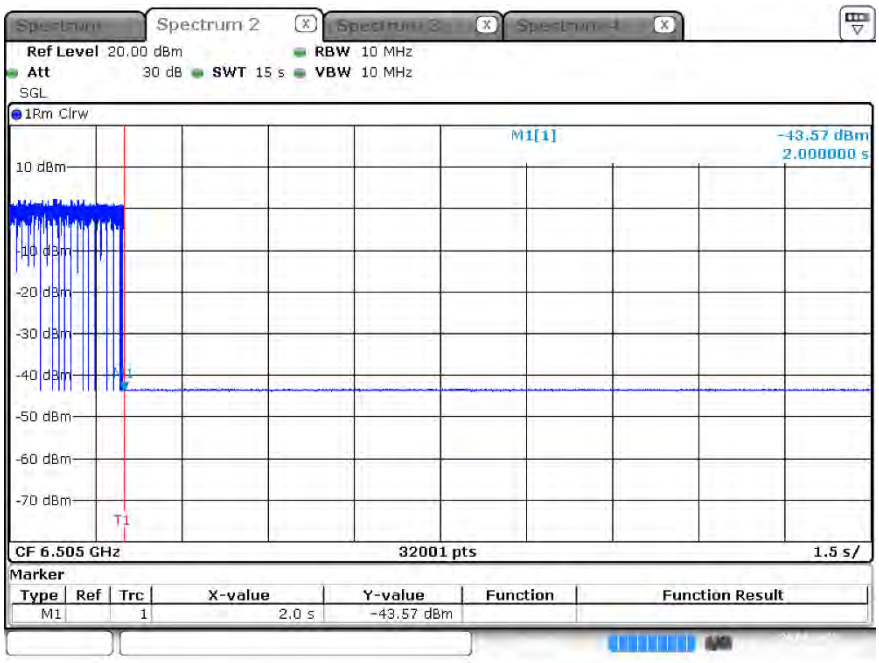
Note : M1 : Inject AWGN signal

Test CH 111 ; Incumbent signal 6430 MHz



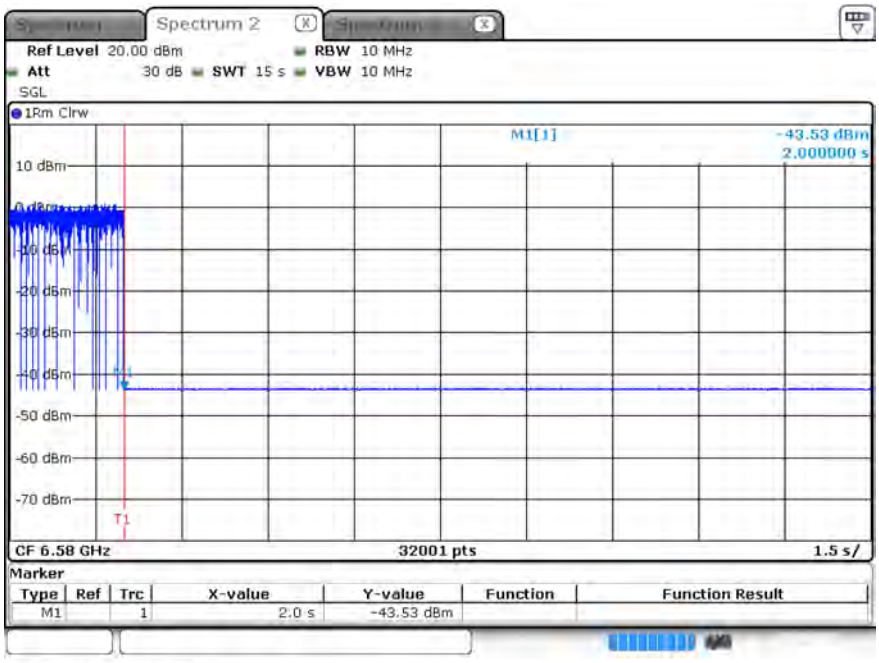
Note : M1 : Inject AWGN signal

Test CH 111 ; Incumbent signal 6505 MHz



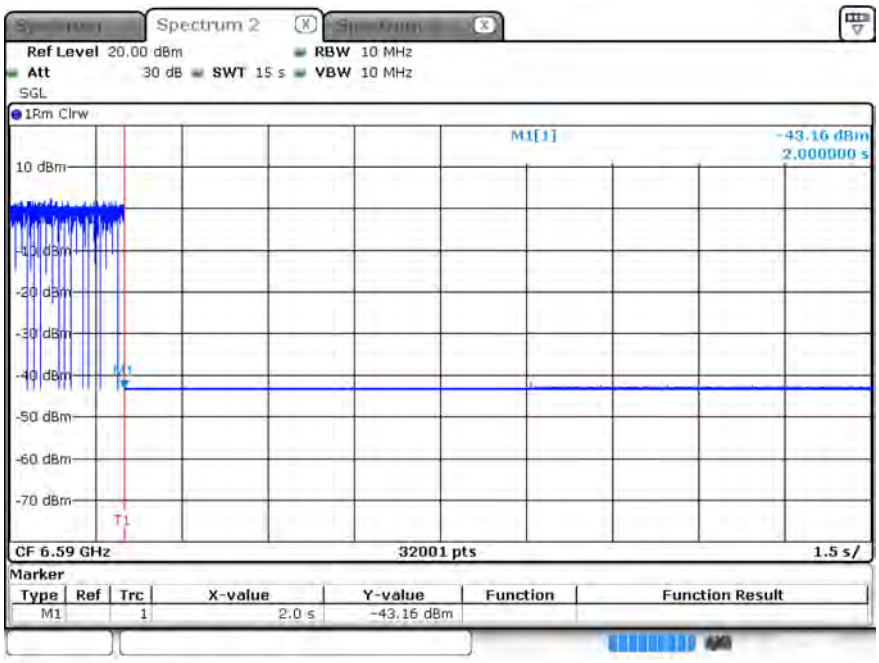
Note : M1 : Inject AWGN signal

Test CH 111 ; Incumbent signal 6580 MHz



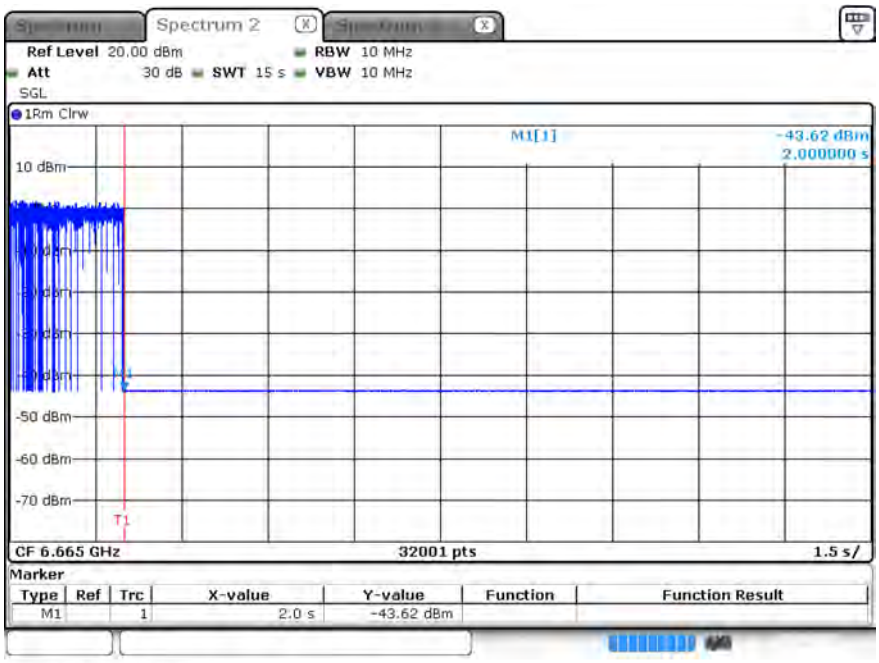
Note : M1 : Inject AWGN signal

Test CH 143 ; Incumbent signal 6590 MHz



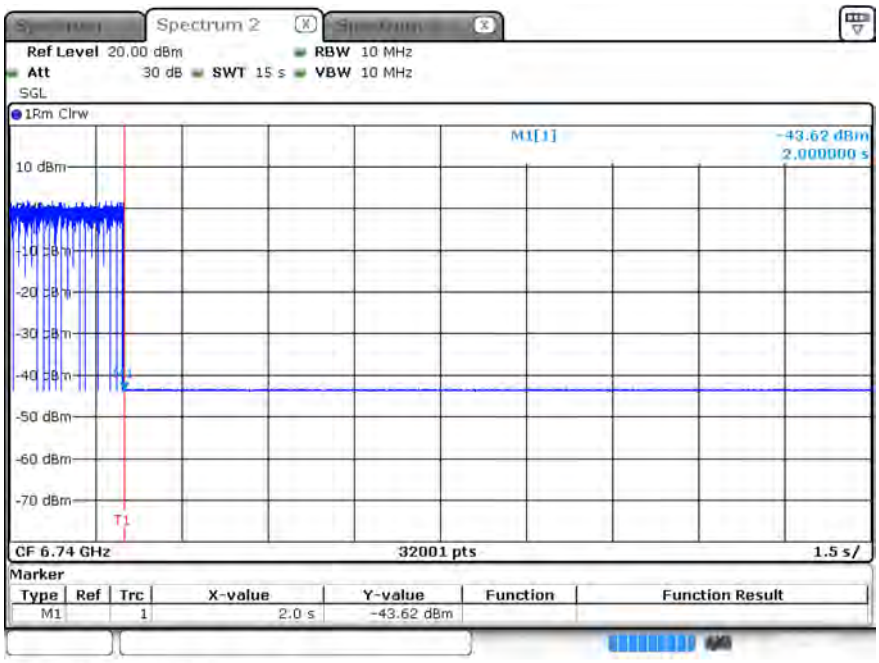
Note : M1 : Inject AWGN signal

Test CH 143 ; Incumbent signal 6665 MHz



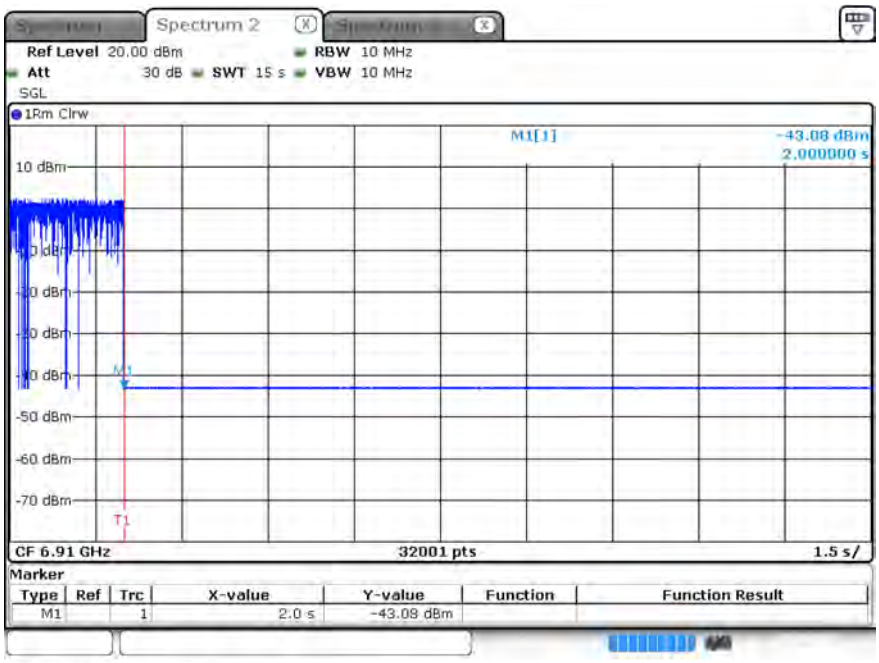
Note : M1 : Inject AWGN signal

Test CH 143 ; Incumbent signal 6740 MHz



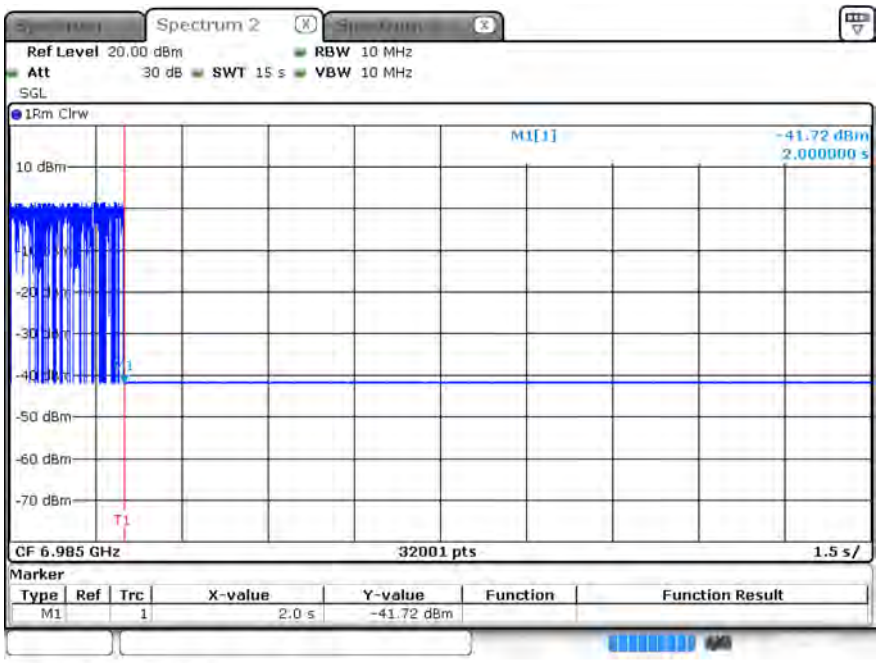
Note : M1 : Inject AWGN signal

Test CH 207 ; Incumbent signal 6910 MHz



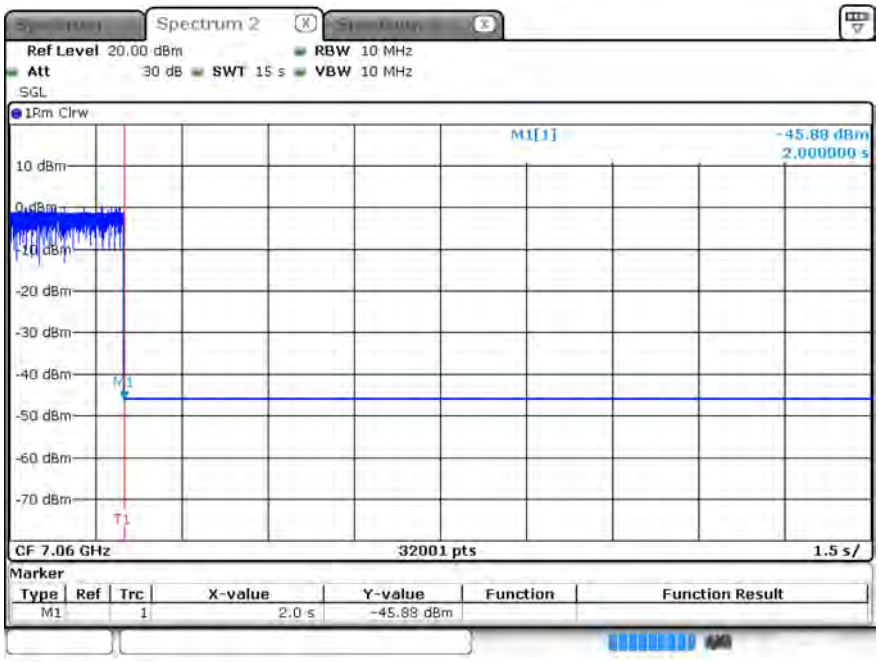
Note : M1 : Inject AWGN signal

Test CH 207 ; Incumbent signal 6985 MHz



Note : M1 : Inject AWGN signal

Test CH 207 ; Incumbent signal 7060 MHz



Note : M1 : Inject AWGN signal