



# RADIO TEST REPORT

**FCC ID** : VW3FAST5290  
**Equipment** : Wireless Home Router  
**Brand Name** : SAGEMCOM  
**Model Name** : FAST 5290V1.1  
**Applicant** : SAGEMCOM BROADBAND SAS  
250 Route de l'Empereur - 92848 RUEIL MALMAISON  
CEDEX- FRANCE  
**Manufacturer** : SAGEMCOM BROADBAND SAS  
250 Route de l'Empereur - 92848 RUEIL MALMAISON  
CEDEX- FRANCE  
**Standard** : 47 CFR FCC Part 15.407

The product was received on Apr. 18, 2022, and testing was starte from Apr. 29, 2022 and completed on May 05, 2022. 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

**Sportun International Inc. Hsinchu Laboratory**

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



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**Appendix A. Test Results of AC Power-line Conducted Emissions****Appendix B. Test Results of Unwanted Emissions****Appendix C. Test Photos****Photographs of EUT v01**



## History of this test report



## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.1	15.203	Antenna Requirement	PASS	-
3.1	15.207	AC Power-line Conducted Emissions	PASS	-
3.2	15.407(b)	Unwanted Emissions	PASS	-

**Declaration of Conformity:**

1. The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to report "Measurement Uncertainty".

**Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Vicky Huang



## 1 General Description

### 1.1 Information

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5925-7125	ax (HEW20)	5955-7095	1-229 [58]
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	802.11ax HEW20	20	4TX
UNII 5~8	802.11ax HEW20-BF	20	4TX
UNII 5~8	802.11ax HEW40	40	4TX
UNII 5~8	802.11ax HEW40-BF	40	4TX
UNII 5~8	802.11ax HEW80	80	4TX
UNII 5~8	802.11ax HEW80-BF	80	4TX
UNII 5~8	802.11ax HEW160	160	4TX
UNII 5~8	802.11ax HEW160-BF	160	4TX

Note:

- HEW20, HEW40, HEW80 and HEW160 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- BWch is the nominal channel bandwidth.
- The channel defined in the IEEE Standard P802.11ax™/D6.1.



## 1.1.1 Antenna Information

Ant.	Port			Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz					
1	1	2	-	Galtronics	02102140-07252C1 DB1	PCB	I-PEX	Note 1
2	2	3	-	Galtronics	02102140-07252C2 DB2	PCB	I-PEX	
3	3	4	-	Galtronics	02102140-07252c3 DB3	PCB	I-PEX	
4	-	1	-	Galtronics	02102142-07252CX 5G	PCB	I-PEX	
5	-	-	1	Galtronics	02102475-07252-1 6G1	PCB	I-PEX	
6	-	-	2	Galtronics	02102475-07252-2 6G2	PCB	I-PEX	
7	-	-	3	Galtronics	02102475-07252-3 6G3	PCB	I-PEX	
8	-	-	4	Galtronics	02102475-07252-4 6G4	PCB	I-PEX	

Antenna Gain (dBi)									
Ant.	WLAN 2.4GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	WLAN 6GHz UNII 5	WLAN 6GHz UNII 6	WLAN 6GHz UNII 7	WLAN 6GHz UNII 8
1	4.12	3.13	3.67	3.57	3.29	-	-	-	-
2	3.66	4.52	5.1	5.33	5.58	-	-	-	-
3	2.01	1.8	2.64	1.87	2.2	-	-	-	-
4	-	3.19	1.58	2.36	3.7	-	-	-	-
5	-	-	-	-	-	3.07	2.98	3.17	5.85
6	-	-	-	-	-	4.39	4.2	4.57	5.95
7	-	-	-	-	-	3.74	3.39	3.25	4.8
8	-	-	-	-	-	4.68	5.79	6.18	4.91

Directional Gain (dBi)									
WLAN 2.4GHz [3T1S]	WLAN 5GHz UNII 1 [4T1S]	WLAN 5GHz UNII 2A [4T1S]	WLAN 5GHz UNII 2C [4T1S]	WLAN 5GHz UNII 3 [4T1S]	WLAN 6GHz UNII 5 [4T1S]	WLAN 6GHz UNII 6 [4T1S]	WLAN 6GHz UNII 7 [4T1S]	WLAN 6GHz UNII 8 [4T1S]	
4.65	4.68	5.22	5.53	5.91	5.11	6.19	6.29	6.22	

Note2: The above information was declared by manufacturer.

The directional gain is measured which follows the procedure of KDB 662911 D03. The antenna report is provided in the operational description for this application.

**For 2.4GHz function:**

**For IEEE 802.11b/g/n/VHT/ax (3TX/3RX):**

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

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

**For 5GHz function:****For IEEE 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 IEEE 802.11ax (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.

### 1.1.2 EUT Operational Condition

<b>EUT Power Type</b>	From Power Adapter		
<b>Beamforming Function</b>	<input checked="" type="checkbox"/> With beamforming	<input type="checkbox"/> Without beamforming	
The product has beamforming function for n/VHT/ax in 2.4GHz and n/ac/ax in 5GHz UNII 1~UNII 3 and ax in 6GHz UNII 5~UNII 8.			
<b>Device Type</b>	<input checked="" type="checkbox"/> Indoor Access Point	<input type="checkbox"/> Subordinate	
	<input type="checkbox"/> Indoor Client	<input type="checkbox"/> Standard Power Access Point	
	<input type="checkbox"/> Dual Client	<input type="checkbox"/> Standard Client	
	<input type="checkbox"/> Fixed Client		
<b>Test Software Version</b>	Acccess Manual Tool (ver.3.2.1.3)		

Note: The above information was declared by manufacturer.

### 1.1.3 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR163028-01

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

Modifications	Performance Checking
1. Remove 2 filters. And remove components which the correspond positions UL16.UL33.UL10.UL34.UL12.UL35.UL14.UL36 (for 5G), H17.UH18.UH11.UH19.UH13.UH20.UH15.UH21 (for 6G).	Unwanted Emissions above 1GHz After evaluating, the worst case is found at 802.11ax HEW20 CH229, 802.11ax HEW40 CH227, 802.11ax HEW80 CH215, 802.11ax HEW160 CH15 and based on original power to retest this channel only.
2. Adding an adapter (Model: NBS50A120410VU). 3. Change the WAN port from 1Gbps to 2.5Gbps. 4. Change some components and shilded case on main board (Please refer to internal photos for detail change.) 5. Adding a RJ-45 cable for accessory. 6. Removing an adapter(Model: NBS60E120500M2) and power cable. 7. Change the Model name from "FAST 5290" to "FAST 5290V1.1"	1.AC Power-line Conducted Emissions 2.Unwanted Emissions below 1GHz  It does not affect the test results.



## 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

## 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
Radiated (Below 1GHz)	03CH05-CB	KJ Chang	24.2-26.1 / 55-58	Apr. 29, 2022~ May 03, 2022
Radiated (Above 1GHz)	03CH03-CB	KJ Chang	23.5-24.6 / 55-59	Apr. 29, 2022~ May 03, 2022
AC Conduction	CO02-CB	Ryan Huang	22~23 / 56~58	May 05, 2022

## 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 Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.4 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	4.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	5.5 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	4.7 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	4.2 dB	Confidence levels of 95%



## 2 Test Configuration of EUT

### 2.1 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	CTX
1	EUT-WLAN 2.4GHz+Adapter
2	EUT-WLAN 5GHz+Adapter
3	EUT- WLAN 6GHz+Adapter

For operating mode 1 is the worst case and it was record in this test report.

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	CTX
The EUT can be placed in X axis, Y axis and Z axis. EUT Y axis has been evaluated to be the worst case at Unwanted Emissions <Above 1GHz>; thus, the measurement will follow this same test configuration.	
1	EUT in Y axis-WLAN 2.4GHz+Adapter
2	EUT in Y axis-WLAN 5GHz+Adapter
3	EUT in Y axis- WLAN 6GHz+Adapter
Operating Mode > 1GHz	CTX
The EUT was performed at X axis, Z axis and Y axis position, and the worst case was found at Y axis. So the measurement will follow this same test configuration.	
1	EUT in Y axis + WLAN 6GHz

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis - Co-location RF Exposure Evaluation
Operating Mode	
1	WLAN 2.4GHz + WLAN 5GHz UNII 1~UNII 3 + WLAN 6GHz UNII 5~UNII 8

Refer to Sporton Test Report No.: FA163028-08 for Co-location RF Exposure Evaluation.



## 2.2 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

## 2.3 Accessories

<b>Accessories</b>			
<b>Equipment Name</b>	<b>Brand Name</b>	<b>Model Name</b>	<b>Rating</b>
Adapter	SAGEMCOM	NBS50A120410VU	Input: 100-127V~50/60Hz, 1.5A Output: 12.0V, 4.1A
<b>Other</b>			
RJ-45 cable*1, Shielded, 1.8m			

## 2.4 Support Equipment

For AC Conduction:

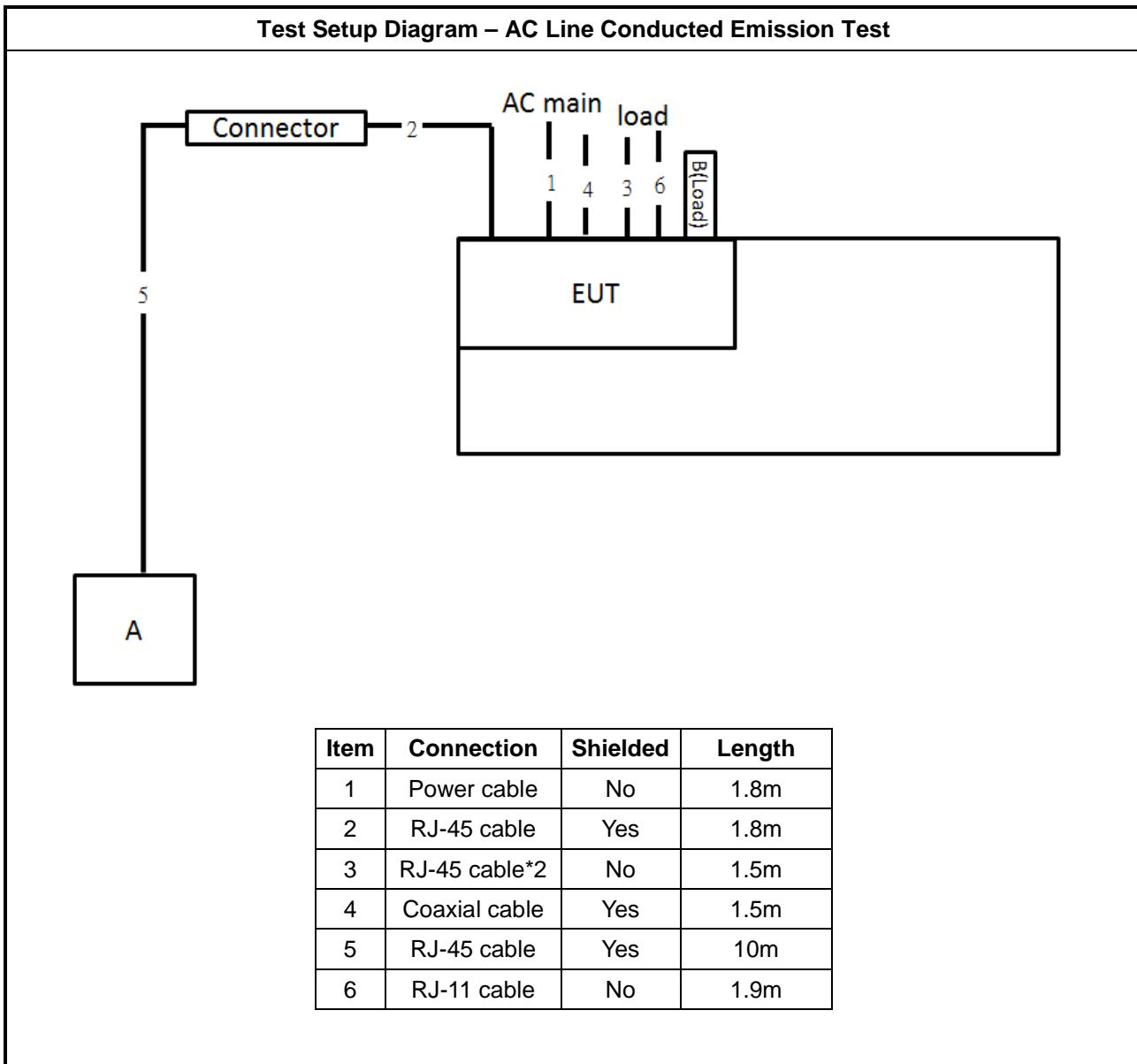
<b>Support Equipment</b>				
<b>No.</b>	<b>Equipment</b>	<b>Brand Name</b>	<b>Model Name</b>	<b>FCC ID</b>
A	LAN1 NB	DELL	E6430	N/A
B	Flash disk3.0	Transcend	JetFlash-700	N/A

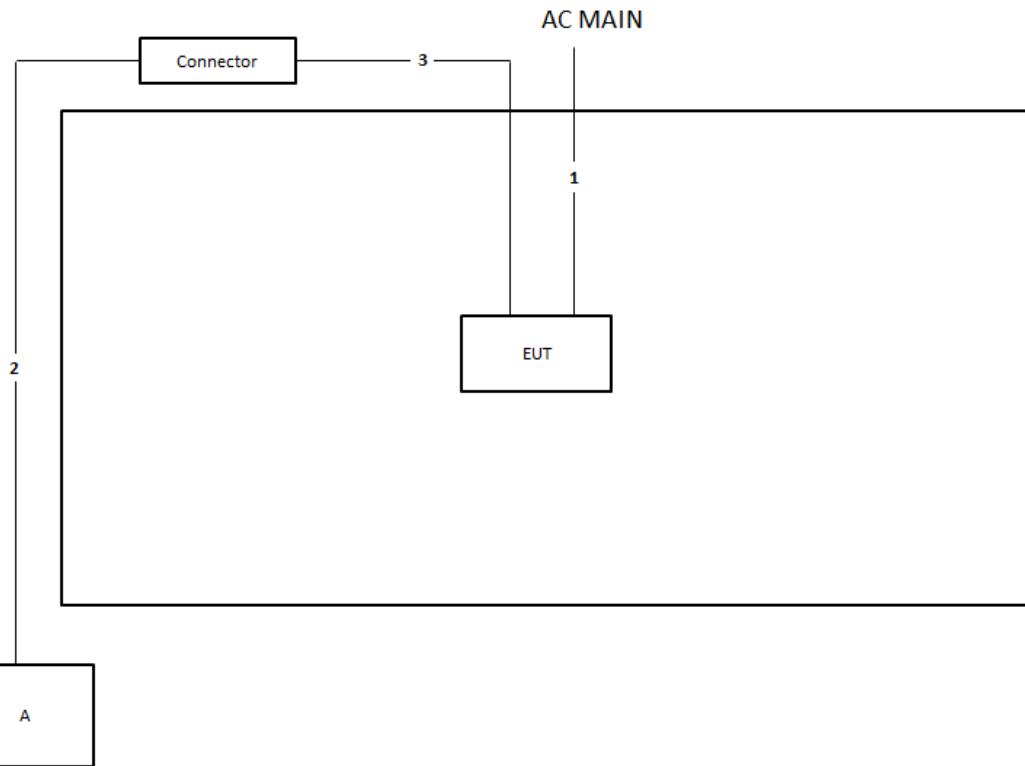
For Radiated:

<b>Support Equipment</b>				
<b>No.</b>	<b>Equipment</b>	<b>Brand Name</b>	<b>Model Name</b>	<b>FCC ID</b>
A	NB	DELL	E4300	N/A

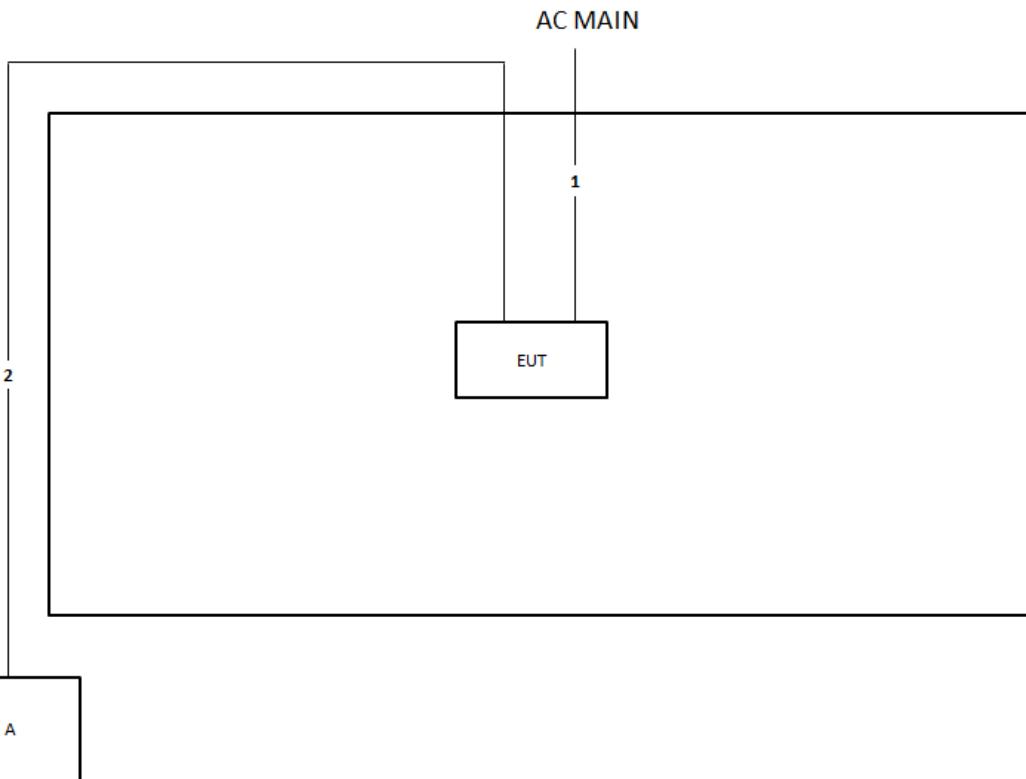


## 2.5 Test Setup Diagram



**Test Setup Diagram - Radiated Test < 1GHz**

Item	Connection	Shielded	Length
1	Power cable	No	1.8m
2	RJ-45 cable	Yes	10m
3	RJ-45 cable	Yes	1.8m

**Test Setup Diagram - Radiated Test > 1GHz**

Item	Connection	Shielded	Length
1	Power cable	No	1.8m
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

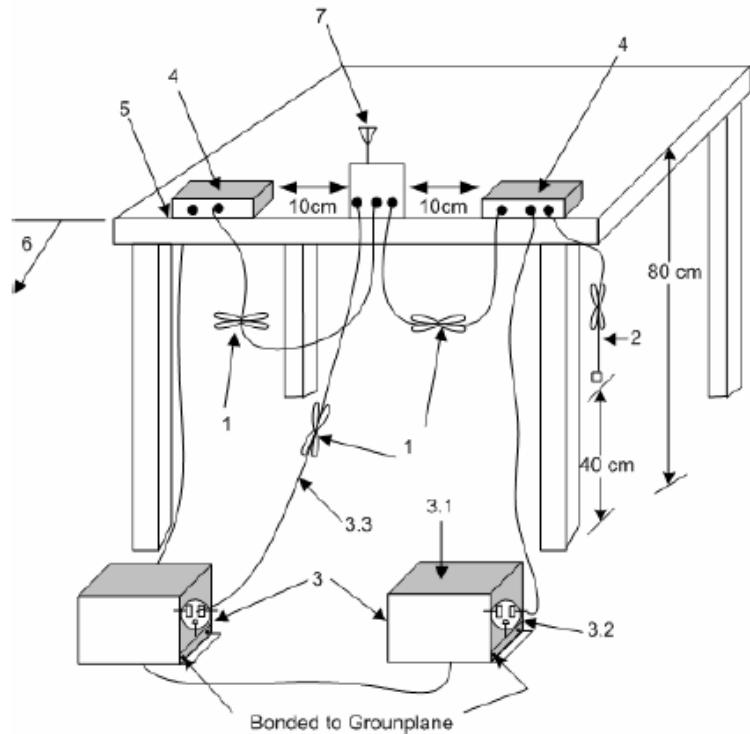
Refer a test equipment and calibration data table in this test report.

##### 3.1.3 Test Procedures

Test Method
<input checked="" type="checkbox"/> 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  $50\ \Omega$  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 Unwanted Emissions

### 3.2.1 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

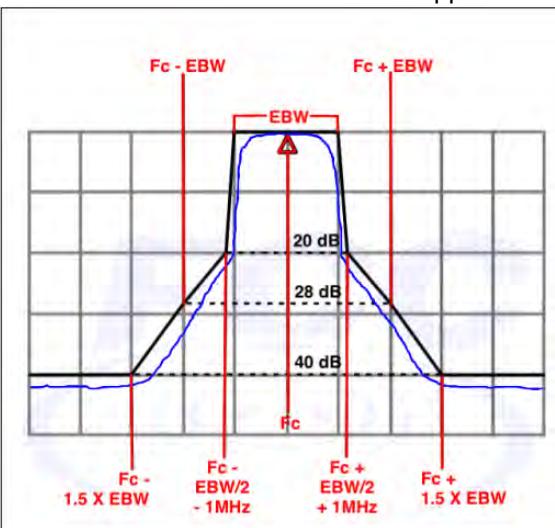
Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance 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( $20 \times \log(\text{standard distance} / \text{test distance}) = 20\log(3/1) = 9.54\text{dB}$ ).  
EX. Above 18GHz emission limit calculation (3m to 1m) =  $54\text{dBuV/m at 3m} + 9.54\text{dB} = 63.54\text{dBuV/m at 1m}$ .

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( $20 \times \log(\text{standard distance} / \text{test distance}) = 20\log(3/1) = 9.54\text{dB}$ ). EX. Above 18GHz emission limit calculation (3m to 1m) = $68.2\text{dBuV/m at 3m} + 9.54\text{dB} = 77.74\text{ dBuV/m at 1m}$ .  Note 2:-27 dBm EIRP OOB 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	<p>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.</p> 
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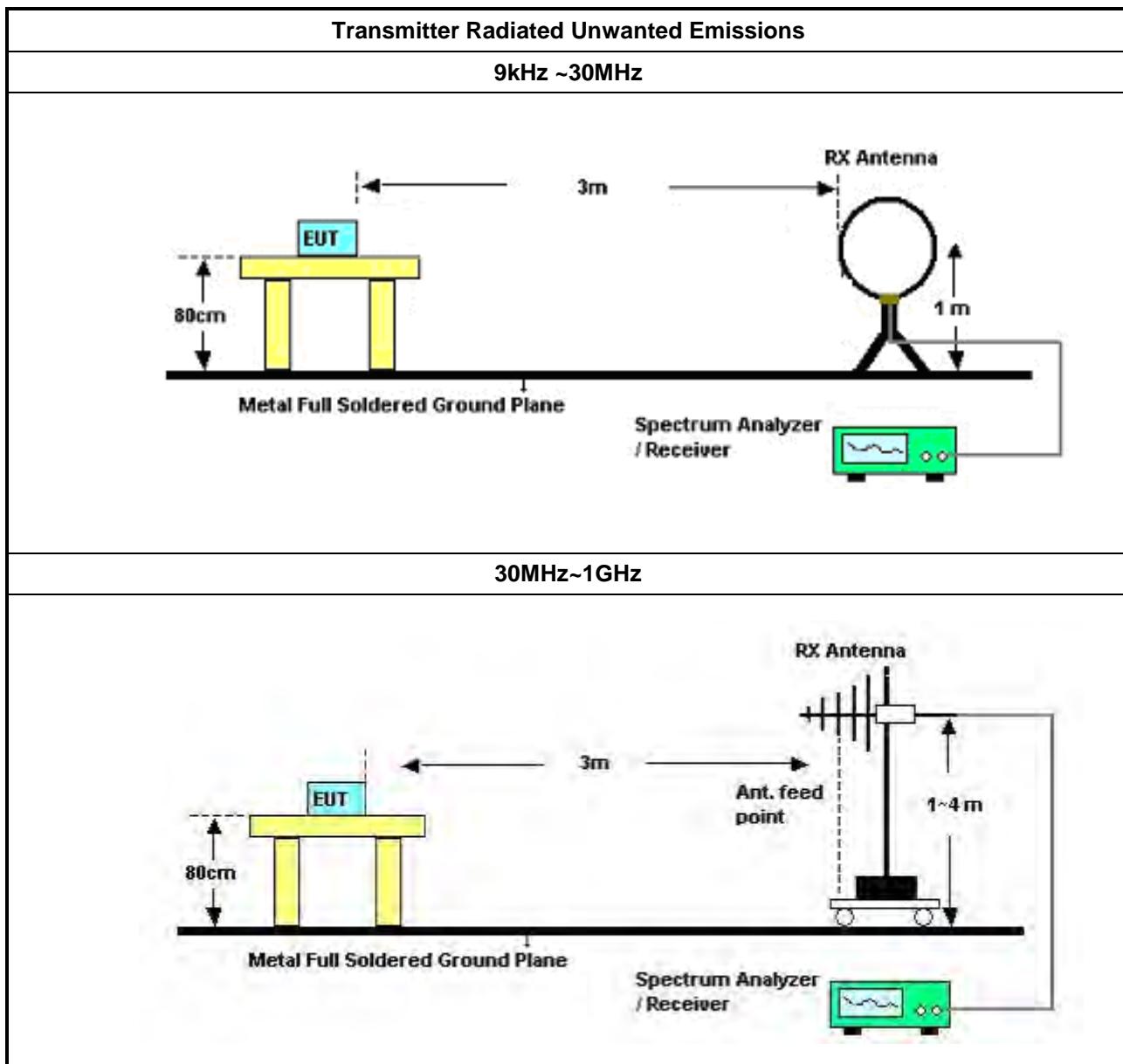
### 3.2.2 Measuring Instruments

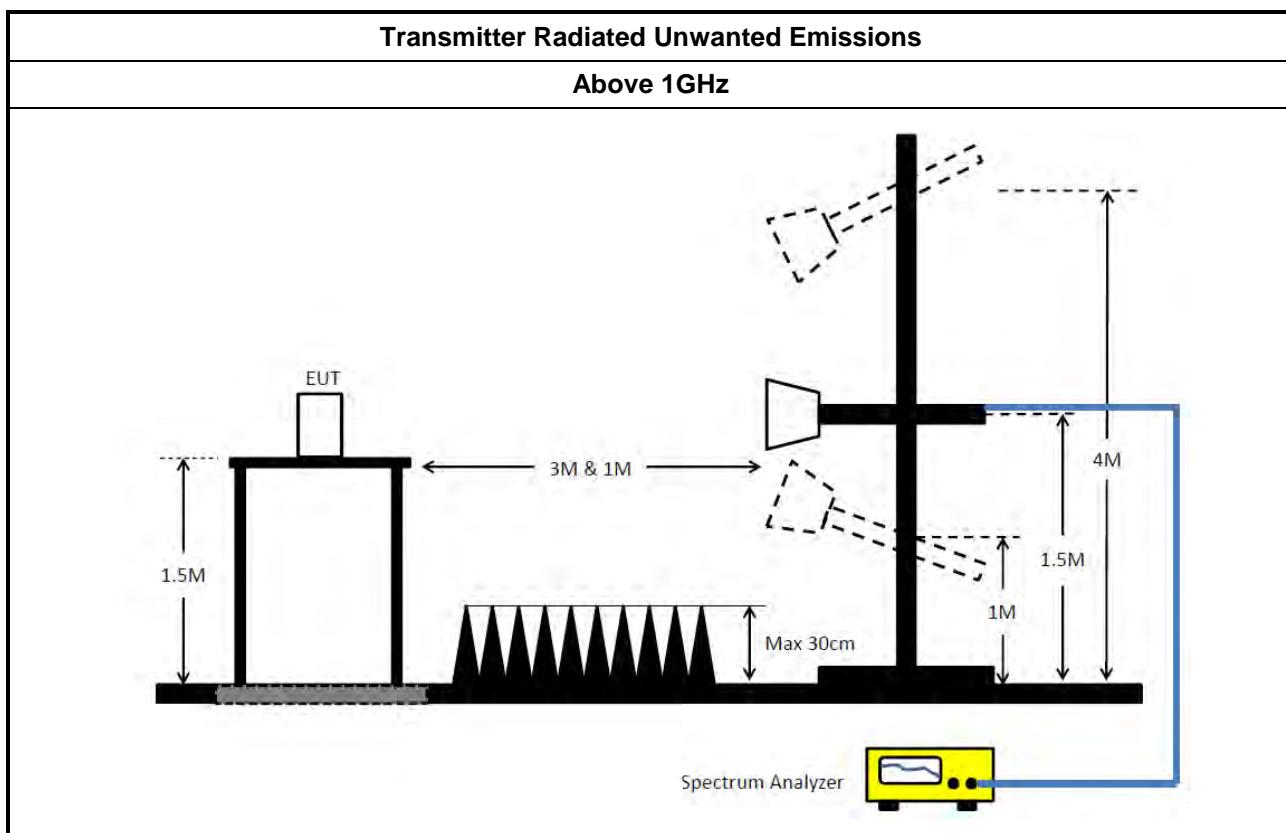
Refer a test equipment and calibration data table in this test report.

### 3.2.3 Test Procedures

Test Method	
<ul style="list-style-type: none"><li>According to 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).</li></ul>	
<ul style="list-style-type: none"><li>The average emission levels shall be measured in [duty cycle <math>\geq</math> 98 or duty factor].</li></ul>	
<ul style="list-style-type: none"><li>For the transmitter unwanted emissions shall be measured using following options below:</li></ul>	
<ul style="list-style-type: none"><li>Refer as FCC KDB 789033, clause G(2) for unwanted emissions into non-restricted bands.</li></ul>	
<ul style="list-style-type: none"><li>Refer as FCC KDB 789033, clause G(1) for unwanted emissions into restricted bands.</li></ul>	
<ul style="list-style-type: none"><li><input checked="" type="checkbox"/> Refer as FCC KDB 789033, G(6) Method AD (Trace Averaging). (For unrestricted band measurement)</li></ul>	
<ul style="list-style-type: none"><li><input type="checkbox"/> Refer as FCC KDB 789033, G(6) Method VB (Reduced VBW).</li></ul>	
<ul style="list-style-type: none"><li><input checked="" type="checkbox"/> Refer as ANSI C63.10, clause 11.12.2.5.3 (Reduced VBW). <math>VBW \geq 1/T</math>, where T is pulse time. ( For restricted band average measurement)</li></ul>	
<ul style="list-style-type: none"><li><input type="checkbox"/> Refer as ANSI C63.10, clause 7.5 average value of pulsed emissions.</li></ul>	
<ul style="list-style-type: none"><li><input checked="" type="checkbox"/> Refer as FCC KDB 789033, clause G(5) measurement procedure peak limit.</li></ul>	
<ul style="list-style-type: none"><li><input type="checkbox"/> Refer as ANSI C63.10, clause 4.1.4.2.2 measurement procedure peak limit.</li></ul>	
<ul style="list-style-type: none"><li>For emission MASK shall be measured using following options below:</li></ul>	
<ul style="list-style-type: none"><li><input checked="" type="checkbox"/> Refer as FCC draft KDB 987594 D02, J) In-Band Emissions</li></ul>	
<ul style="list-style-type: none"><li>For radiated measurement.</li></ul>	
<ul style="list-style-type: none"><li>Refer as ANSI C63.10, clause 6.4 for radiated emissions below 30 MHz and test distance is 3m.</li></ul>	
<ul style="list-style-type: none"><li>Refer as ANSI C63.10, clause 6.5 for radiated emissions 30 MHz to 1 GHz and test distance is 3m.</li></ul>	
<ul style="list-style-type: none"><li>Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.</li></ul>	
<ul style="list-style-type: none"><li>The any unwanted emissions level shall not exceed the fundamental emission level.</li></ul>	
<ul style="list-style-type: none"><li>All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.</li></ul>	

### 3.2.4 Test Setup





### 3.2.5 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

### 3.2.6 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.

### 3.2.7 Test Result of Transmitter Unwanted Emissions

Refer as Appendix B



## 4 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
LISN	Schwarzbeck	NSLK 8127	8127650	9kHz ~ 30MHz	Jan. 07, 2022	Jan. 06, 2023	Conduction (CO02-CB)
LISN	Schwarzbeck	NSLK 8127	8127478	9kHz ~ 30MHz	Dec. 22, 2021	Dec. 21, 2022	Conduction (CO02-CB)
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.4GHz	Feb. 22, 2022	Feb. 21, 2023	Conduction (CO02-CB)
COND Cable	Woken	Cable	2	0.15MHz ~ 30MHz	Oct. 19, 2021	Oct. 18, 2022	Conduction (CO02-CB)
Pulse Limiter	Schwarzbeck	VTSD 9561F-N	00378	9kHz ~ 30MHz	Mar. 18, 2022	Mar. 17, 2023	Conduction (CO02-CB)
Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Conduction (CO02-CB)
3m Semi Anechoic Chamber NSA	TDK	SAC-3M	03CH05-CB	30 MHz ~ 1 GHz	Aug. 09, 2021	Aug. 08, 2022	Radiation (03CH05-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 (03CH05-CB)
Pre-Amplifier	EMCI	EMC330N	980331	20MHz ~ 3GHz	Apr. 26, 2022	Apr. 25, 2023	Radiation (03CH05-CB)
Spectrum Analyzer	R&S	FSP40	100304	9kHz ~ 40GHz	Mar. 14, 2022	Mar. 13, 2023	Radiation (03CH05-CB)
EMI Test Receiver	R&S	ESCS	826547/017	9kHz ~ 2.75GHz	Jun. 21, 2021	Jun. 20, 2022	Radiation (03CH05-CB)
RF Cable-low	Woken	RG402	Low Cable-04+23	30MHz~1GHz	Oct. 13, 2021	Oct. 12, 2022	Radiation (03CH05-CB)
Loop Antenna	Teseq	HLA 6120	31244	9kHz - 30 MHz	Mar. 18, 2022	Mar. 17, 2023	Radiation (03CH05-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH05-CB)
3m Semi Anechoic Chamber VSWR	TDK	SAC-3M	03CH03-CB	1GHz ~18GHz 3m	May 06, 2021	May 05, 2022	Radiation (03CH03-CB)
Horn Antenna	ETS • Lindgren	3115	6821	750MHz~18GHz	Jan. 21, 2022	Jan. 20, 2023	Radiation (03CH03-CB)
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Aug. 05, 2021	Aug. 04, 2022	Radiation (03CH03-CB)
Pre-Amplifier	Agilent	8449B	3008A02097	1GHz ~ 26.5GHz	Jul. 02, 2021	Jul. 01, 2022	Radiation (03CH03-CB)
Pre-Amplifier	MITEQ	TTA1840-35-H G	1864479	18GHz ~ 40GHz	Jul. 13, 2021	Jul. 12, 2022	Radiation (03CH03-CB)
Spectrum Analyzer	R&S	FSP40	100019	9kHz ~ 40GHz	Jun. 04, 2021	Jun. 03, 2022	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-20+29	1GHz ~ 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH03-CB)
RF Cable-high	Woken	RG402	High Cable-29	1GHz ~ 18GHz	Oct. 04, 2021	Oct. 03, 2022	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#5+7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH03-CB)

**RADIO TEST REPORT****Report No. : FR163028-08AB**

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
High Cable	Woken	WCA0929M	40G#5	1GHz ~ 40 GHz	Dec. 08, 2021	Dec. 07, 2022	Radiation (03CH03-CB)
High Cable	Woken	WCA0929M	40G#7	1GHz ~ 40 GHz	Dec. 14, 2021	Dec. 13, 2022	Radiation (03CH03-CB)
Test Software	SPORTON	SENSE	V5.10	-	N.C.R.	N.C.R.	Radiation (03CH03-CB)

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

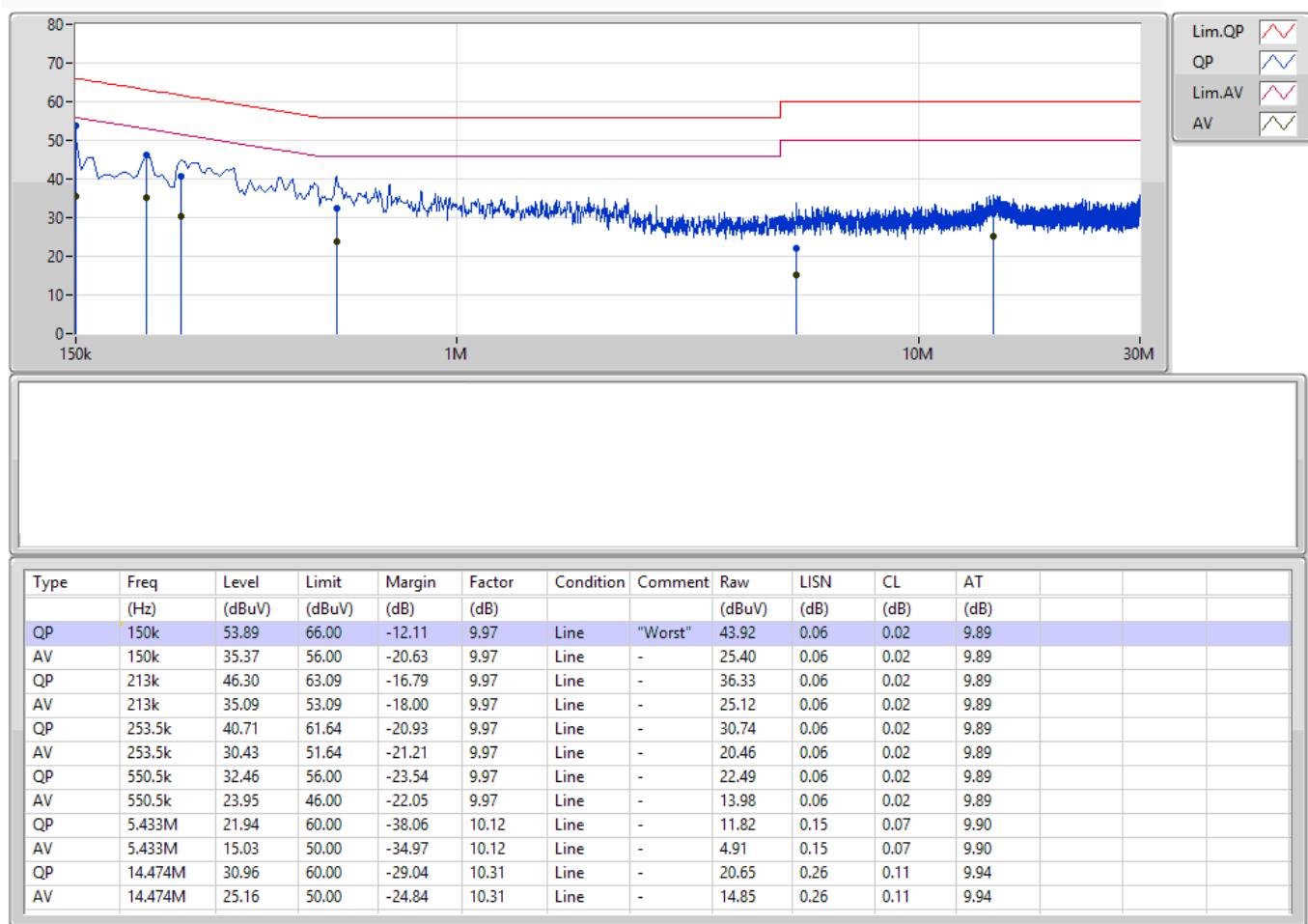
NCR means Non-Calibration required.

**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Condition
Mode 1	Pass	QP	150k	53.99	66.00	-12.01	Neutral

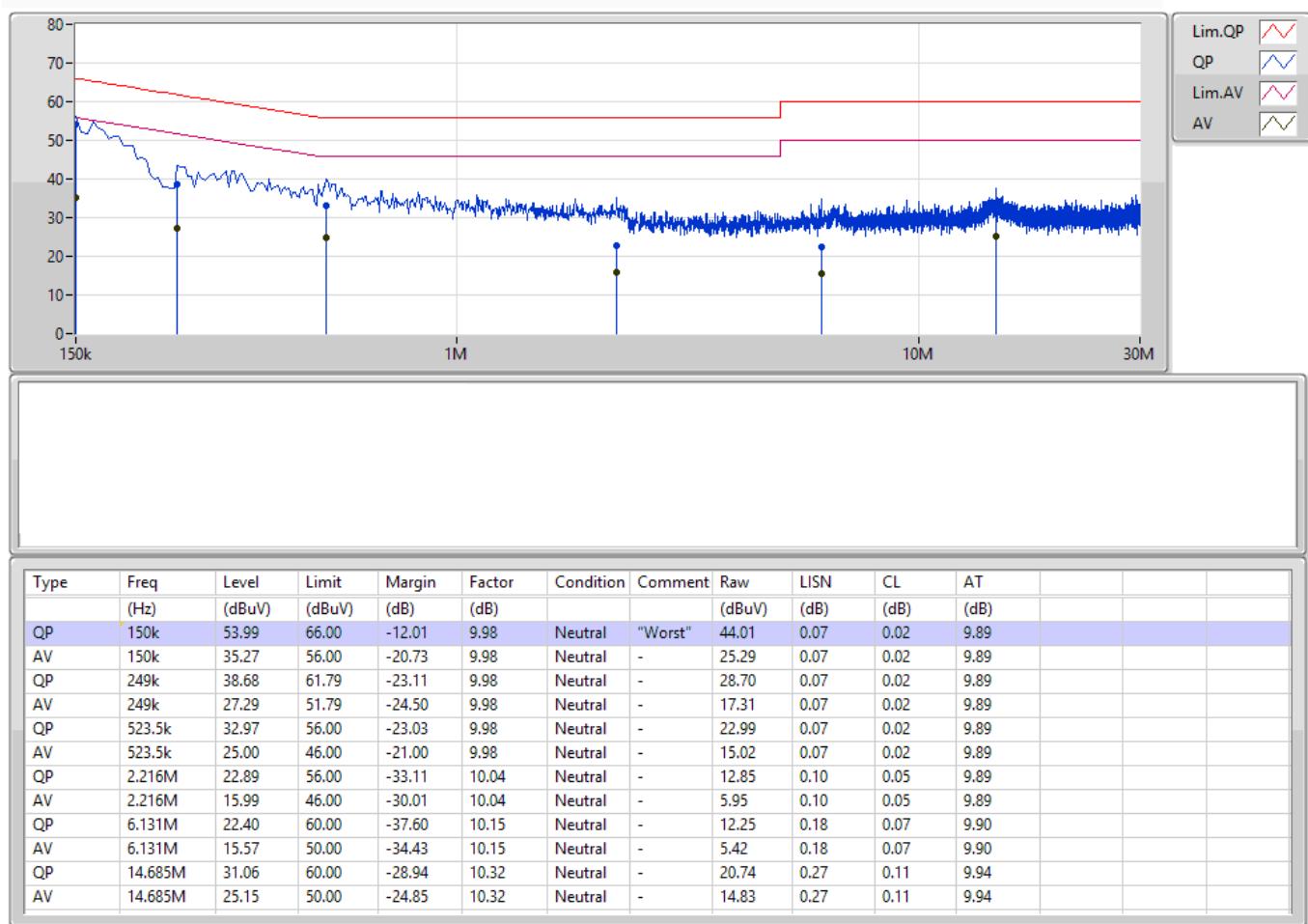
**Mode 1**

05/05/2022



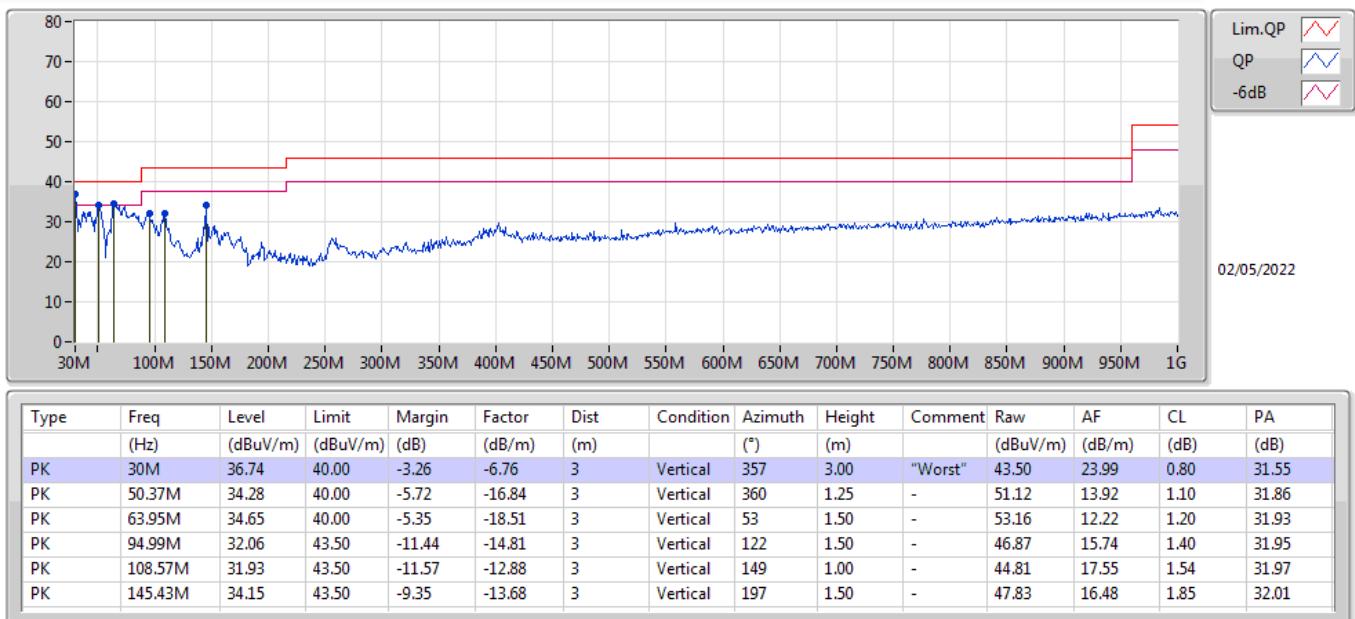
**Mode 1**

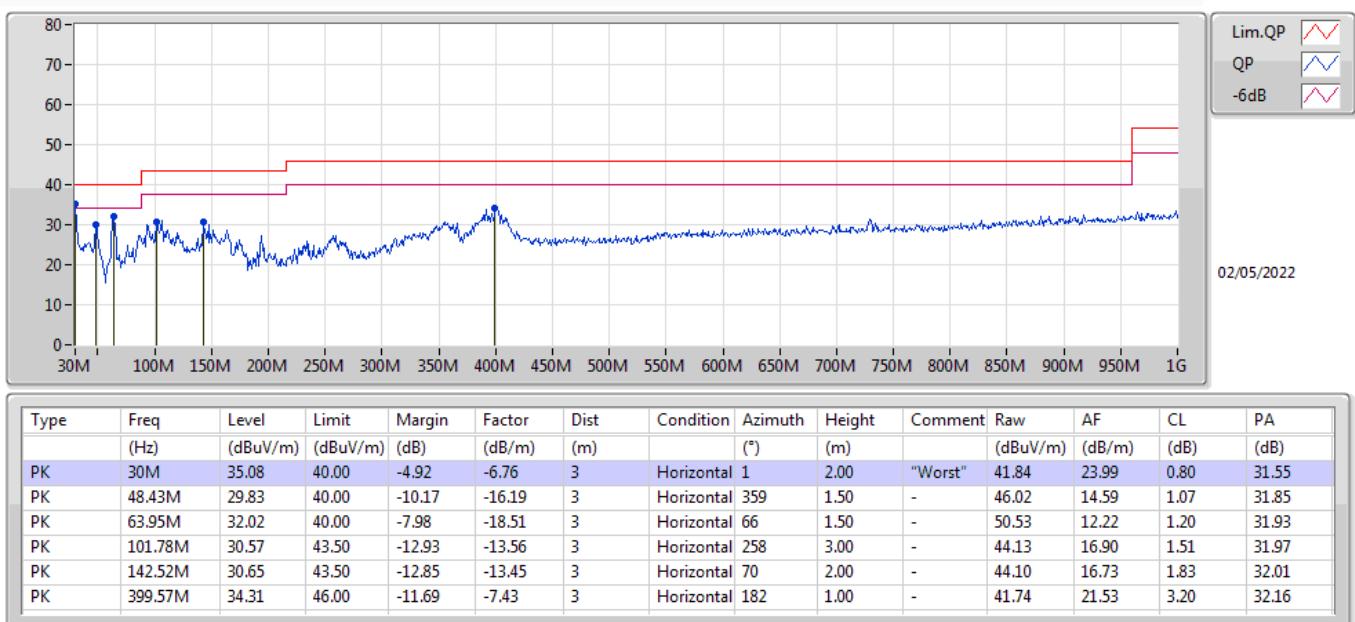
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**Summary**

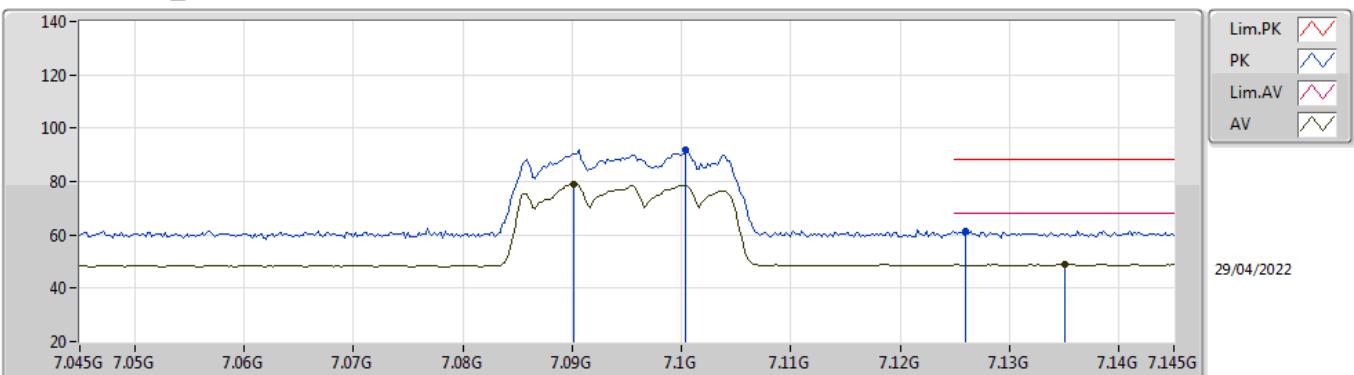
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Condition
Mode 2	Pass	PK	30M	36.74	40.00	-3.26	Vertical

**Mode 2**


**Mode 2**


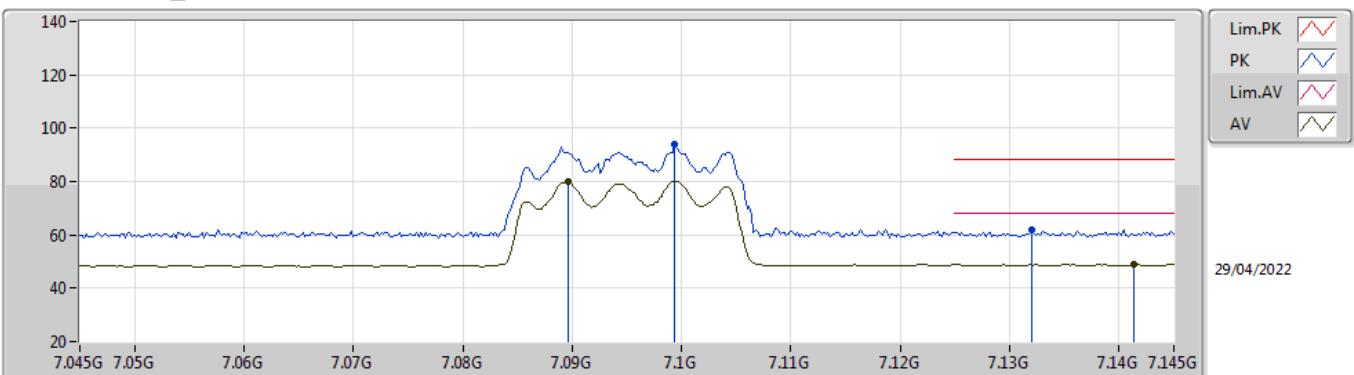
**Summary**

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
5.925-6.425GHz	-	-	-	-	-	-	-	-	-	-	-
802.11ax HEW160_Nss1,(MCS0)_4TX	Pass	AV	12.0287G	44.62	54.00	-9.38	3	Horizontal	205	2.12	-

**802.11ax HEW20\_Nss1,(MCS0)\_4TX**
**7095MHz\_TnomVnom**


EUT Y\_4TX  
Setting 25  
03-C-E-2-10

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	7.1004G	91.79	Inf	-Inf	83.31	3	Vertical	188	1.80	-	35.80	8.20	35.52	
RMS	7.0902G	79.14	Inf	-Inf	70.67	3	Vertical	188	1.80	-	35.78	8.20	35.51	
PK	7.126G	61.46	88.20	-26.74	52.82	3	Vertical	188	1.80	-	35.96	8.20	35.52	
RMS	7.135G	48.85	68.20	-19.35	40.17	3	Vertical	188	1.80	-	36.01	8.20	35.53	

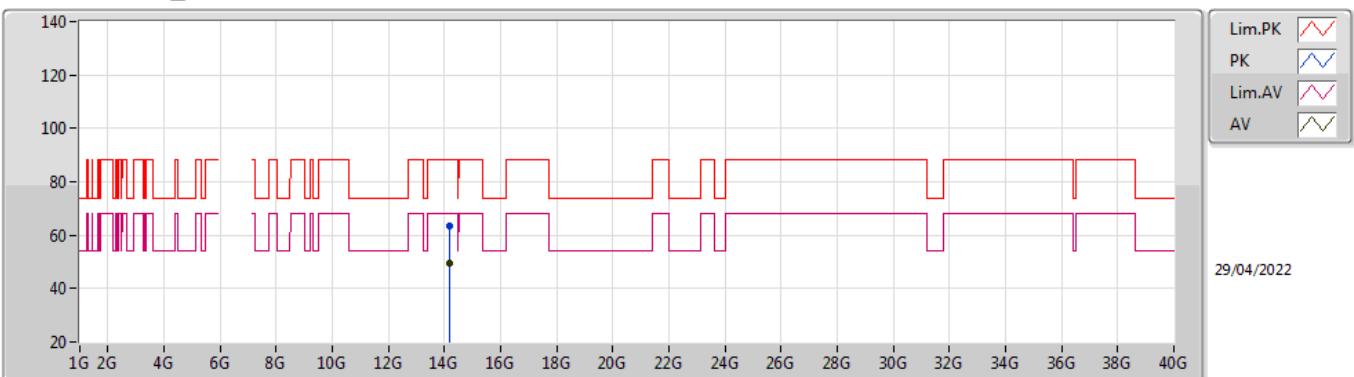
**802.11ax HEW20\_Nss1,(MCS0)\_4TX**
**7095MHz\_TnomVnom**


EUT Y\_4TX  
Setting 25  
03-C-E-2-10

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	7.0994G	94.04	Inf	-Inf	85.56	3	Horizontal	80	1.80	-	35.80	8.20	35.52	
RMS	7.0896G	79.90	Inf	-Inf	71.43	3	Horizontal	80	1.80	-	35.78	8.20	35.51	
PK	7.132G	61.83	88.20	-26.37	53.16	3	Horizontal	80	1.80	-	35.99	8.20	35.52	
RMS	7.1414G	48.86	68.20	-19.34	40.14	3	Horizontal	80	1.80	-	36.05	8.20	35.53	

**802.11ax HEW20\_Nss1,(MCS0)\_4TX**

**7095MHz\_TnomVnom**

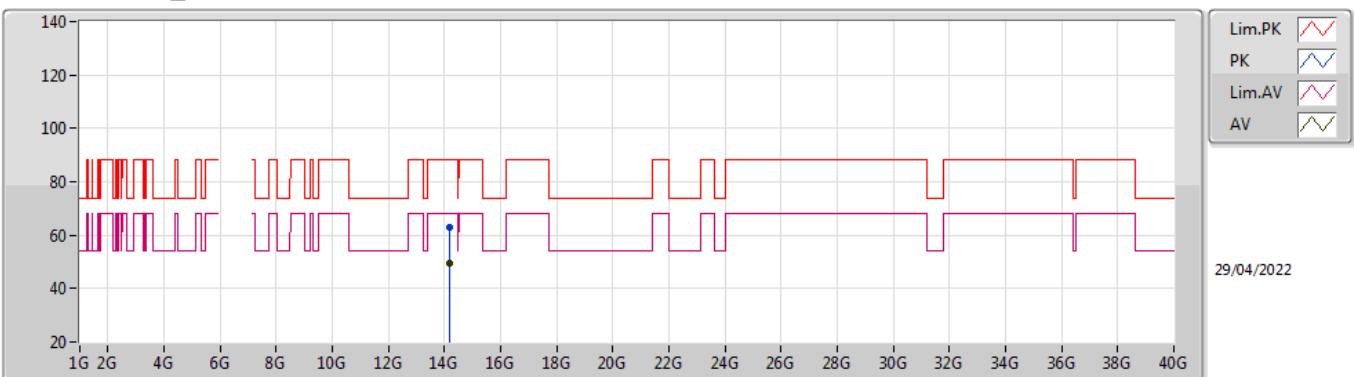


EUT Y\_4TX  
Setting 25  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	14.18952G	63.29	88.20	-24.91	43.09	3	Vertical	79	1.65	-	41.59	12.49	33.88	
RMS	14.18824G	49.57	68.20	-18.63	29.37	3	Vertical	79	1.65	-	41.59	12.49	33.88	

**802.11ax HEW20\_Nss1,(MCS0)\_4TX**

**7095MHz\_TnomVnom**

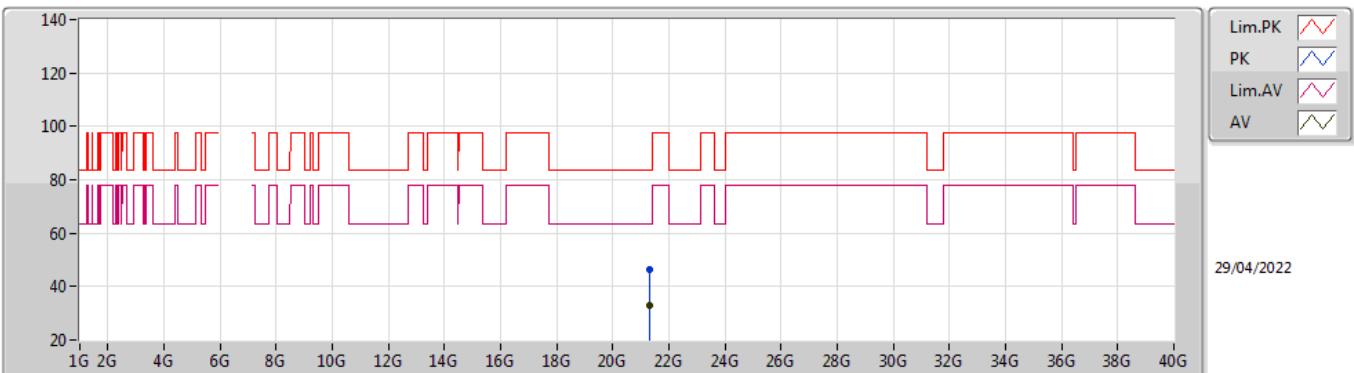


EUT Y\_4TX  
Setting 25  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	14.18614G	62.89	88.20	-25.31	42.68	3	Horizontal	63	2.99	-	41.59	12.49	33.87	
RMS	14.18534G	49.57	68.20	-18.63	29.36	3	Horizontal	63	2.99	-	41.59	12.49	33.87	

**802.11ax HEW20\_Nss1,(MCS0)\_4TX**

**7095MHz\_TnomVnom**

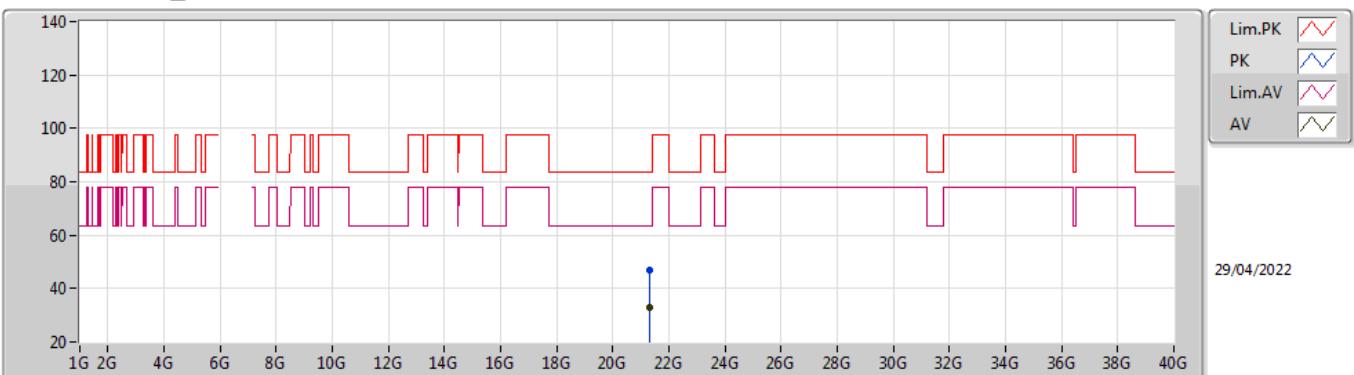


EUT Y\_4TX  
Setting 25  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	21.28852G	46.46	83.54	-37.08	42.37	1	Vertical	354	1.31	-	37.65	16.08	49.64
AV	21.28802G	33.16	63.54	-30.38	29.07	1	Vertical	354	1.31	-	37.65	16.08	49.64

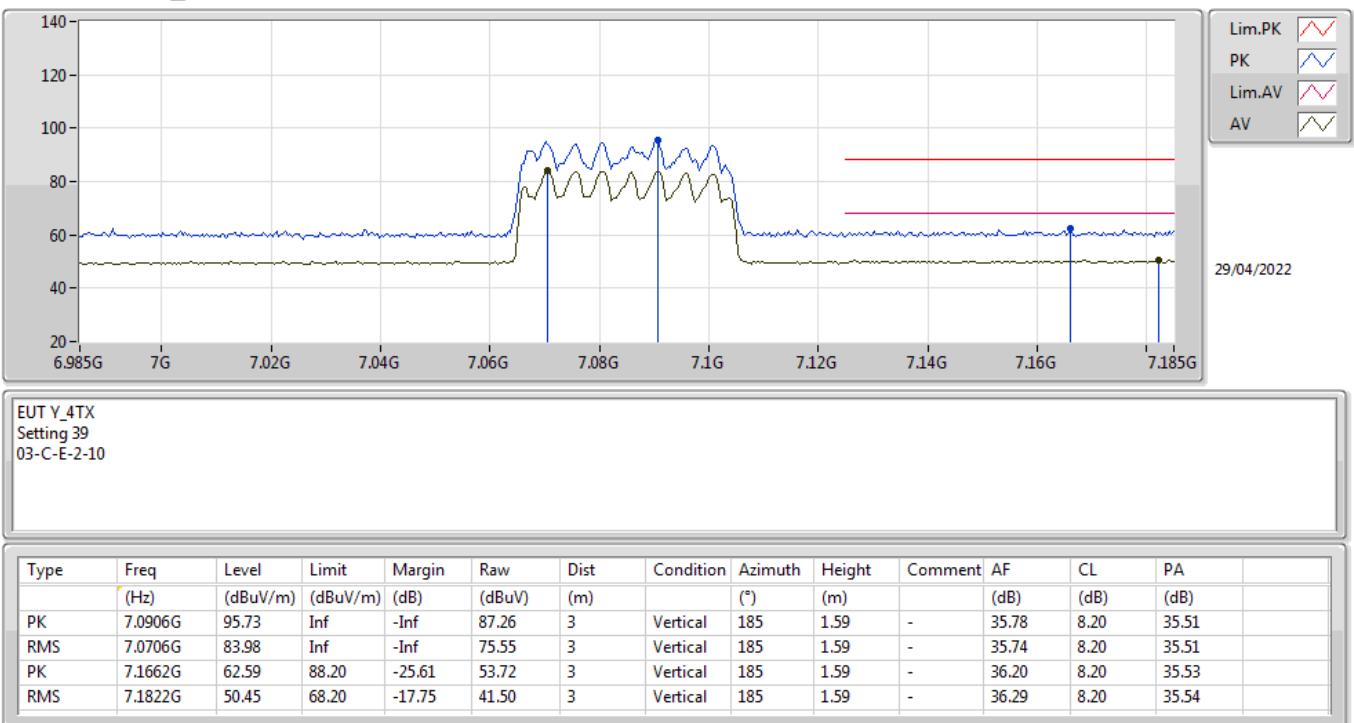
**802.11ax HEW20\_Nss1,(MCS0)\_4TX**

**7095MHz\_TnomVnom**



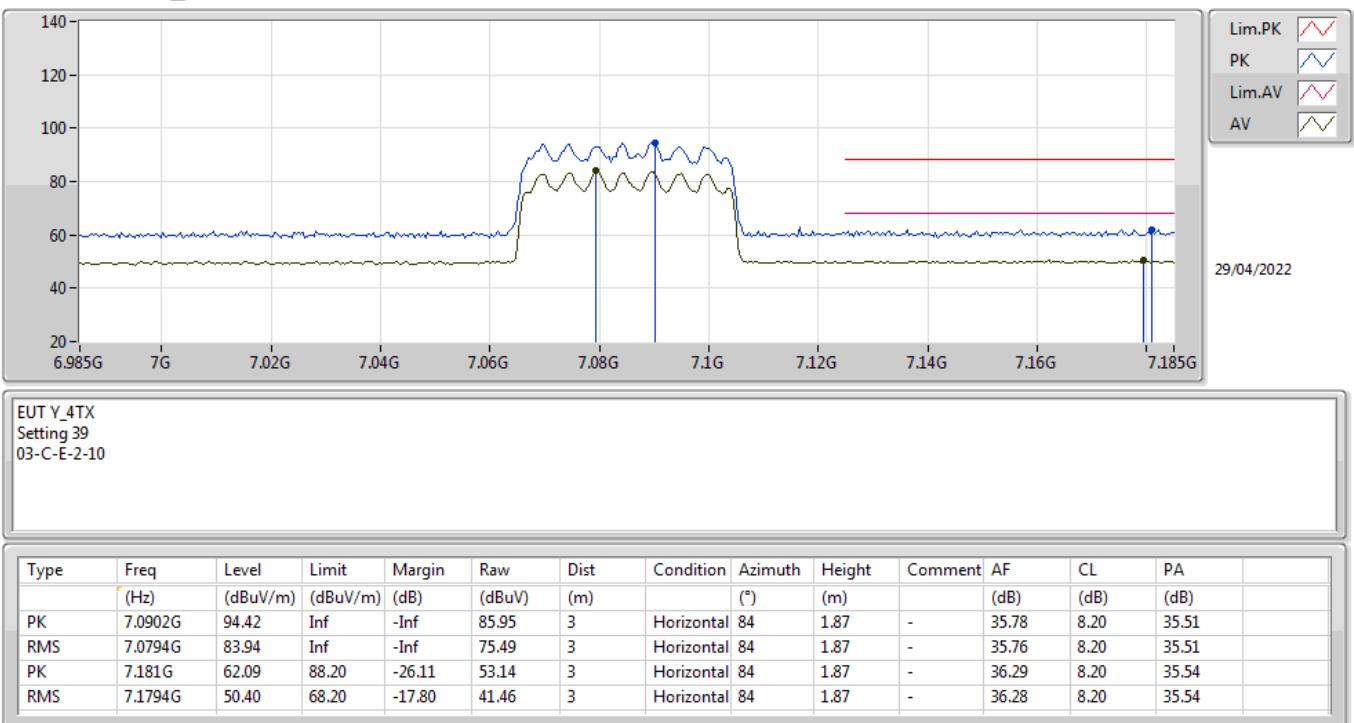
EUT Y\_4TX  
Setting 25  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	21.2882G	47.11	83.54	-36.43	43.02	1	Horizontal	64	1.58	-	37.65	16.08	49.64
AV	21.28806G	33.03	63.54	-30.51	28.94	1	Horizontal	64	1.58	-	37.65	16.08	49.64

**802.11ax HEW40\_Nss1,(MCS0)\_4TX**
**7085MHz\_TnomVnom**


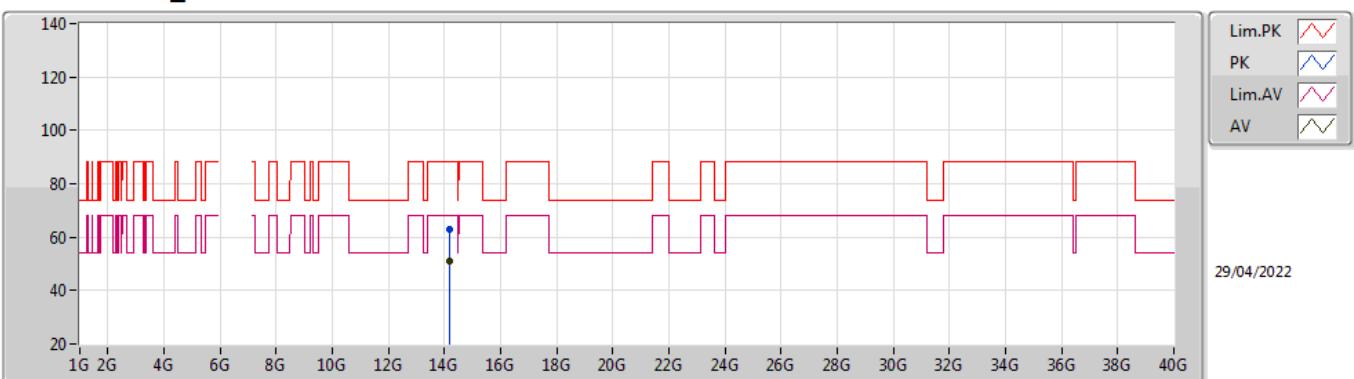
**802.11ax HEW40\_Nss1,(MCS0)\_4TX**

**7085MHz\_TnomVnom**



**802.11ax HEW40\_Nss1,(MCS0)\_4TX**

**7085MHz\_TnomVnom**

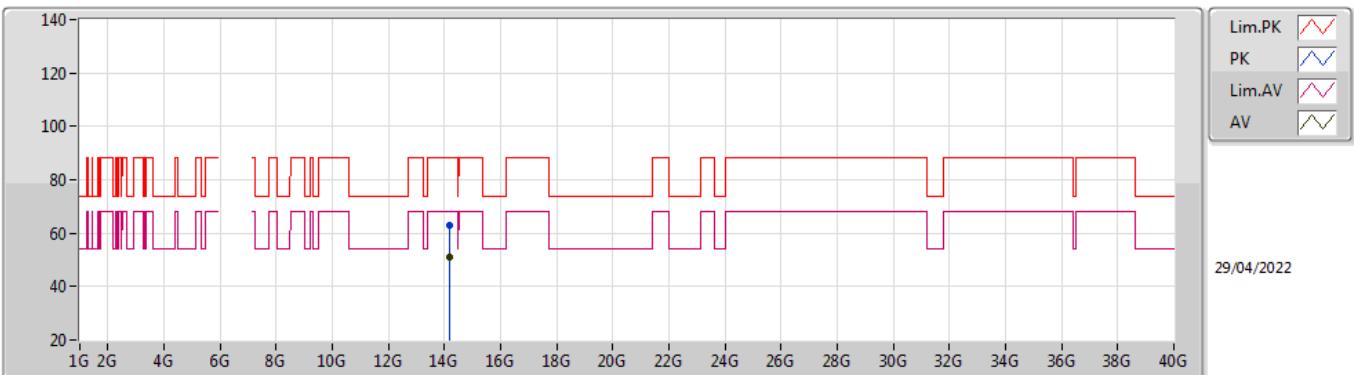


EUT Y\_4TX  
Setting 39  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	14.1738G	62.98	88.20	-25.22	42.77	3	Vertical	205	1.86	-	41.57	12.49	33.85
RMS	14.17276G	50.87	68.20	-17.33	30.66	3	Vertical	205	1.86	-	41.57	12.49	33.85

**802.11ax HEW40\_Nss1,(MCS0)\_4TX**

**7085MHz\_TnomVnom**

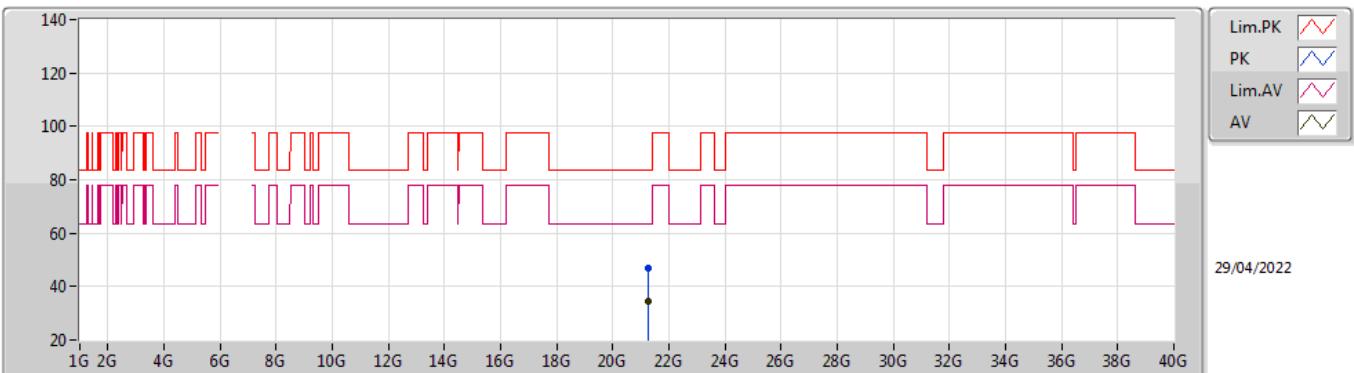


EUT Y\_4TX  
Setting 39  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	14.17G	62.90	88.20	-25.30	42.69	3	Horizontal	138	1.36	-	41.57	12.49	33.85
RMS	14.169G	50.90	68.20	-17.30	30.70	3	Horizontal	138	1.36	-	41.57	12.48	33.85

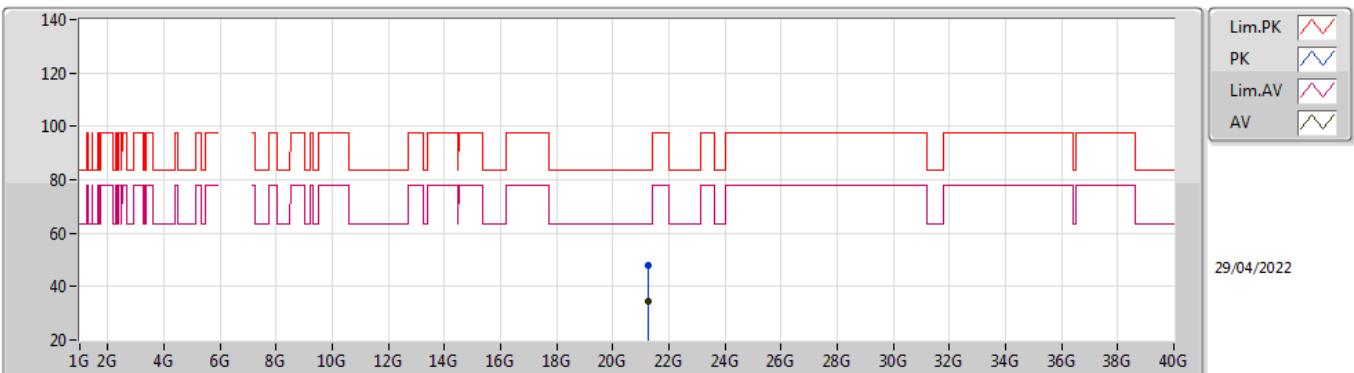
**802.11ax HEW40\_Nss1,(MCS0)\_4TX**

**7085MHz\_TnomVnom**



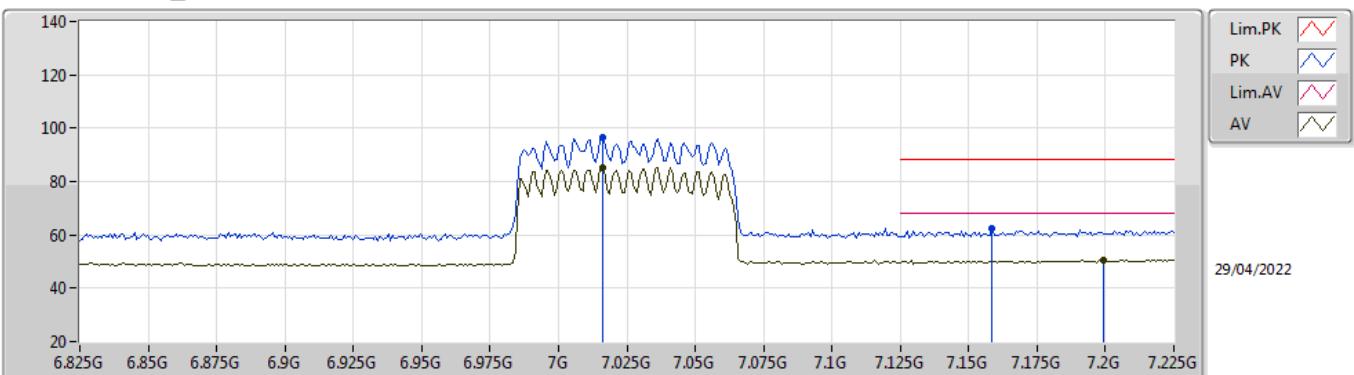
EUT Y\_4TX  
Setting 39  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	21.25954G	47.06	83.54	-36.48	43.03	1	Vertical	18	2.58	-	37.61	16.07	49.65	
AV	21.25832G	34.73	63.54	-28.81	30.70	1	Vertical	18	2.58	-	37.61	16.07	49.65	

**802.11ax HEW40\_Nss1,(MCS0)\_4TX**
**7085MHz\_TnomVnom**


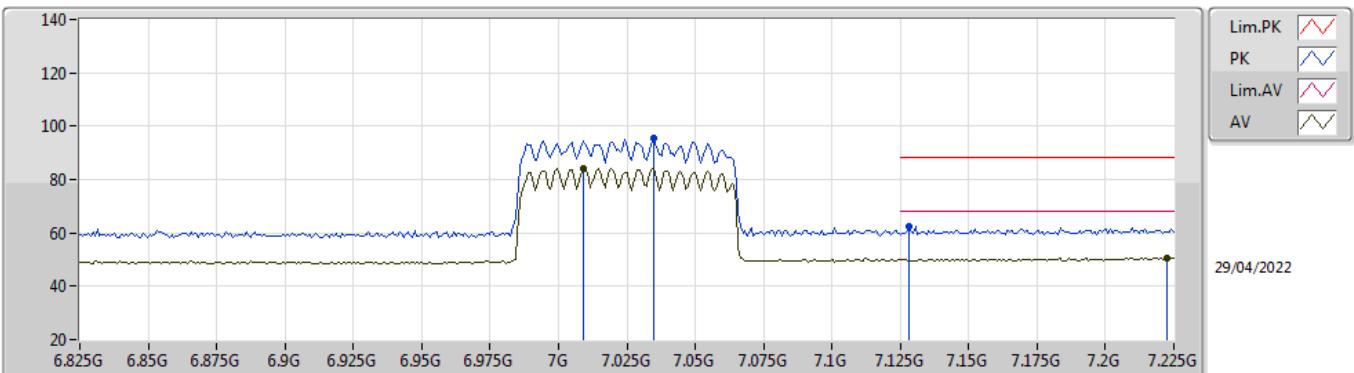
EUT Y\_4TX  
Setting 39  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	21.25948G	47.85	83.54	-35.69	43.82	1	Horizontal	213	1.90	-	37.61	16.07	49.65	
AV	21.25582G	34.64	63.54	-28.90	30.61	1	Horizontal	213	1.90	-	37.61	16.07	49.65	

**802.11ax HEW80\_Nss1,(MCS0)\_4TX**
**7025MHz\_TnomVnom**


EUT Y\_4TX  
Setting 45  
03-C-E-2-10

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	7.0162G	96.51	Inf	-Inf	88.10	3	Vertical	184	1.54	-	35.70	8.20	35.49	
RMS	7.0162G	85.23	Inf	-Inf	76.82	3	Vertical	184	1.54	-	35.70	8.20	35.49	
PK	7.1586G	62.48	88.20	-25.72	53.66	3	Vertical	184	1.54	-	36.15	8.20	35.53	
RMS	7.1994G	50.76	68.20	-17.44	41.70	3	Vertical	184	1.54	-	36.40	8.20	35.54	

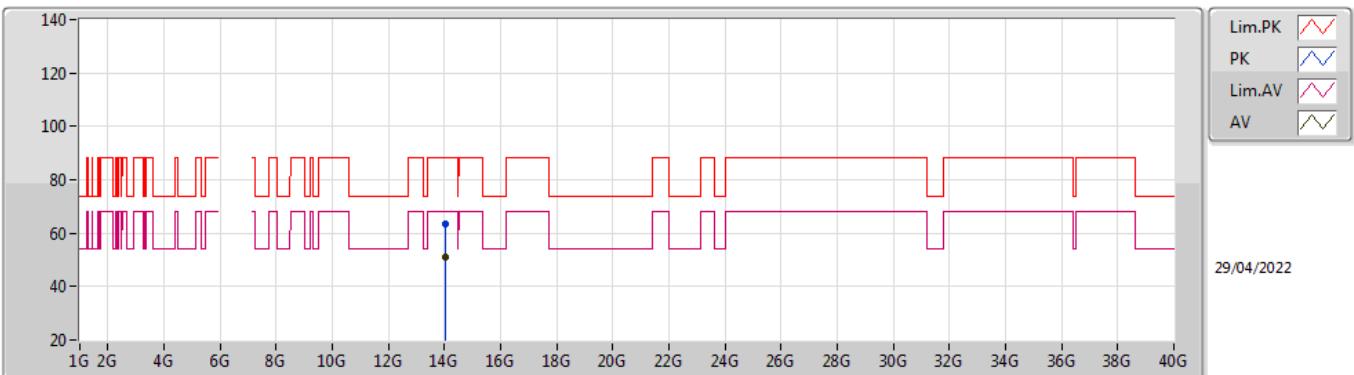
**802.11ax HEW80\_Nss1,(MCS0)\_4TX**
**7025MHz\_TnomVnom**


EUT Y\_4TX  
Setting 45  
03-C-E-2-10

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	7.0346G	95.26	Inf	-Inf	86.86	3	Horizontal	87	1.79	-	35.70	8.20	35.50	
RMS	7.009G	84.22	Inf	-Inf	75.81	3	Horizontal	87	1.79	-	35.70	8.20	35.49	
PK	7.1282G	62.46	88.20	-25.74	53.81	3	Horizontal	87	1.79	-	35.97	8.20	35.52	
RMS	7.2226G	50.72	68.20	-17.48	41.48	3	Horizontal	87	1.79	-	36.54	8.25	35.55	

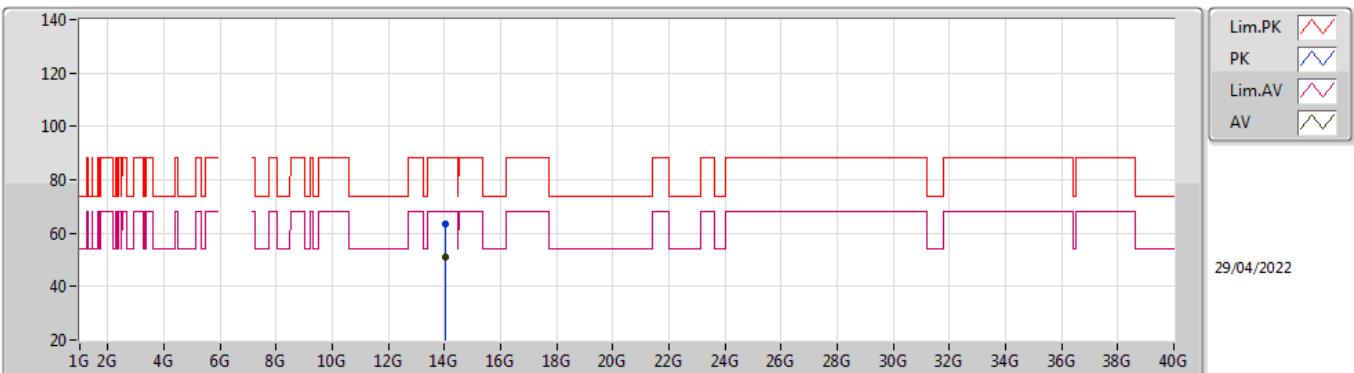
**802.11ax HEW80\_Nss1,(MCS0)\_4TX**

**7025MHz\_TnomVnom**



EUT Y\_4TX  
Setting 45  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	14.047G	63.39	88.20	-24.81	43.28	3	Vertical	170	1.67	-	41.34	12.42	33.65
RMS	14.05282G	51.12	68.20	-17.08	30.99	3	Vertical	170	1.67	-	41.36	12.43	33.66

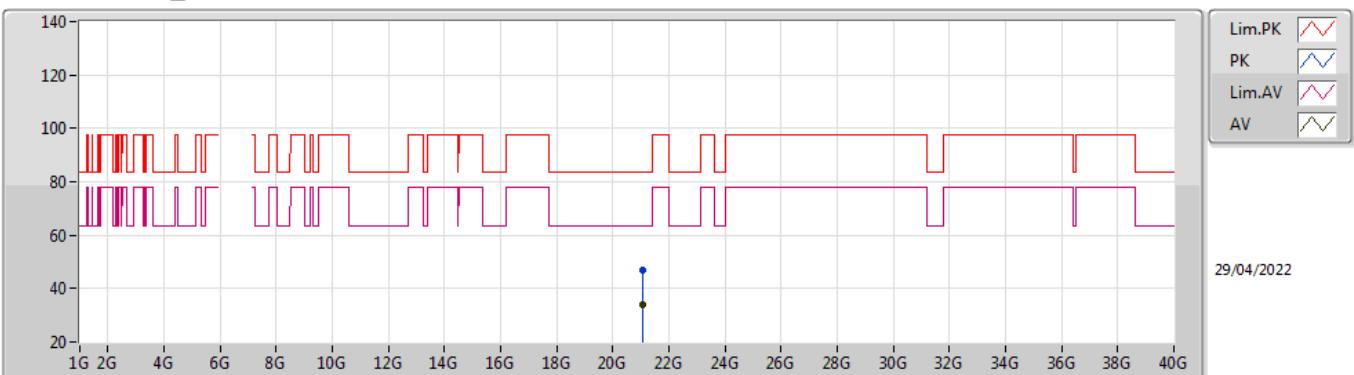
**802.11ax HEW80\_Nss1,(MCS0)\_4TX**
**7025MHz\_TnomVnom**


EUT Y\_4TX  
Setting 45  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	14.05272G	63.31	88.20	-24.89	43.18	3	Horizontal	15	1.43	-	41.36	12.43	33.66	
RMS	14.0511G	51.08	68.20	-17.12	30.96	3	Horizontal	15	1.43	-	41.35	12.43	33.66	

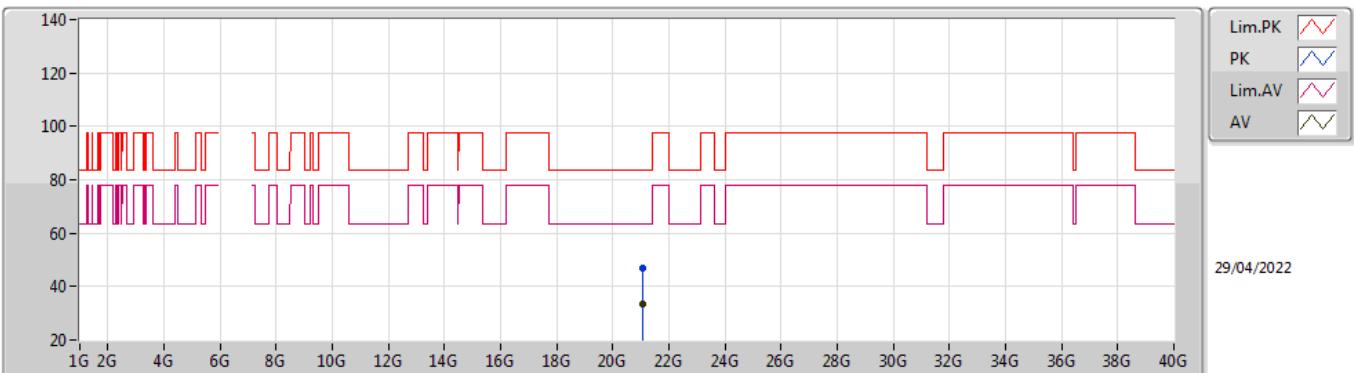
## 802.11ax HEW80\_Nss1,(MCS0)\_4TX

### 7025MHz\_TnomVnom



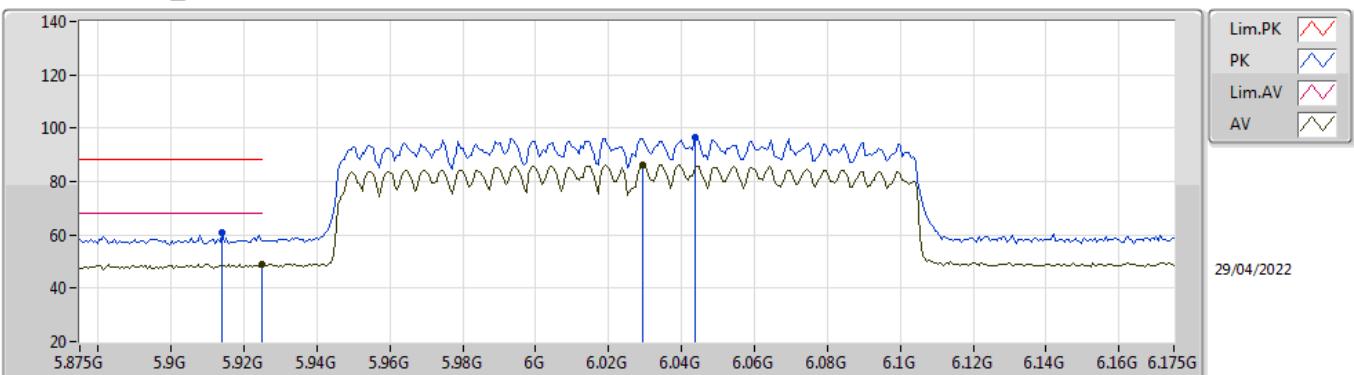
EUT Y\_4TX  
Setting 45  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	21.0705G	46.75	83.54	-36.79	42.86	1	Vertical	298	1.85	-	37.60	15.98	49.69	
AV	21.0772G	33.78	63.54	-29.76	29.88	1	Vertical	298	1.85	-	37.60	15.98	49.68	

**802.11ax HEW80\_Nss1,(MCS0)\_4TX**
**7025MHz\_TnomVnom**


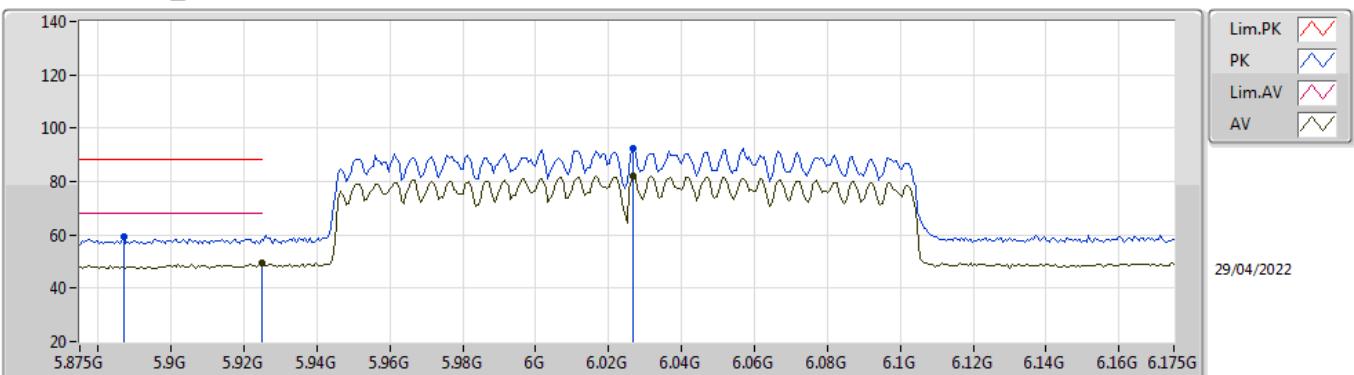
EUT Y\_4TX  
Setting 45  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	21.07722G	46.75	83.54	-36.79	42.85	1	Horizontal	326	2.70	-	37.60	15.98	49.68	
AV	21.0785G	33.70	63.54	-29.84	29.79	1	Horizontal	326	2.70	-	37.60	15.99	49.68	

**802.11ax HEW160\_Nss1,(MCS0)\_4TX**
**6025MHz\_TnomVnom**


EUT Y\_4TX  
Setting 61  
03-C-E-2-10

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	5.914G	60.63	88.20	-27.57	54.02	3	Vertical	2	1.87	-	34.66	7.51	35.56	
RMS	5.9248G	49.16	68.20	-19.04	42.50	3	Vertical	2	1.87	-	34.70	7.52	35.56	
PK	6.0436G	96.75	Inf	-Inf	89.82	3	Vertical	2	1.87	-	34.89	7.62	35.58	
RMS	6.0292G	86.44	Inf	-Inf	79.56	3	Vertical	2	1.87	-	34.86	7.61	35.59	

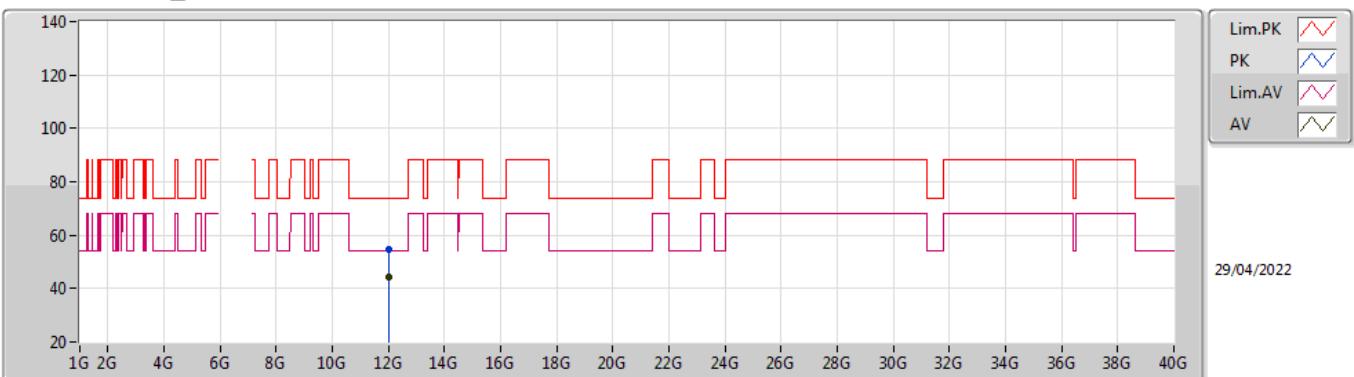
**802.11ax HEW160\_Nss1,(MCS0)\_4TX**
**6025MHz\_TnomVnom**


EUT Y\_4TX  
Setting 61  
03-C-E-2-10

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	5.887G	59.12	88.20	-29.08	52.65	3	Horizontal	131	1.80	-	34.52	7.49	35.54	
RMS	5.9248G	49.45	68.20	-18.75	42.79	3	Horizontal	131	1.80	-	34.70	7.52	35.56	
PK	6.0268G	92.43	Inf	-Inf	85.56	3	Horizontal	131	1.80	-	34.85	7.61	35.59	
RMS	6.0268G	81.97	Inf	-Inf	75.10	3	Horizontal	131	1.80	-	34.85	7.61	35.59	

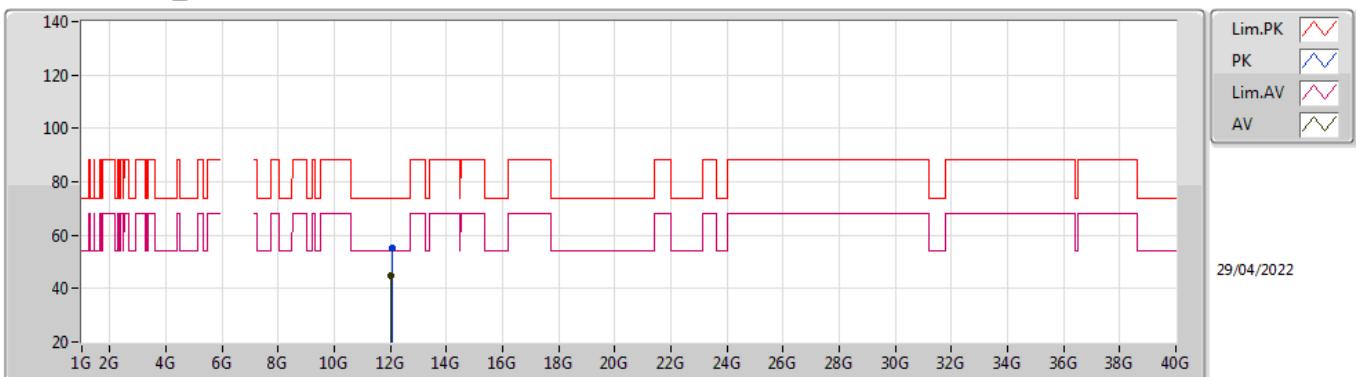
**802.11ax HEW160\_Nss1,(MCS0)\_4TX**

**6025MHz\_TnomVnom**



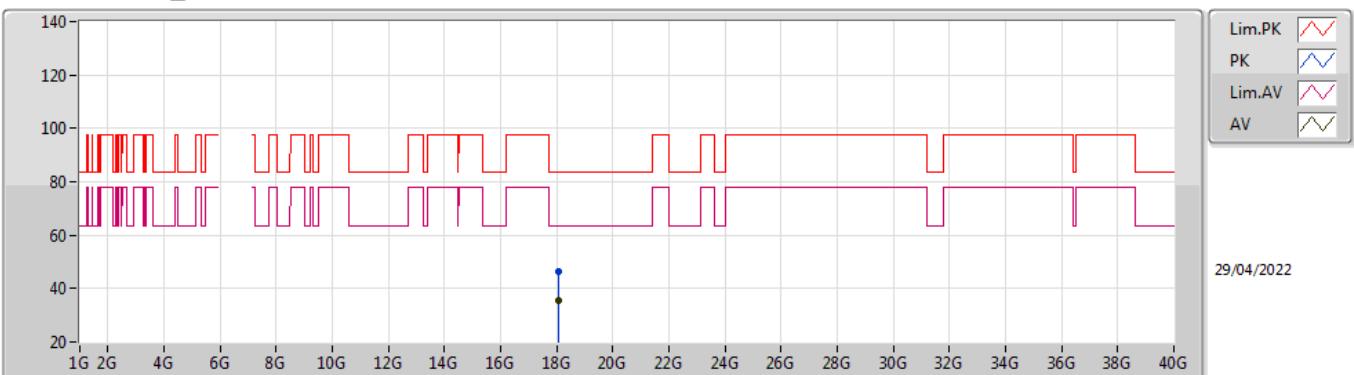
EUT Y\_4TX  
Setting 61  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	12.0357G	54.74	74.00	-19.26	40.26	3	Vertical	322	2.44	-	39.13	10.83	35.48
AV	12.0388G	44.41	54.00	-9.59	29.94	3	Vertical	322	2.44	-	39.12	10.83	35.48

**802.11ax HEW160\_Nss1,(MCS0)\_4TX**
**6025MHz\_TnomVnom**


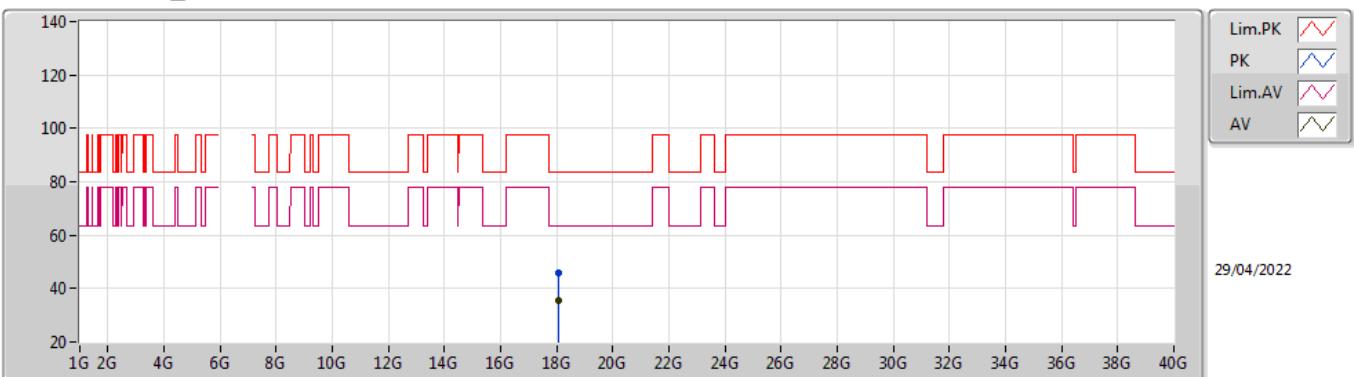
EUT Y\_4TX  
Setting 61  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	12.0574G	54.97	74.00	-19.03	40.51	3	Horizontal	205	2.12	-	39.09	10.85	35.48	
AV	12.0287G	44.62	54.00	-9.38	30.14	3	Horizontal	205	2.12	-	39.14	10.82	35.48	

**802.11ax HEW160\_Nss1,(MCS0)\_4TX**
**6025MHz\_TnomVnom**


EUT Y\_4TX  
Setting 61  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)
PK	18.07466G	46.53	83.54	-37.01	44.43	1	Vertical	127	2.78	-	37.64	14.73	50.27
AV	18.0764G	35.31	63.54	-28.23	33.21	1	Vertical	127	2.78	-	37.64	14.73	50.27

**802.11ax HEW160\_Nss1,(MCS0)\_4TX**
**6025MHz\_TnomVnom**


EUT Y\_4TX  
Setting 61  
03-C-K-4

Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Raw (dBuV)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	AF (dB)	CL (dB)	PA (dB)	
PK	18.07942G	46.03	83.54	-37.51	43.93	1	Horizontal	276	2.44	-	37.64	14.73	50.27	
AV	18.07796G	35.35	63.54	-28.19	33.25	1	Horizontal	276	2.44	-	37.64	14.73	50.27	