Prüfbericht-Nr.: *Test report no.:*	**SE2445EQ-004**	**Auftrags-Nr.:** *Order no.*:	S0002390299	Seite 1 von 47 *Page 1 of 47*
Kunden-Referenz-Nr.: *Client reference no.:*	2380811	**Auftragsdatum:** *Order date:*	2023.12.01	
Auftraggeber: *Client:*	Axis Communications AB			
Prüfgegenstand: *Test item:*	Network surveillance camera including 60GHz radar sensor			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	Axis Q1686-DLE / FCC ID: PNB-AXISQ1686-DLE			
Auftrags-Inhalt: *Order content*:	Accredited testing			
Prüfgrundlage: *Test specification:*	FCC 47 CFR Part 15.255 with parts 15.207, 15.209 & 15.215 ANSI C63.10: 2013			

Wareneingangsdatum: *Date of sample receipt:*	2023.12.20
Prüfmuster-Nr.: *Test sample no:*	A003653502-001
Prüfzeitraum: *Testing period:*	2023.12.20 - 2024.05.21
Ort der Prüfung: *Place of testing:*	Lund, Sweden
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland Sweden
Prüfergebnis*: *Test result*:*	Pass

überprüft von: reviewed by:	X Signed by: Fariborz Abasi	**genehmigt von:** authorized by:	X Signed by: Hakan Ahlberg
Datum: 2024.06.05 *Date:*		**Datum: 2024.06.05** *Date:*	
Stellung / *Position:*	Technical Expert	**Stellung** / *Position:*	Lab Manager

Sonstiges / *Other:* -

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Revision History

REVISION	DATE	REMARKS	AUTHOR
001	2024.04.10	First Release	Fariborz Abasi
002	2024.04.26	Corrected product name	Fariborz Abasi
003	2024.05.22	Updated results from spot check to full test	Fariborz Abasi
004	2024.06.05	Corrected table in 4.2	Fariborz Abasi
Note: Latest revision report will replace all previous reports			
This report based on FCC Part 15.255 Template version 1.1			

Summary of Test Results

FCC 47 CFR Rule Part	Test Description	Applicability	Report Section	RESULT	REMARKS
15.207	AC Power Line Conducted Emissions (Intentional Radiators)	YES	4.1	PASS	
15.215 (c)	Emission Bandwidth	YES	4.2	PASS	
15.255 (c)(1-3) & (e)	Peak Conducted Output Power and e.i.r.p	YES	4.3	PASS	
15.209 & 15.255 (d)	Spurious Emissions (Intentional Radiators)	YES	4.5	PASS	
15.255 (f)	Frequency Tolerance	YES	4.6	PASS	

Possible test case verdicts:

- Test case does not apply to the test object: N/A
- Test object complies with the requirement: PASS or COMPLIANT
- Test object does not meet the requirement: FAIL or NOT COMPLIANT
- Test case not performed on the test object: N.P.

Table of Contents

1. GENERAL INFORMATION

1.1 Test Site

Test Facility:	**TÜV Rheinland Sweden AB**
Address:	**Mobilvägen 10**
	223 62 Lund
	Sweden
Swedac Registration Number: **FCC Test Firm Registration Number:** **ISED Test Site Registration Number:**	**10325** **517458** **24753**

1.2 Client Information

Company Name:	**Axis Communications AB**
Address:	**Gränden 1**
	22369 Lund
	Sweden
Contact Person:	**Riham Karim**
Contact e-Mail / Telephone	**riham.karim@axis.com** **+46 721 83 36 50**

2. PRODUCT INFORMATION

2.1 General Description

Model name:	AXIS Q1686-DLE Radar -Video Fusion Camera.
Manufacturer:	Axis Communications AB
Model number / Marketing name:	AXIS Q1686-DLE Radar -Video Fusion Camera.
FCC ID:	PNB-AXISQ1686-DLE
Description:	Network surveillance camera including 60GHz radar sensor.
Ancillary Equipment:	See section 0

2.2 Device Characteristics

Type of Power Supply	Power Over Ethernet (PoE) or AC/DC PSU
Nominal Supply Voltage	PoE (class 4): 55V DC DC power port: 12V or 24V DC
Supply Voltage Range	PoE (class 4): 50V to 57V DC DC power port: 10V to 28V DC
Operating Temperature Range	-40°C to 60°C
Operating Air Humidity Range	-
Highest Internal Frequency Source	61.5 GHz

2.3 Test Samples

EUT #	EUT ID	Serial Number	Hardware / Software Versions	Used For:
1	A003653502-001	B8A44F9DEA4D	1.0 / 11.9.35	All activities

2.4 Wireless Technologies and Bands Supported by the EUT

Technology	Band	Frequency Range (Tx)	Evaluation Performed*
FMCW Radar	61 GHz	61.0 GHz – 61.5 GHz	YES

*This statement refers only to this report. Other wireless technologies may be covered by other reports.

2.5 Antenna Information

Technology	Band	Number of Antennas	Antenna Type(s)	Gain
FMCW Radar	61 GHz	3 x Tx 4 x Rx	Patch	6 dBi

2.6 Wireless Technology Details

Technology	Band	Modulation Type(s)	No. of Channels	Channel Spacing	Transmitter Type
FMCW Radar	61 GHz	FMCW	2	250 MHz	Field Disturbance Sensor

2.7 Ancillary Equipment

ID	Description	Manufacturer / Model	Hardware & Software Versions
A003624354-002	Power Over Ethernet injector	Axis	-
A003653502-002	AC/DC power supply (PSU)	Axis	-

2.8 EUT Diagrams

N/A

3. TEST METHODS

3.1 Test Standards

Testing was performed according to the following standards / references

Standard	Version	Description
FCC 47 CFR 15.255	-	Operation within the band 57-71 GHz
FCC 47 CFR 15.207	-	Conducted limits
FCC 47 CFR 15.209	-	Radiated emission limits; general requirements
FCC 47 CFR 15.215	-	Additional provisions to the general radiated emission limitations

3.2 Additional references

The following standards / references were also considered for the testing

Standard	Version	Description
ANSI C63.10	2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

3.3 Limits

FCC 47 CFR Rule Part	Test Description	Limit Reference (FCC 47 CFR Reference)
15.207	AC Power Line Conducted Emissions (Intentional Radiators)	15.207 (a)
15.215 (c)	Emission Bandwidth	15.215 (c)
15.255 (c)(1-3) & (e)	Peak Conducted Output Power and e.i.r.p	15.255 (c)(1-3) 15.255 (e)(1)
15.209 & 15.255 (d)	Spurious Emissions (Intentional Radiators)	15.209 (a) & 15.255 (d) (3&4) *See Note 1
15.255 (f)	Frequency Tolerance	15.255 (f)

Interpretation of the measurement results has been performed in accordance with ANSI C63.10 section 1.3

Compliance with the requirements has been based on the results of the measurements compared to the specified limits, not taking into account measurement instrumentation uncertainty.

Measurement Uncertainty figures are stated in section 6

Note 1

Radiated Emissions limits in the tables from 47 CFR sections 15.109 & 15.209 are presented in µV/m. Measurements on the test system are made in dBµV/m. To convert between these, the following adjustment is used:

$$New\ Limit = 20\log\left(\frac{Original\ Limit}{10^6}\right)+120$$

Example: from 15.209(a) the limit for 30MHz – 88MHz is 100µV/m at 3m. This gives:

$$New\ Limit = 20\log\left(\frac{100}{10^6}\right)+120 = 40\text{dBµV/m at 3m}$$

Radiated Emissions limits in 47 CFR 15.255 (d)(3) are presented in pW/cm^2. Measurements on the test system are made in dBµV/m. To convert between these, the following adjustment is used:

$$New\ Limit = 10\log\left(\frac{Original\ Limit}{10^4}\right)+115.8$$

Example: from 15.255 (d)(3) the limit for 40GHz – 200GHz is 90 pw/cm^2 at 3m. This gives:

$$New\ Limit = 10\log\left(\frac{90}{10^4}\right)+115.8 = 85.34\text{dBµV/m at 3m}$$

Additionally, in some cases testing has been performed at distances other than those specified in the tables. When this has occurred, the limits have been adjusted in accordance with the requirements in 47 CFR 15.31, using an extrapolation factor of 40dB/decade at frequencies below 30MHz and 20dB/decade at or above 30MHz

Example: from 15.209(a) the limit for 1.705MHz – 30MHz is 30µV/m (=29.54 dBµV/m) at 30m

$Limit@3m = Limit@30m + 40\log\left(\frac{30}{3}\right)$ = 29.54 +40.00 = 69.54 dBµV/m at 3m

Example: from 15.209(a) the limit for 1GHz – 18GHz is 500µV/m (=53.98 dBµV/m) at 3m

$Limit@1m = Limit@3m + 20\log\left(\frac{3}{1}\right)$ = 53.98 +9.54 = 63.52 dBµV/m at 1m

3.4 Description of Test Methods and Equipment Setup

3.4.1 General Description

Testing was performed in accordance with the various requirements of ANSI C63.4 and ANSI C63.10. Any deviations from the test methods are described in section 3.7

Where different arrangements of equipment were used for different types of measurements, these are tabulated in section 3.4.2 and details of each arrangement are included in subsequent sections

3.4.2 Test Equipment Setup Used by Test Type

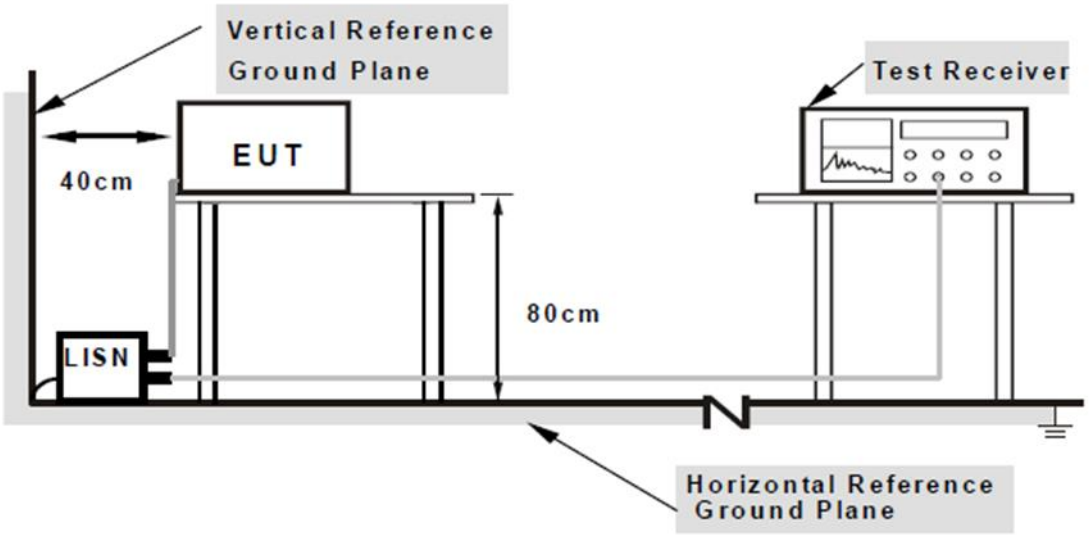
FCC 47 CFR Rule Part	Test Description	Test Equipment Used
15.207	AC Power Line Conducted Emissions (Intentional Radiators)	Conducted Emissions
15.215 (c)	Emission Bandwidth	R&S ESW
15.255 (c)(1-3) & (e)	Peak Conducted Output Power and e.i.r.p	R&S ESW
15.209 & 15.255 (d)	Spurious Emissions (Intentional Radiators)	SAC5
15.255 (f)	Frequency Tolerance	R&S ESW

3.4.3 Test Equipment Setup – Conducted Emissions

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The LISNs provide 50Ω/ 50µH of coupling impedance for the measuring instrument.

- The lines of the power mains connected to the EUT were checked for maximum conducted interference.

- The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10 dB under the prescribed limits could not be reported.



3.4.4 Test Equipment Setup – SAC 5 (Radiated Emissions and Restricted Band Edge)

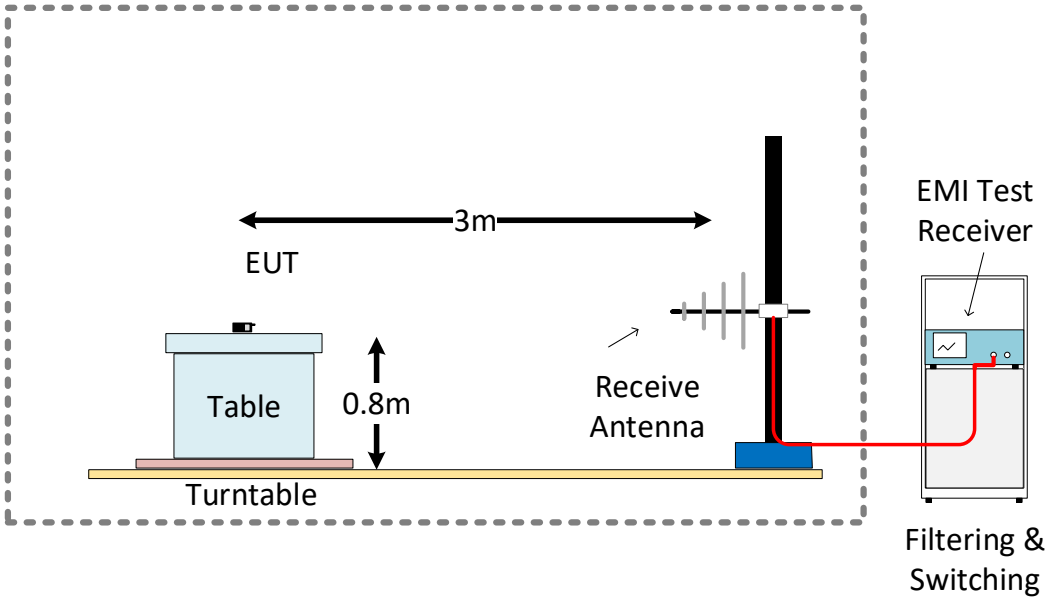
- For frequency range 30MHz-1GHz Log-Periodic Antenna was used. Antenna elevated from 100 cm from floor to 400 cm from floor, and was placed at 3 m from center of turntable in tilted position. The equipment under test (EUT) was placed at the middle of the turntable at 80 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

- For frequency range 1GHz-18GHz horn Antenna was used. Antenna elevated from 100 cm from floor to 200 cm from floor, and was placed at 3 m from center of turntable. The equipment under test (EUT) was placed at the middle of the turntable at 150 cm height from floor. The antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained.

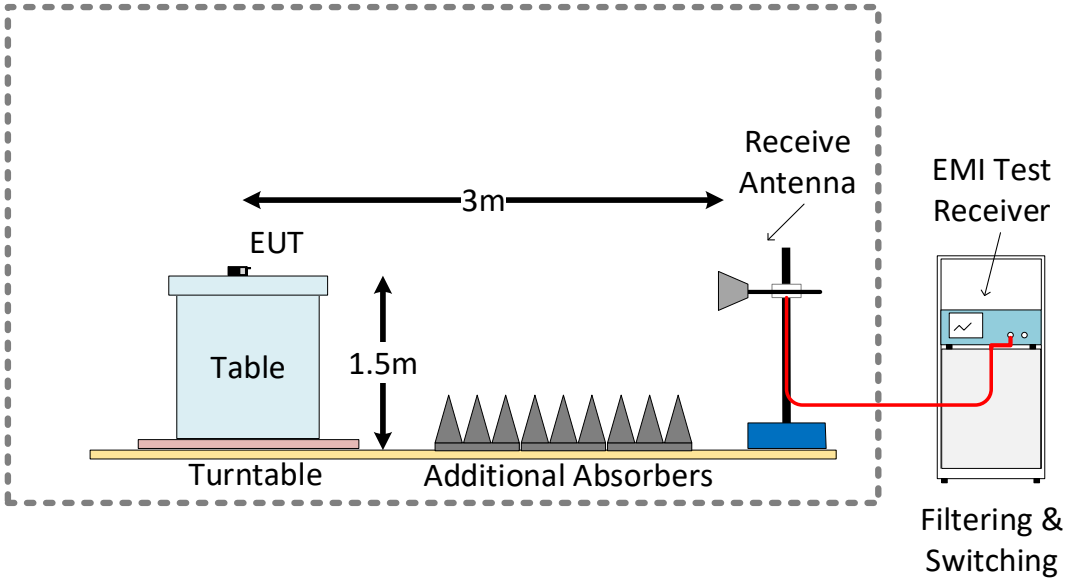
- For frequency range 18GHz-40GHz double horn Antenna was used. Antenna's height was adjusted to150 cm from floor, and 1 m distance to center of turntable. The equipment under test (EUT) was placed at the middle of the turntable on at 150 cm height from floor.

- For all frequency ranges the turntable was rotated 360˚ for obtaining the maximum emission.

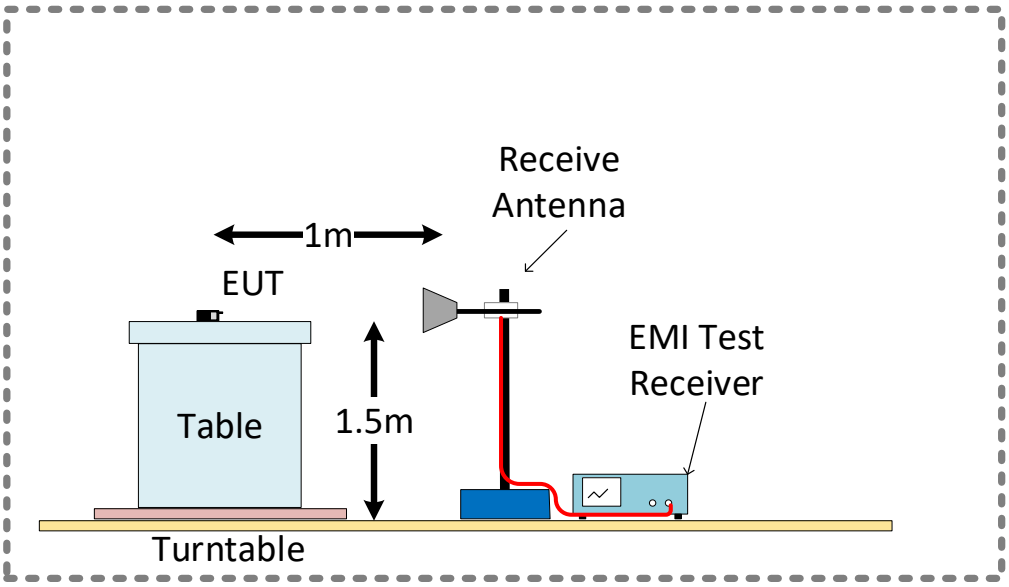
SAC 5 Test Setup Configuration 30MHz – 1GHz



SAC 5 Test Setup Configuration 1GHz – 18GHz

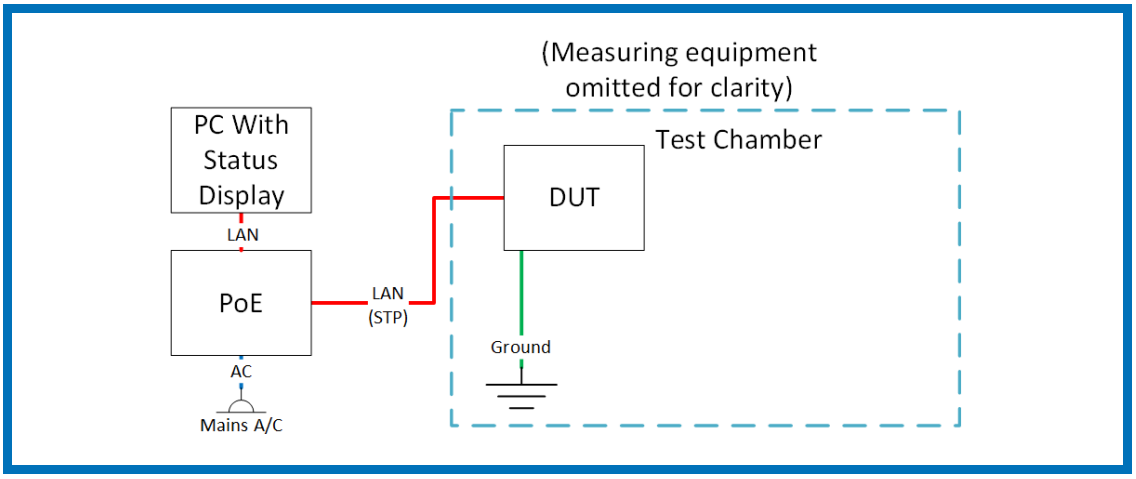


SAC 5 Test Setup Configuration 18GHz – 40GHz



3.5 EUT Configuration During Test

Radiated Emissions & Radiated RF Testing: Block Diagram (Power via PoE)



3.6 EUT Operation Modes

Operation mode	Description
Default (PoE)	The device is powered and the radar is operating as normal. Power via PoE over an STP LAN cable.
Default (AC/DC)	The device is powered and the radar is operating as normal. DC power from an AC/DC adapter.

The radar transceiver supports two different “channels” and two different modes of operation, as follows:

- Channel 1 (“CH1”) – occupies the upper part of the 61.0GHz – 61.5GHz band
- Channel 2 (“CH2”) – occupies the lower part of the 61.0GHz – 61.5GHz band

- “Area monitoring” mode uses all three Tx antennas and has a higher bandwidth & faster frequency ramp
- “Road monitoring” mode uses two Tx antennas and has a lower bandwidth and slower frequency ramp

Note1: on choice of channels/modes used for testing:

The default configuration for the device is “Area monitoring” mode on Channel 1. In normal operation, the device can be set to use the different modes and can automatically change between channels.

For the purposes of testing, the mode and channel were set manually and fixed for the duration of testing. Where relevant, testing was performed for multiple modes and/or channels.

3.7 Deviations from the Test Standard

-

3.8 Environmental Conditions

3.8.1 Environmental Conditions – Radiated RF

Date	Time	Temperature (°C)	Relative Humidity (%)
2024.05.07	09:30	18.8	43
2024-05-16	09:16	18.7	50
2024-05-17	07:50	20.0	39
2024-05-20	10:05	18.5	53

3.8.2 Environmental Conditions – Conducted Emissions System

Date	Time	Temperature (°C)	Relative Humidity (%)
2024.05.21	11:31	22.4	25

3.8.3 Environmental Conditions – SAC5 (Radiated Emissions)

Date	Time	Temperature (°C)	Relative Humidity (%)
2023.12.20	08:14	20.1	41
2023.12.28	09:20	20.6	33
2024.01.03	11:03	19.1	33
2024.01.16	08:17	18.2	28
2024.01.17	09:14	18.6	30

4. TEST RESULTS

4.1 Test Results – AC Power Line Conducted Emissions (Intentional Transmitter)

4.1.1 AC Power Line Conducted Emissions (Intentional) – Test Summary

Test Specification	FCC 47 CFR 15.207 (Part 15 Subpart C)	
Test Engineer & Date	Fariborz Abasi	Date:2024.05.21
EUT and Ancillary Equipment IDs	A003653502-001	-A003653502-002 PSU - A003624354-002 PoE
EUT Operation Mode(s)	Radar transmission ON	
EUT Wireless Configuration(s)	Area Monitoring CH1	
EUT Hardware Configuration(s)	-DUT Powered by AC/DC adaptor (PSU) - DUT Powered by Ethernet power injector (PoE)	
Overall Result	Pass	

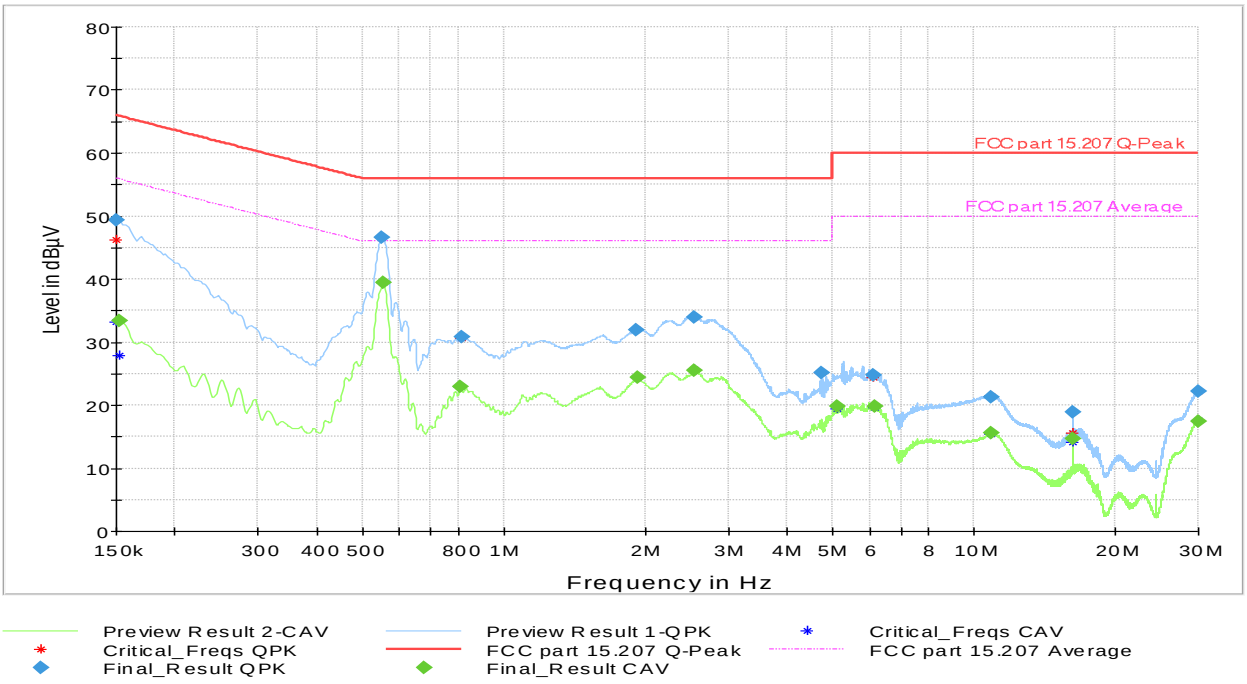
Test Parameter	Wireless Configuration	Frequency Range	Result*
AC Conducted Power Line Emissions – “N” Line (PoE)	Area Monitoring CH1	150 kHz – 30 MHz	Pass
AC Conducted Power Line Emissions – “L1” Line (PoE)	Area Monitoring CH1	150 kHz – 30 MHz	Pass
AC Conducted Power Line Emissions – “N” Line (AC/DC)	Area Monitoring CH1	150 kHz – 30 MHz	Pass
AC Conducted Power Line Emissions – “L1” Line (AC/DC)	Area Monitoring CH1	150 kHz – 30 MHz	Pass

* For detailed measurements, see tables and graphs in sections below

4.1.2 AC Power Line Conducted Emissions (Intentional) – Test Details

AC Power Line Conducted Emissions - PoE

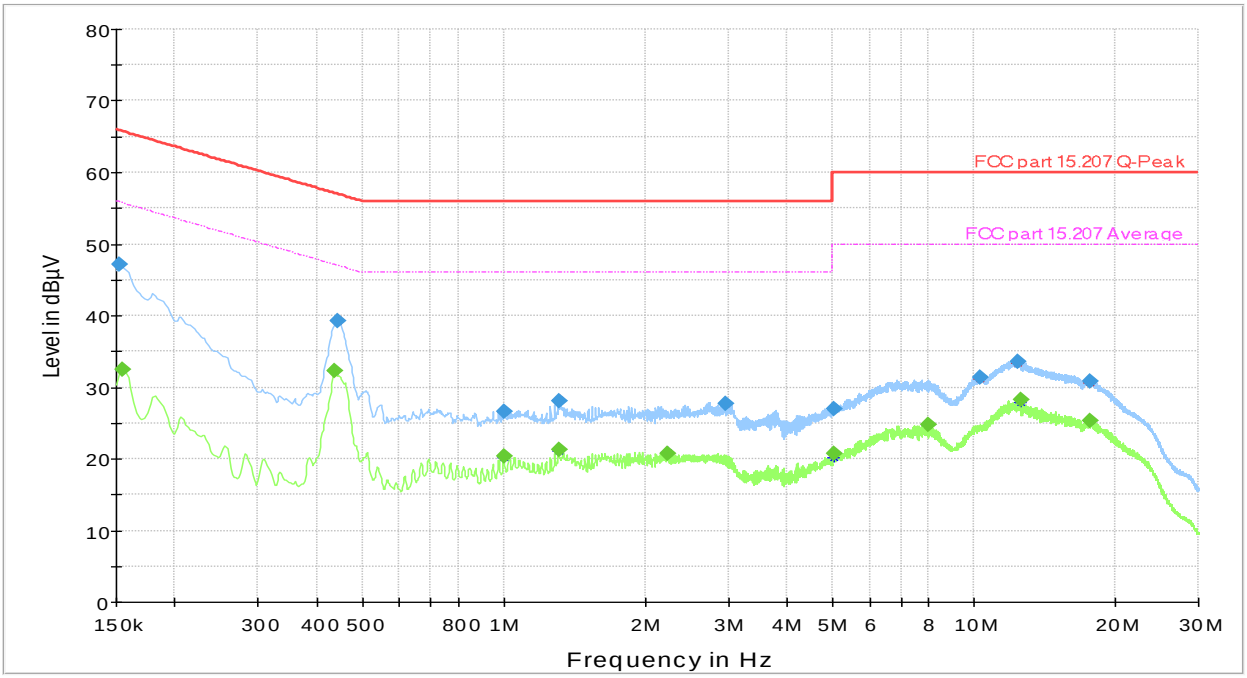
Test mode condition	Conducted Emissions	
Sweep frequency	150 kHz – 30 MHz	
Standard	FCC 47 Part 15.207	
EUT	A003653502-001	
Ancillary Equipment	PoE: A003624354-002	
Test Engineer	Fariborz Abasi	Date:2024.05.21



Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	49.30	---	66.00	16.70	1000.0	9.000	N	ON	9.6
0.152250	---	33.48	55.88	22.40	1000.0	9.000	N	ON	9.6
0.550500	46.64	---	56.00	9.36	1000.0	9.000	N	ON	9.6
0.552750	---	39.51	46.00	6.49	1000.0	9.000	N	ON	9.6
0.809250	---	22.94	46.00	23.06	1000.0	9.000	L1	ON	9.6
0.811500	30.86	---	56.00	25.14	1000.0	9.000	L1	ON	9.6
1.914000	32.01	---	56.00	23.99	1000.0	9.000	L1	ON	9.7
1.929750	---	24.47	46.00	21.53	1000.0	9.000	L1	ON	9.7
2.532750	33.94	---	56.00	22.06	1000.0	9.000	N	ON	9.7
2.548500	---	25.48	46.00	20.52	1000.0	9.000	N	ON	9.7
4.751250	25.09	---	56.00	30.91	1000.0	9.000	L1	ON	9.7
5.102250	---	19.76	50.00	30.24	1000.0	9.000	L1	ON	9.7
6.121500	24.70	---	60.00	35.30	1000.0	9.000	L1	ON	9.7
6.153000	---	19.82	50.00	30.18	1000.0	9.000	L1	ON	9.7
10.875750	---	15.51	50.00	34.49	1000.0	9.000	L1	ON	9.8
10.909500	21.33	---	60.00	38.67	1000.0	9.000	L1	ON	9.8
16.239750	18.92	---	60.00	41.08	1000.0	9.000	L1	ON	9.8
16.239750	---	14.60	50.00	35.40	1000.0	9.000	L1	ON	9.8
29.982750	---	17.44	50.00	32.56	1000.0	9.000	L1	ON	9.8
29.996250	22.18	---	60.00	37.82	1000.0	9.000	L1	ON	9.8

AC Power Line Conducted Emissions – AC/DC

Test mode condition	Conducted Emissions	
Sweep frequency	150 kHz – 30 MHz	
Standard	FCC 47 Part 15.207	
EUT	A003653502-001	
Ancillary Equipment	PSU: A003653502-002	
Test Engineer	Fariborz Abasi	Date:2024.05.21



Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.152250	47.19	---	65.88	18.68	1000.0	9.000	L1	ON	9.6
0.154500	---	32.56	55.75	23.19	1000.0	9.000	N	ON	9.6
0.438000	---	32.28	47.10	14.82	1000.0	9.000	L1	ON	9.6
0.444750	39.35	---	56.97	17.62	1000.0	9.000	L1	ON	9.6
1.000500	26.65	---	56.00	29.35	1000.0	9.000	N	ON	9.6
1.000500	---	20.28	46.00	25.72	1000.0	9.000	N	ON	9.6
1.308750	28.13	---	56.00	27.87	1000.0	9.000	N	ON	9.6
1.308750	---	21.22	46.00	24.78	1000.0	9.000	N	ON	9.6
2.231250	---	20.82	46.00	25.18	1000.0	9.000	N	ON	9.7
2.973750	27.74	---	56.00	28.26	1000.0	9.000	N	ON	9.7
5.025750	26.98	---	60.00	33.02	1000.0	9.000	L1	ON	9.7
5.050500	---	20.69	50.00	29.31	1000.0	9.000	L1	ON	9.7
8.000250	---	24.73	50.00	25.27	1000.0	9.000	L1	ON	9.7
10.333500	31.35	---	60.00	28.65	1000.0	9.000	L1	ON	9.8
12.363000	33.53	---	60.00	26.47	1000.0	9.000	L1	ON	9.8
12.588000	---	28.27	50.00	21.73	1000.0	9.000	L1	ON	9.8
17.668500	---	25.25	50.00	24.75	1000.0	9.000	L1	ON	9.8
17.668500	30.78	---	60.00	29.22	1000.0	9.000	L1	ON	9.8

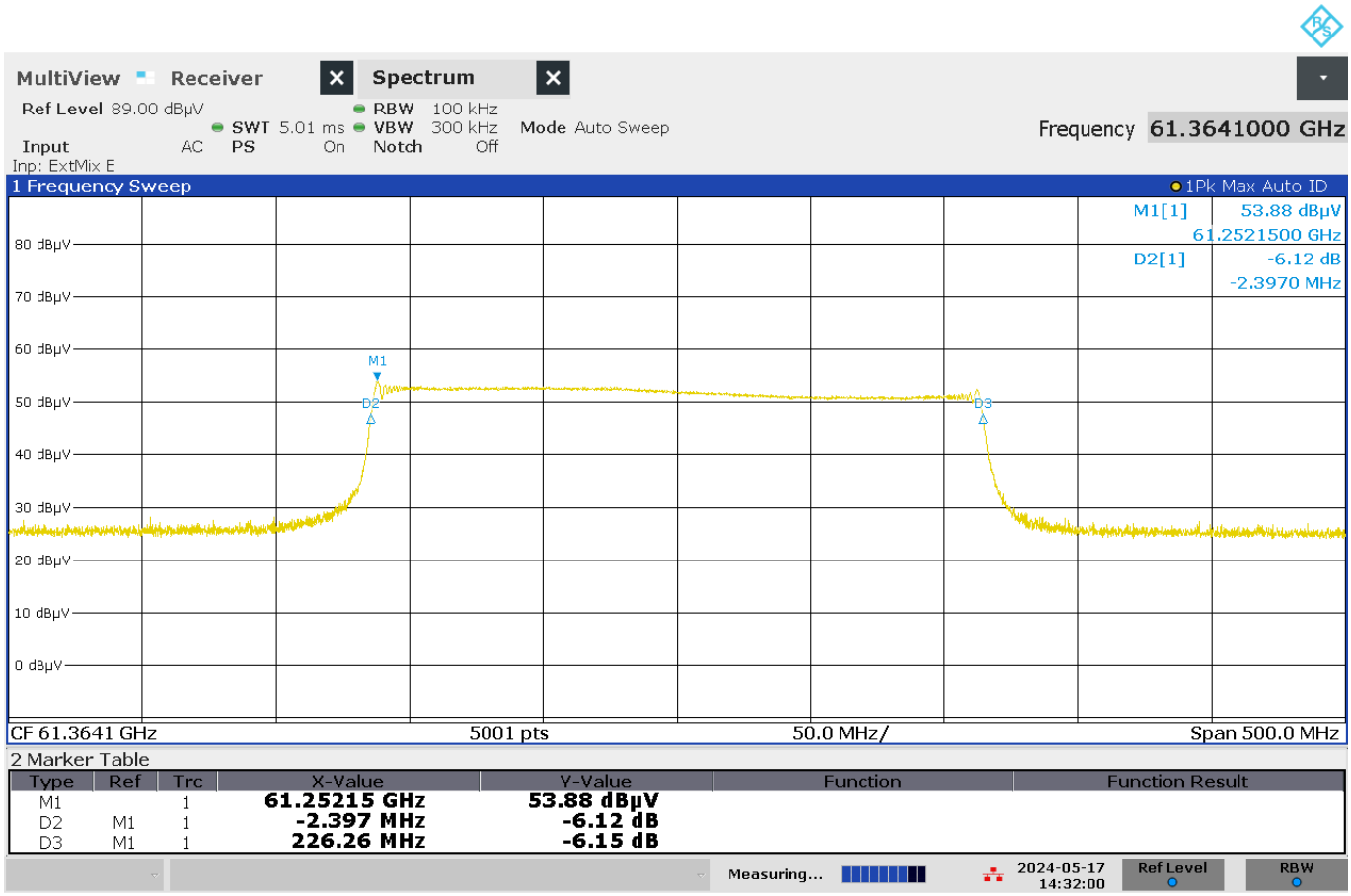
4.2 Test Results – Emission Bandwidth

4.2.1 Emission Bandwidth – Test Summary

Test Specification	FCC 47 CFR 15.215 (c) (Part 15 Subpart C)	
Test Engineer & Date	Håkan Ahlberg/Per Isacsson	2024.05.17
EUT and Ancillary Equipment IDs	A003653502-001	A003624354-002 PoE injector
EUT Operation Mode(s)	Default (PoE)	
EUT Wireless Configuration(s)	All channel / mode combinations (See below)	
EUT Hardware Configuration(s)	-	
Overall Result	PASS	

Test Parameter	Wireless Configuration	Emission Bandwidth (MHz)	BW Limit (MHz)	F_{Low} (GHz)	Limit F_{Low} (GHz)	F_{High} (GHz)	Limit F_{High} (GHz)	Result
6dB Bandwidth	Area CH1	228,657	500	61,25	>61.0	61,48	<61.5	PASS
6dB Bandwidth	Area CH2	230,4811	500	61,02	>61.0	61,25	<61.5	PASS
6dB Bandwidth	Road CH1	178,8907	500	61,25	>61.0	61,43	<61.5	PASS
6dB Bandwidth	Road CH2	180,3861	500	61,07	>61.0	61,25	<61.5	PASS

4.2.2 Emission Bandwidth – Test Details (Example plot: “Area CH1”)



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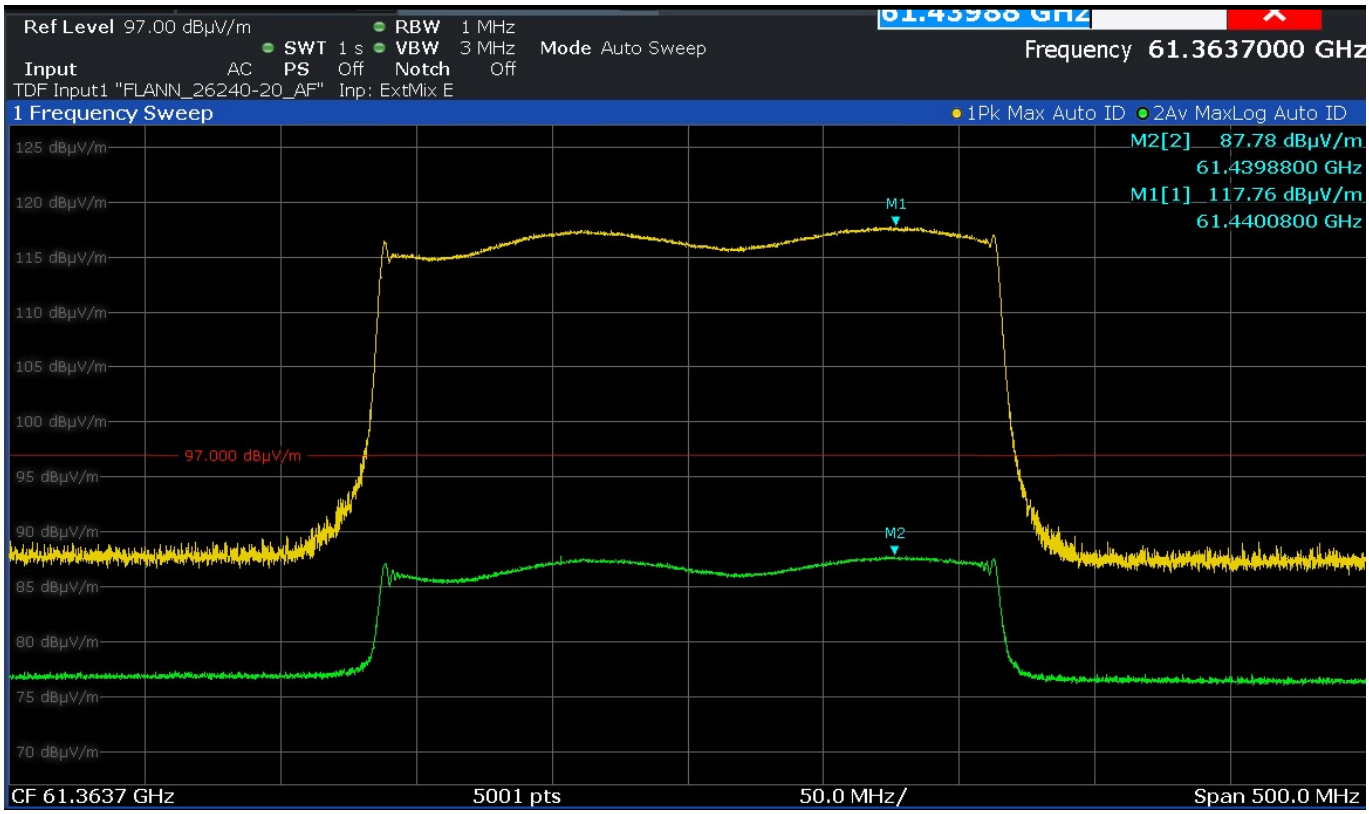


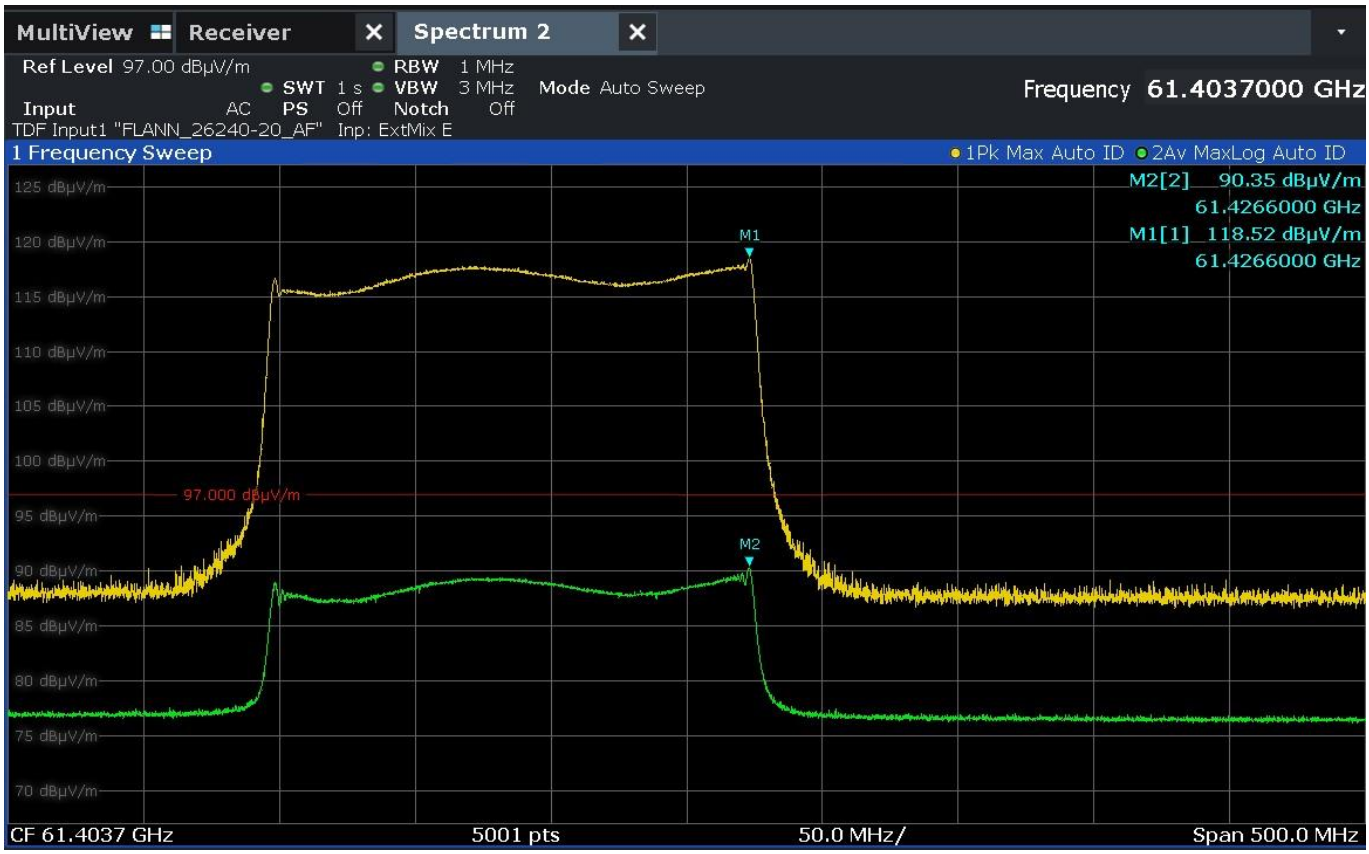
4.3 Test Results – Peak and Average e.i.r.p. and Conducted Power

4.3.1 Peak and Average e.i.r.p. and Conducted Power – Test Summary

Test Specification	FCC 47 CFR 15.255(c)(1-3) (Part 15 Subpart C) FCC 47 CFR 15.255 (e)	
Test Engineer & Date	Per Isacsson	2024.05.07
EUT and Ancillary Equipment IDs	A003653502-001	A003624354-002 PoE injector
EUT Operation Mode(s)	Default (PoE)	
EUT Wireless Configuration(s)	All channel / mode combinations (See below)	
EUT Hardware Configuration(s)	-	
Overall Result	PASS	

Test Parameter	Wireless Configuration	Power (dBm)	Power (mW)	Limit: Power (dBm)	Limit: Power (mW)	Result
Peak e.i.r.p.	Area CH1	7,04	5,06	43	-	PASS
Average e.i.r.p.	Area CH1	-22,94	0,01	40	-	PASS
Conducted power	Area CH1	1,04	1,27	-	500	PASS
Peak e.i.r.p.	Area CH2	6,10	4,07	43	-	PASS
Average e.i.r.p.	Area CH2	-22,92	0,01	40	-	PASS
Conducted power	Area CH2	0,10	1,02	-	500	PASS
Peak e.i.r.p.	Road CH1	7,80	6,02	43	-	PASS
Average e.i.r.p.	Road CH1	-20,37	0,01	40	-	PASS
Conducted power	Road CH1	1,80	1,51	-	500	PASS
Peak e.i.r.p.	Road CH2	6,99	5,00	43	-	PASS
Average e.i.r.p.	Road CH2	-20,95	0,01	40	-	PASS
Conducted power	Road CH2	0,99	1,26	-	500	PASS

4.3.2 Peak and Average e.i.r.p. and Conducted Power – Test Details (Example plot: "Road CH1")



Using equation 22 from ANSI C63.10:

$EIRP = E_{Meas} + 20\ log(d_{Meas}) - 104.7$

Where d_{Meas} = 0.5m:

$EIRP\ (Peak) = 119.73 + 20\ log(0.5) - 104.7$ = 8.45 dBm

$EIRP\ (Average) = 91.03 + 20\ log(0.5) - 104.7$ = -19.69 dBm

Conducted power = EIRP – Antenna Gain

Conducted power (Peak) = 8.45 dBm – 6.0 dBi = 2.45 dBm

4.4 Test Results –Spurious Emissions (Intentional Transmitter)

4.4.1 Spurious Emissions (Intentional) – Test Summary

Test Specification	FCC 47 CFR 15.209 (Part 15 Subpart C) FCC 47 CFR 15.255 (d)	
Test Engineer & Date	Per Isacsson Fariborz Abasi	2023.12.20 2023.12.28 2024.01.03 2024.01.16 2024.01.17
EUT and Ancillary Equipment IDs	A003653502-001	A003624354-002 PoE injector
EUT Operation Mode(s)	Power over Ethernet (PoE) Area mode - Channel 1 Area mode - Channel 2	
EUT Wireless Configuration(s)	Radar _TX mode	
EUT Hardware Configuration(s)	See setup photos in Appendix	
Overall Result	Pass	

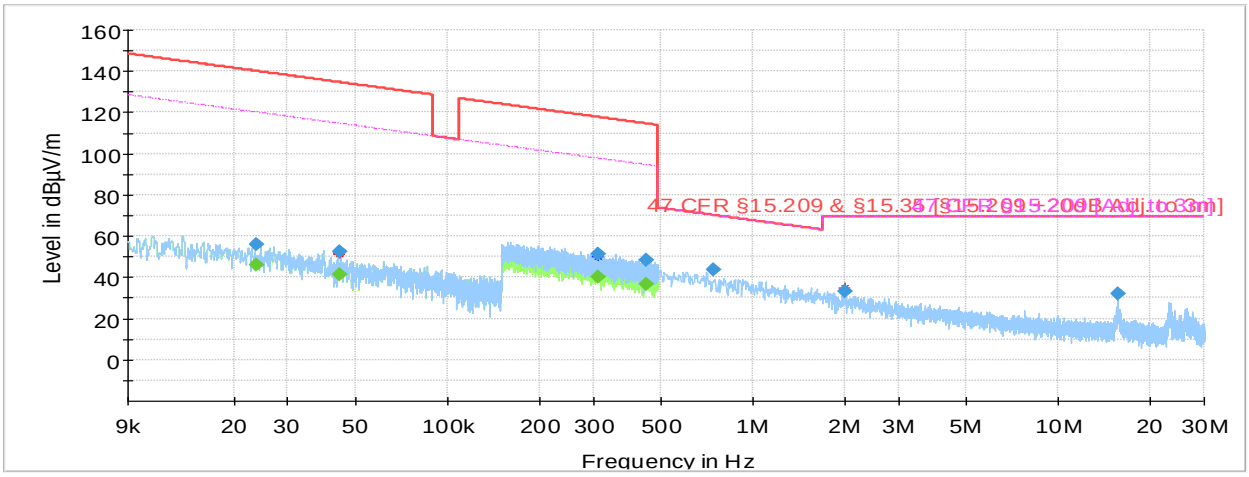
Test Parameter	Operation Mode	Frequency Range	Result
Radiated Emissions	- Shielded Twisted Pair Ethernet Cable - Power over Ethernet - Area Profile Channel 1	9 kHz – 30 MHz	Pass
Radiated Emissions	- Shielded Twisted Pair Ethernet Cable - Power over Ethernet - Area Profile Channel 1	30 MHz – 1 GHz	Pass
Radiated Emissions	- Shielded Twisted Pair Ethernet Cable - Power over Ethernet - Area Profile Channel 1	1 GHz – 18 GHz	Pass
Radiated Emissions	- Shielded Twisted Pair Ethernet Cable - Power over Ethernet - Area Profile Channel 1	18 GHz – 40 GHz	Pass
Radiated Emissions	- Shielded Twisted Pair Ethernet Cable - Power over Ethernet - Area Profile Channel 1	40 GHz – 60 GHz	Pass
Radiated Emissions	-Shielded Twisted Pair Ethernet Cable -Power over Ethernet -Area Profile Channel 1	60 GHz – 90 GHz	Pass
Radiated Emissions	- Shielded Twisted Pair Ethernet Cable - Power over Ethernet - Area Profile Channel 2	60 GHz – 90 GHz	Pass
Radiated Emissions	-Shielded Twisted Pair Ethernet Cable -Power over Ethernet -Area Profile Channel 1	90 GHz – 140 GHz	Pass
Radiated Emissions	-Shielded Twisted Pair Ethernet Cable -Power over Ethernet -Area Profile Channel 2	90 GHz – 140 GHz	Pass

Radiated Emissions	-Shielded Twisted Pair Ethernet Cable -Power over Ethernet -Area Profile Channel 1	140 GHz – 200 GHz	Pass
Radiated Emissions	-Shielded Twisted Pair Ethernet Cable -Power over Ethernet -Area Profile Channel 2	140 GHz – 200 GHz	Pass

4.4.2 Radiated Emissions (Intentional) – Test Details

9kHz – 30MHz (Parallel to Axis): Area Profile CH1

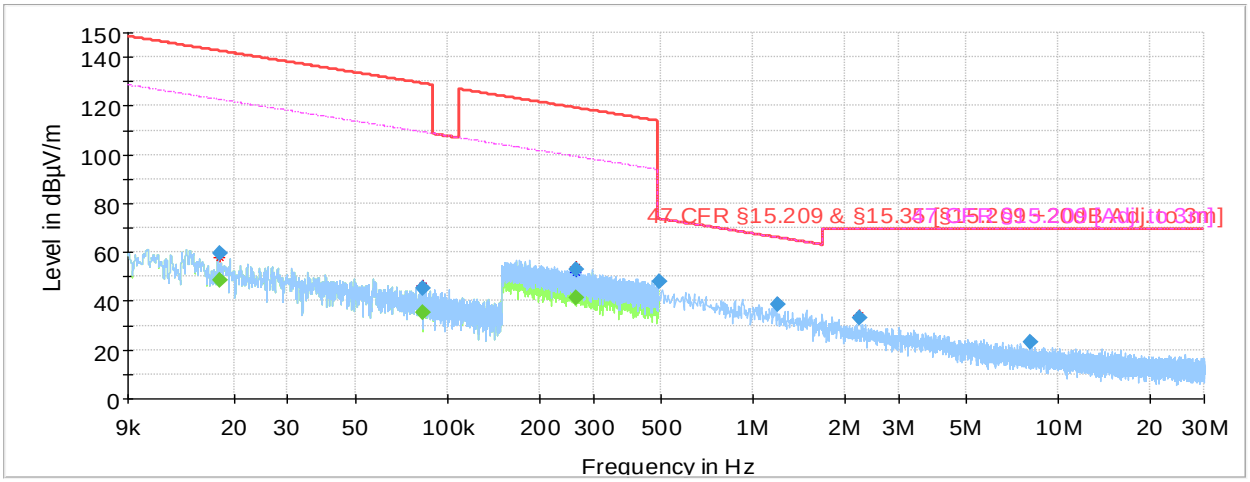
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Loop Antenna Parallel to Axis	
Sweep frequency	9 kHz-30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.05.14
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.023828	---	46.21	120.06	73.85	1000.0	0.200	100.0	H	24.0
0.023828	56.27	---	140.06	83.80	1000.0	0.200	100.0	H	24.0
0.044610	---	41.20	114.62	73.41	1000.0	0.200	100.0	H	45.0
0.044610	52.25	---	134.62	82.36	1000.0	0.200	100.0	H	45.0
0.312310	51.25	---	117.71	66.46	1000.0	9.000	100.0	H	244.0
0.312310	---	40.14	97.71	57.57	1000.0	9.000	100.0	H	244.0
0.447507	---	36.96	94.59	57.63	1000.0	9.000	100.0	H	45.0
0.447507	48.61	---	114.59	65.98	1000.0	9.000	100.0	H	45.0
0.746175	43.92	---	70.16	26.24	1000.0	9.000	100.0	H	89.0
2.002268	33.27	---	69.50	36.23	1000.0	9.000	100.0	H	37.0
15.617967	31.83	---	69.50	37.67	1000.0	9.000	100.0	H	45.0

9kHz – 30MHz (Perpendicular to Axis): Area Profile CH1

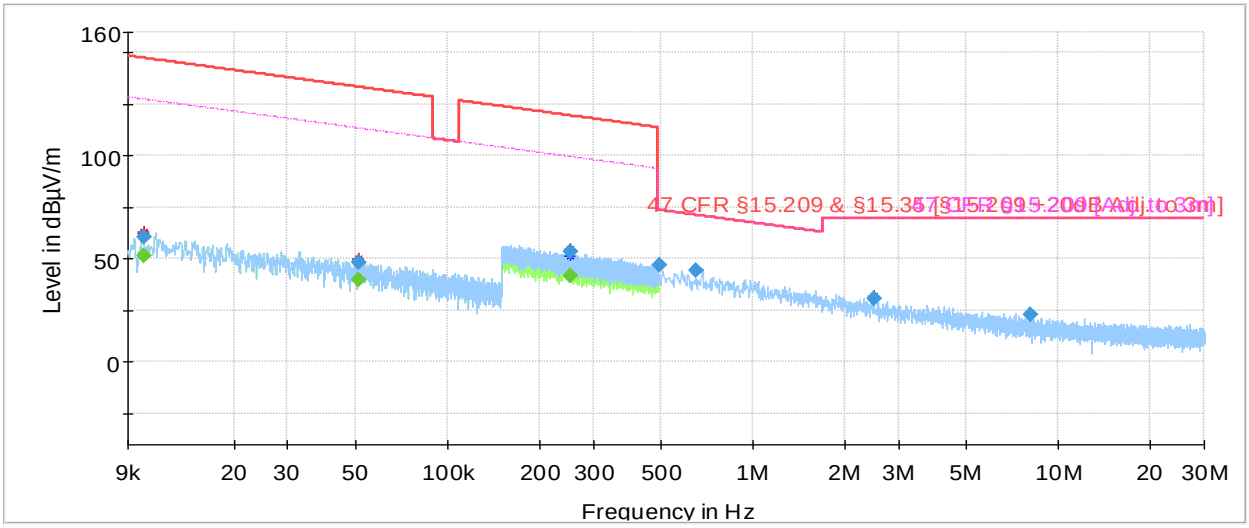
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Loop Antenna Perpendicular to Axis	
Sweep frequency	9 kHz-30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.05.14
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.018072	59.32	---	142.46	83.14	1000.0	0.200	100.0	H	45.0
0.018072	---	48.56	122.46	73.91	1000.0	0.200	100.0	H	45.0
0.082886	---	35.47	109.24	73.76	1000.0	0.200	100.0	H	217.0
0.082886	45.08	---	129.23	84.16	1000.0	0.200	100.0	H	217.0
0.264293	---	41.59	99.16	57.57	1000.0	9.000	100.0	H	225.0
0.264293	52.68	---	119.16	66.48	1000.0	9.000	100.0	H	225.0
0.497004	48.23	---	73.68	25.44	1000.0	9.000	100.0	H	225.0
1.208797	38.40	---	65.98	27.58	1000.0	9.000	100.0	H	229.0
2.245747	33.34	---	69.50	36.16	1000.0	9.000	100.0	H	45.0
8.097324	23.33	---	69.50	46.17	1000.0	9.000	100.0	H	101.0

9kHz – 30MHz (Parallel to Floor): Area Profile CH1

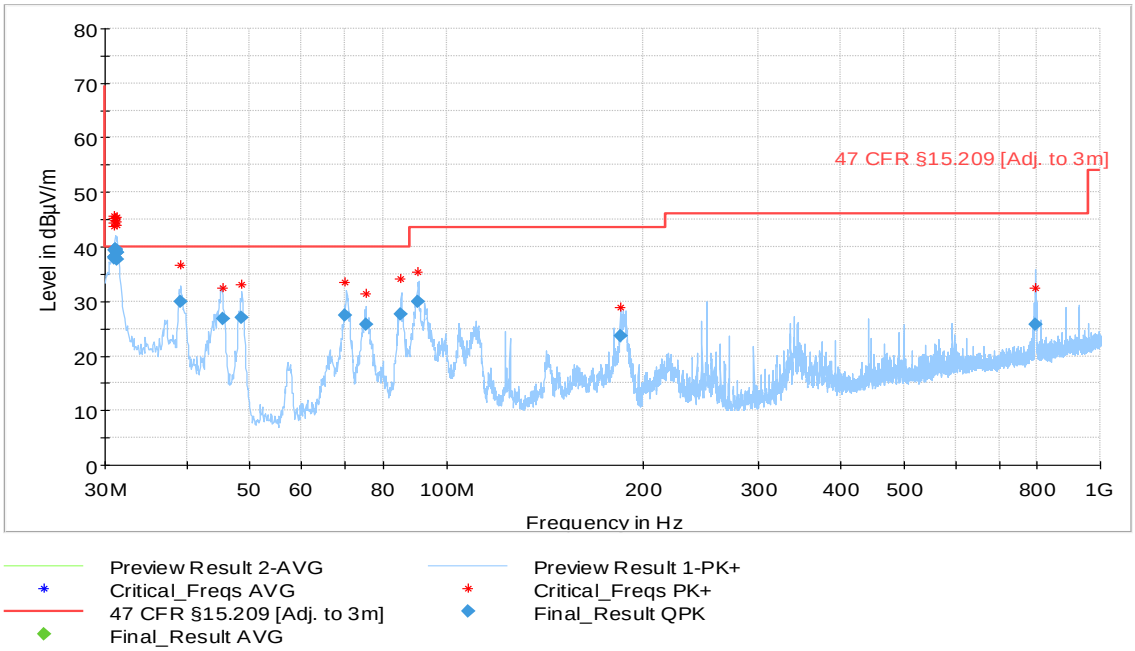
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Loop Antenna Parallel to Floor	
Sweep frequency	9 kHz-30 MHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.05.14
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
0.010178	---	51.85	127.45	75.60	1000.0	0.200	100.0	H	11.0
0.010178	60.51	---	147.45	86.94	1000.0	0.200	100.0	H	11.0
0.051134	---	39.63	113.43	73.80	1000.0	0.200	100.0	H	179.0
0.051134	48.28	---	133.43	85.15	1000.0	0.200	100.0	H	179.0
0.253756	---	42.04	99.52	57.48	1000.0	9.000	100.0	H	225.0
0.253756	53.35	---	119.52	66.16	1000.0	9.000	100.0	H	225.0
0.496214	47.01	---	73.69	26.68	1000.0	9.000	100.0	H	225.0
0.649711	44.47	---	71.36	26.89	1000.0	9.000	100.0	H	179.0
2.507264	31.09	---	69.50	38.41	1000.0	9.000	100.0	H	191.0
8.122838	22.99	---	69.50	46.51	1000.0	9.000	100.0	H	154.0

30MHz – 1GHz: Area Profile CH1

Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	30 MHz – 1 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2023.12.20
Chamber details	Chamber: SAC 5	

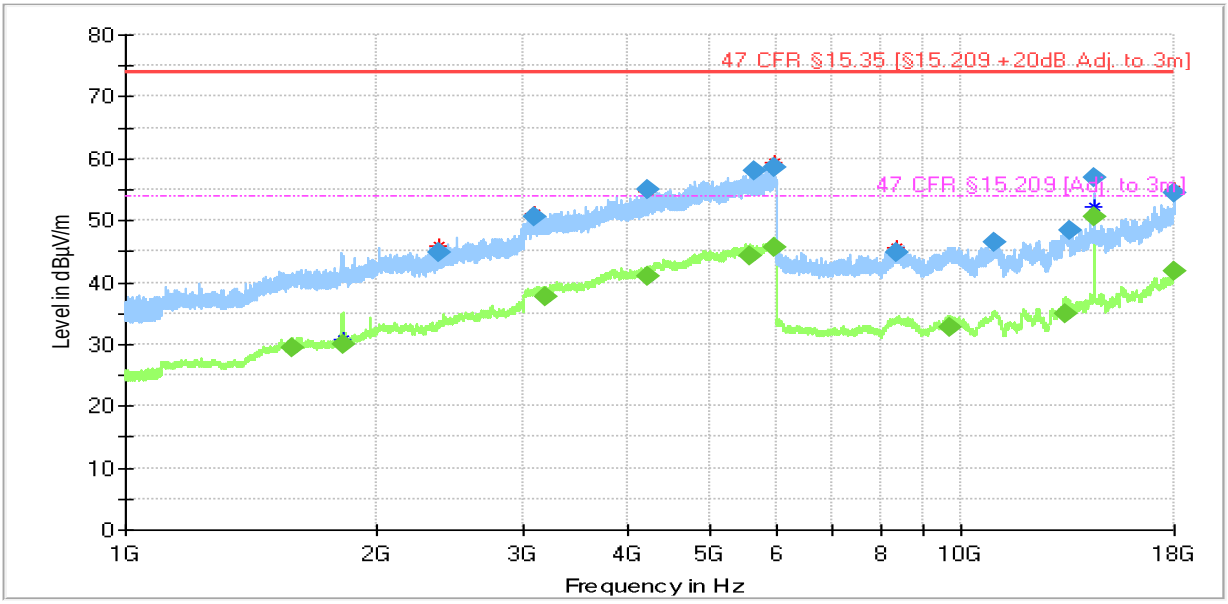


Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
30.9264 *	38.08	40	1.92	1000	120	100	V	312	-28.6
31.0058 *	38.08	40	1.92	1000	120	125	V	335	-28.6
31.007965 *	37.95	40	2.05	1000	120	105	V	296	-28.6
31.03652 *	39.27	40	0.73	1000	120	100	V	290	-28.7
31.1176 *	39.5	40	0.5	1000	120	100	V	334	-28.7
31.12488 *	39.41	40	0.59	1000	120	100	V	162	-28.7
31.16128 *	39.35	40	0.65	1000	120	100	V	334	-28.8
31.21844 *	39	40	1	1000	120	100	V	280	-28.8
31.25032 *	37.67	40	2.33	1000	120	125	V	109	-28.8
31.26324 *	39.03	40	0.97	1000	120	100	V	202	-28.8

Remark * : Marked emissions in above table are closer to margin than the calculated measurement uncertainty for the used measurement system. This emission peaks could be challenged please consider this. For these frequencies the measurement uncertainties is 3.38 dB (See section 6.3 in this rapport with a 95% confidence).

1GHz – 18GHz: Area profile CH1

Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	1 GHz – 18 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Per Isacsson	Date: 2023.12.28
Chamber details	Chamber: SAC 5	

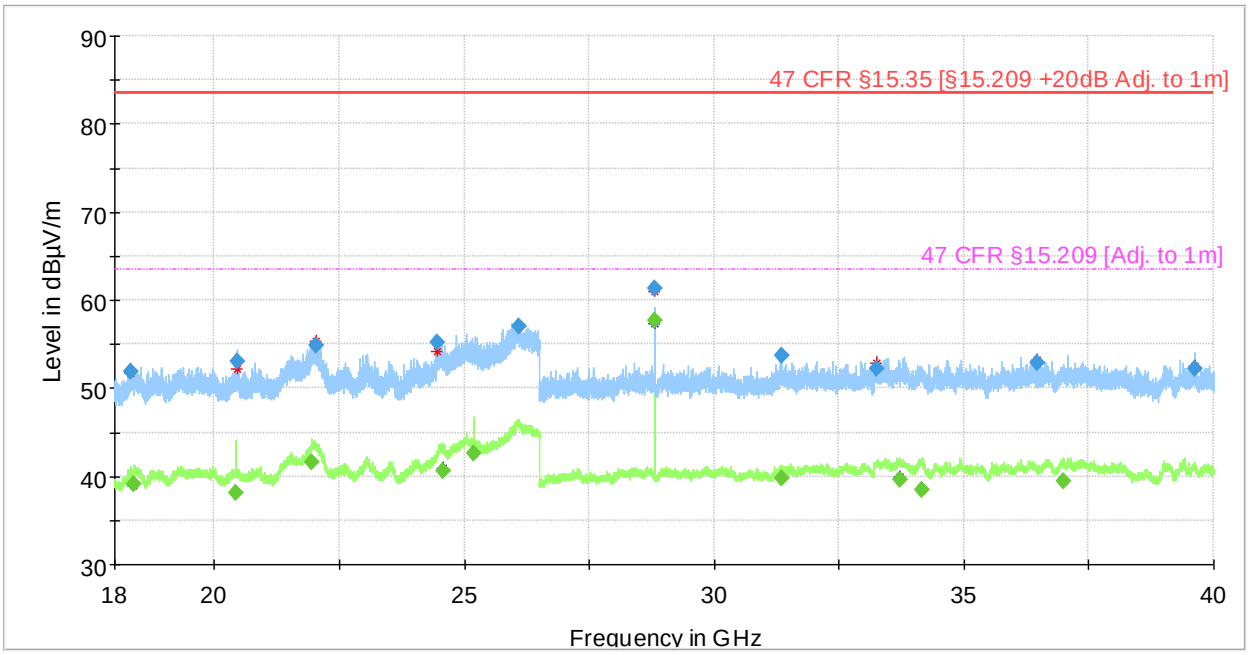


Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4214.102	---	40.95	53.98	13.03	1000	1000	104	V	112.0	-5.4
5588.369	---	44.3	53.98	9.68	1000	1000	100	H	26.0	-2.3
5970.929	58.62	---	73.98	15.35	1000	1000	219	H	222.0	-1.5
5976.208	---	45.75	53.98	8.23	1000	1000	104	V	235.0	-1.5
14400.158 *	---	50.55	53.98	3.43	1000	1000	156	V	310.0	13.2
17989.424	---	41.65	53.98	12.32	1000	1000	100	H	202.0	22.3

Remark * : Marked emissions in above table are closer to margin than the calculated measurement uncertainty for the used measurement system. This emission peaks could be challenged please consider this. For these frequencies the measurement uncertainties is 4.88 dB (See section 6.3 in this rapport with a 95% confidence).

18GHz – 40GHz: Area Profile CH1

Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Horizontal and Vertical	
Sweep frequency	18 GHz – 40 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Per Isacsson	Date: 2024.01.03
Chamber details	Chamber: SAC 5	

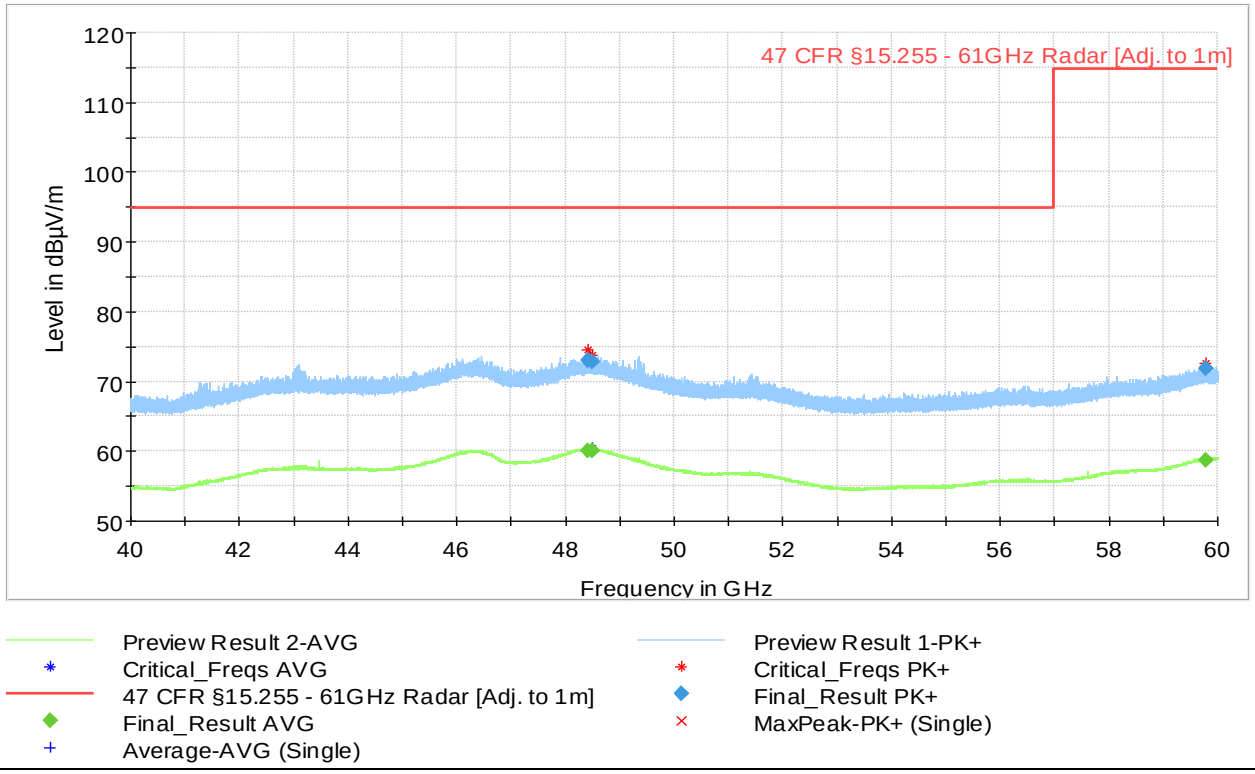


Preview Result 2-AVG
Critical_Freqs AVG
47 CFR §15.35 [§15.209 +20dB Adj. to 1m]
Final_Result PK+
MaxPeak-PK+ (Single)
Preview Result 1-PK+
Critical_Freqs PK+
47 CFR §15.209 [Adj. to 1m]
Final_Result AVG
Average-AVG (Single)

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
21954.778	---	41.62	63.52	21.9	1000	1000	155	H	232	0.2
24575.798	---	40.61	63.52	22.91	1000	1000	155	V	22	-1.7
25200.14	---	42.63	63.52	20.9	1000	1000	155	V	308	-1.1
28800.226	61.27	---	83.52	22.25	1000	1000	155	V	266	-5.4
28800.263	---	57.65	63.52	5.87	1000	1000	155	V	266	-5.4
31343.49	---	39.8	63.52	23.72	1000	1000	155	H	202	-4.3

40GHz – 60GHz (Horizontal): Area Profile CH1

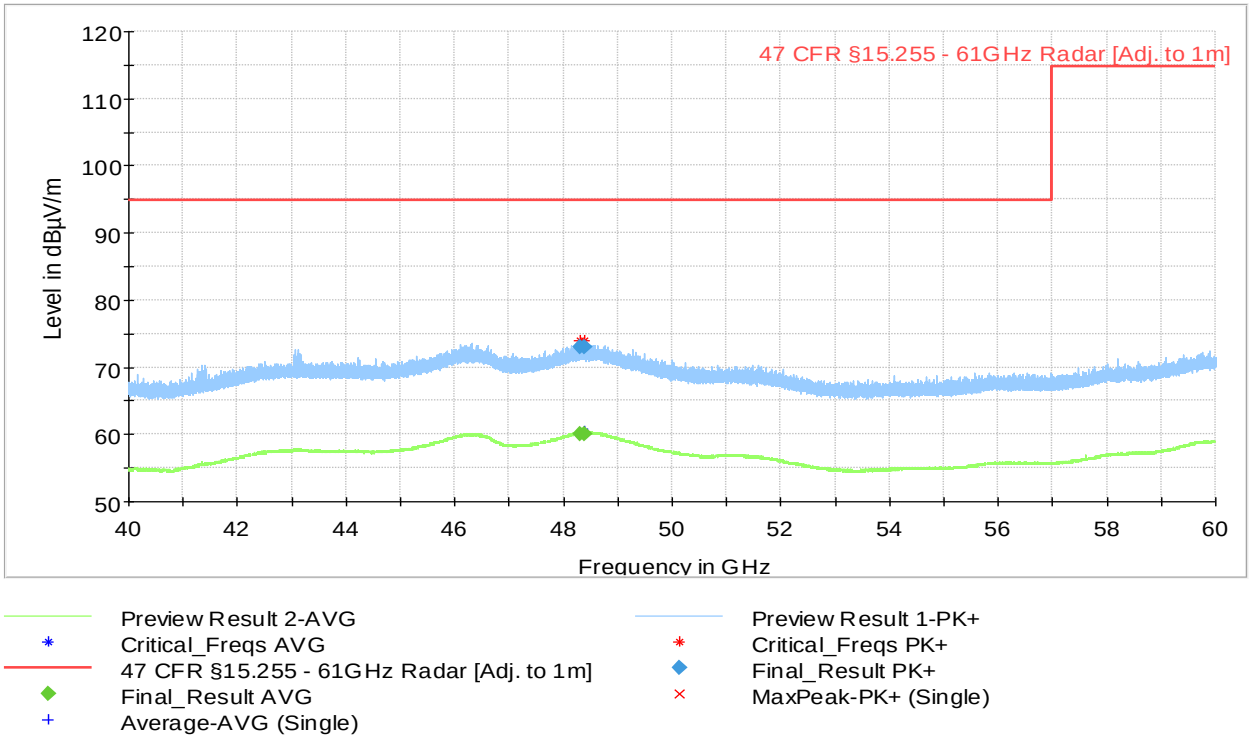
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Horn Antenna Horizontal	
Sweep frequency	40 GHz-60 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.04.29
Chamber details	Chamber: SAC 5	



Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
48424.815910	60.13	94.89	34.76	1000.0	1000.000	152.0	H	337.0
48424.815910	---	94.89	21.82	1000.0	1000.000	152.0	H	337.0
48483.115000	60.13	94.89	34.75	1000.0	1000.000	152.0	H	124.0
48483.115000	---	94.89	22.02	1000.0	1000.000	152.0	H	124.0
59778.068182	58.73	114.77	56.04	1000.0	1000.000	152.0	H	292.0
59778.068182	---	114.77	42.87	1000.0	1000.000	152.0	H	292.0

40GHz – 60GHz (Vertical): Area Profile CH1

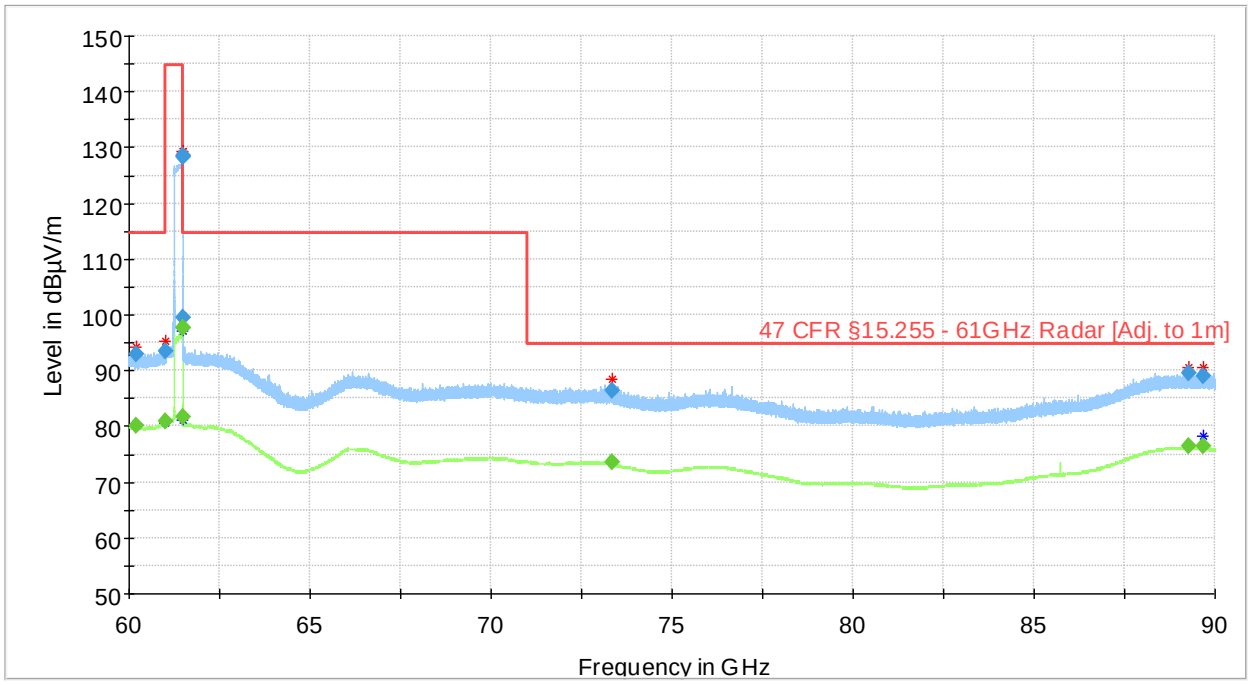
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Horn Antenna Vertical	
Sweep frequency	40 GHz-60 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.04.29
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
48297.226818	---	94.89	21.88	1000.0	1000.000	152.0	V	280.0
48297.226818	60.01	94.89	34.87	1000.0	1000.000	152.0	V	280.0
48391.839546	---	94.89	21.90	1000.0	1000.000	152.0	V	91.0
48391.839546	60.10	94.89	34.79	1000.0	1000.000	152.0	V	91.0

60GHz – 90GHz (Horizontal): Area Profile CH1

Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Horizontal	
Sweep frequency	60 GHz – 90 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Per Isacsson	Date: 2024.01.16
Chamber details	Chamber: SAC 5	



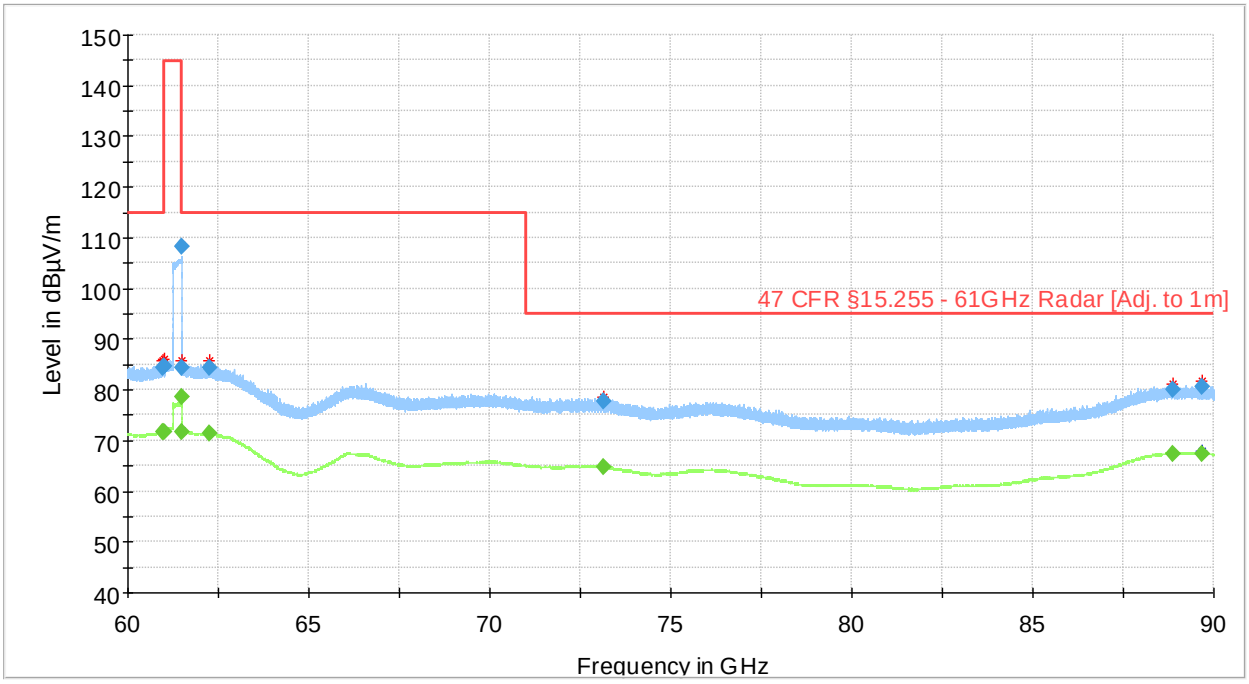
Preview Result 2-AVG
47 CFR §15.255 - 61GHz Radar [Adj. to 1m]
PK+
Final_Result PK+
Preview Result 1-PK+
47 CFR §15.255 - 61GHz Radar [Adj. to 1m]
AVG
Final_Result AVG

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
61476	---	144.77	16.54	1000	1000	152	H	314
61476.1	---	144.77	16.24	1000	1000	152	H	315
61500	---	114.77	15.26	1000	1000	152	H	319
73339.0909	---	94.89	8.4	1000	1000	152	H	59
89259.5455 *	---	94.89	5.25	1000	1000	152	H	47
89693.1818	---	94.89	5.85	1000	1000	152	H	26

Remark * : Emission at frequencies marked in above table are closer to margin than the calculated measurement uncertainty for the used measurement system. This emission peaks could be challenged please consider this. For these frequencies the measurement uncertainty is 5.43 dB (See section 6.3 in this rapport with a 95% confidence).

60GHz – 90GHz (Vertical): Area Profile CH1

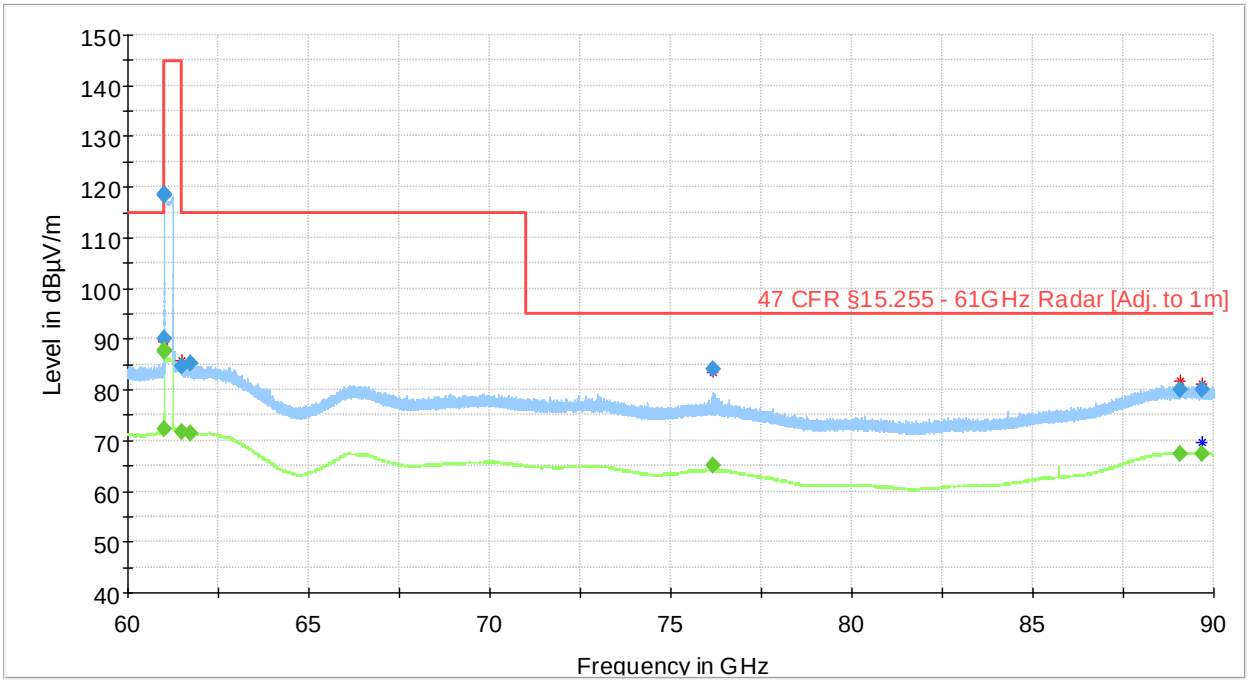
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Vertical	
Sweep frequency	60 GHz – 90 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Per Isacsson	Date: 2024.01.16
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
73139.5455	---	94.89	17.19	1000	1000	152	V	85
73139.5455	64.73	94.89	30.16	1000	1000	152	V	85
88852.2727	---	94.89	14.73	1000	1000	152	V	59
88852.2727	67.35	94.89	27.54	1000	1000	152	V	59
89693.6364	---	94.89	14.26	1000	1000	152	V	38
89693.6364	67.26	94.89	27.62	1000	1000	152	V	38

60GHz – 90GHz (Horizontal): Area Profile CH2

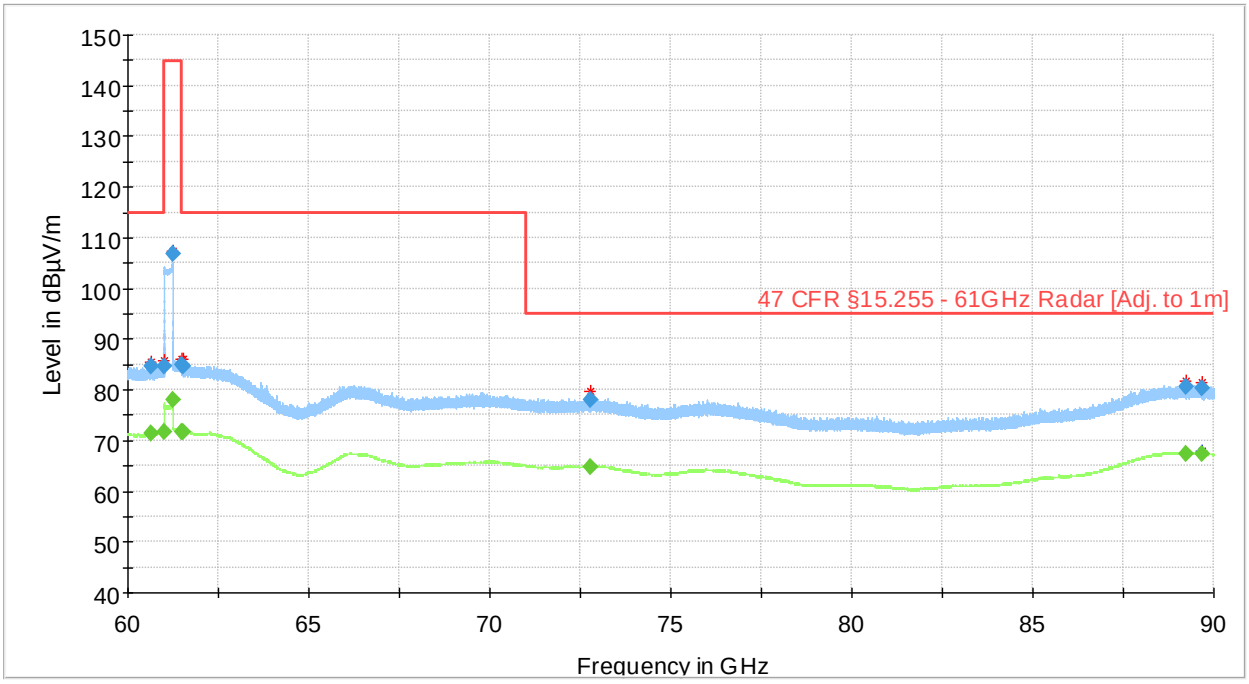
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 2	
Antenna orientation	Horizontal	
Sweep frequency	60 GHz – 90 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Per Isacsson	Date: 2024.01.17
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
61000	---	114.77	24.73	1000	1000	152	V	312
61023.1	---	144.77	26.48	1000	1000	152	V	314
61023.3	---	144.77	26.07	1000	1000	152	V	315
76188.6364	---	94.89	10.68	1000	1000	152	V	316
89086.3636	---	94.89	14.83	1000	1000	152	V	277
89693.1818	---	94.89	14.89	1000	1000	152	V	304

60GHz – 90GHz (Vertical): Area Profile CH2

Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 2	
Antenna orientation	Vertical	
Sweep frequency	60 GHz – 90 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Per Isacsson	Date: 2024.01.17
Chamber details	Chamber: SAC 5	

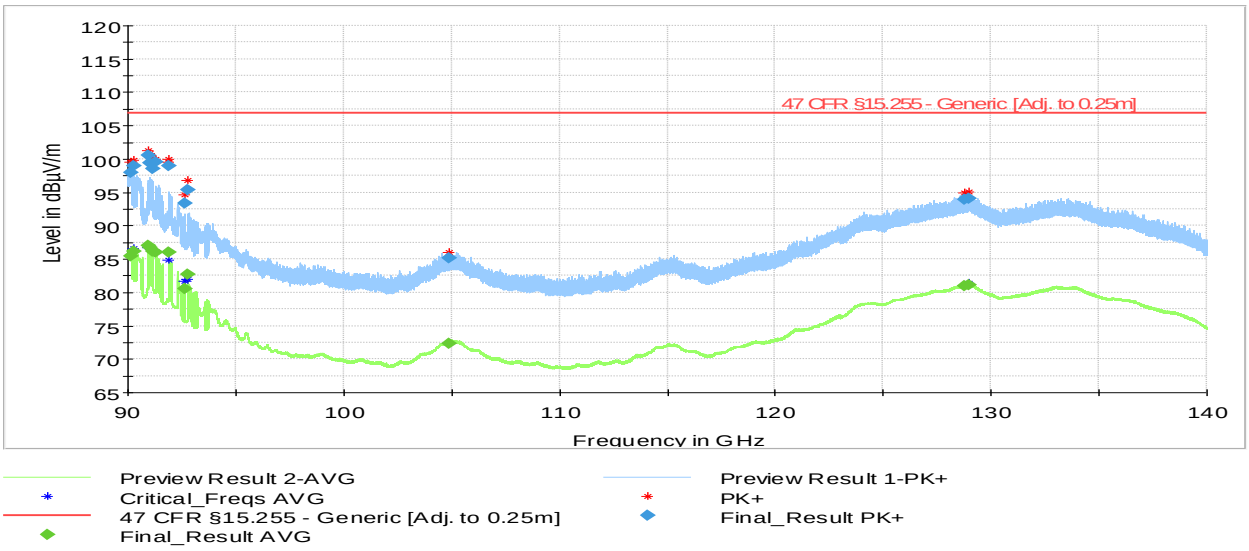


Preview Result 2-AVG
Critical_Freqs AVG
47 CFR §15.255 - 61GHz Radar [Adj. to 1m]
Final_Result AVG
Preview Result 1-PK+
Critical_Freqs PK+
Final_Result PK+

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
61500	---	114.77	29.8	1000	1000	152	V	156
72777.7273	---	94.89	16.76	1000	1000	152	V	102
89220.9091	---	94.89	14.33	1000	1000	152	V	304
89220.9091	67.31	94.89	27.57	1000	1000	152	V	304
89693.1818	---	94.89	14.63	1000	1000	152	V	20
89693.1818	67.27	94.89	27.62	1000	1000	152	V	20

90GHz – 140GHz (Horizontal): Area CH1

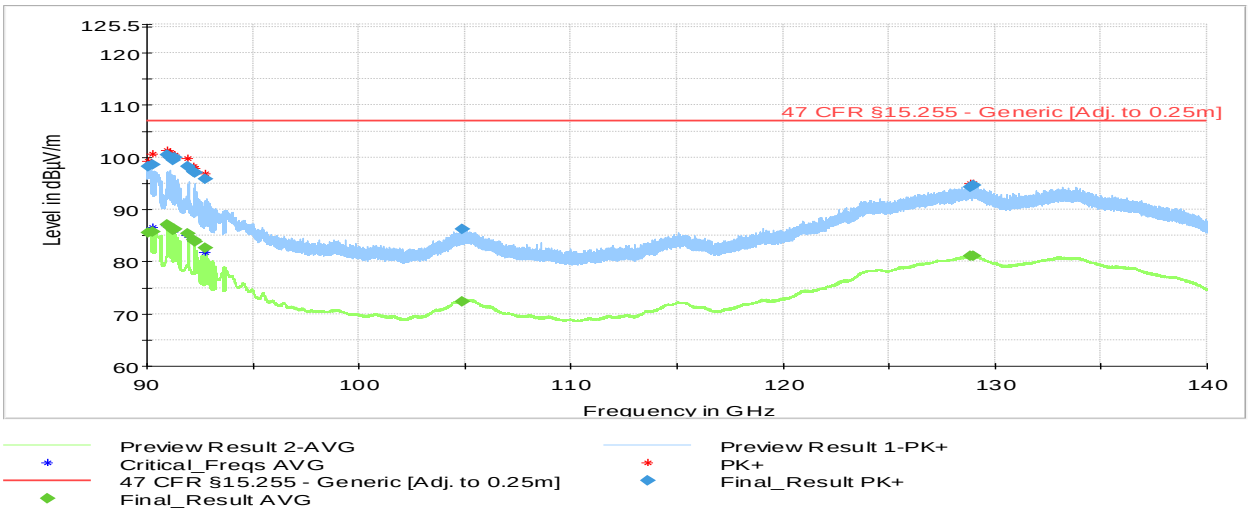
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Horizontal	
Sweep frequency	90 GHz – 140 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.04.30
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
90151.818182	85.38	106.93	21.55	1000.0	1000.000	152.0	H	346.0
90151.818182	---	106.93	8.89	1000.0	1000.000	152.0	H	346.0
90292.272727	---	106.93	7.94	1000.0	1000.000	152.0	H	289.0
90292.272727	86.13	106.93	20.80	1000.0	1000.000	152.0	H	289.0
90958.636364	---	106.93	6.39	1000.0	1000.000	152.0	H	40.0
90958.636364	87.07	106.93	19.86	1000.0	1000.000	152.0	H	40.0
91036.363636	86.71	106.93	20.21	1000.0	1000.000	152.0	H	91.0
91036.363636	---	106.93	7.47	1000.0	1000.000	152.0	H	91.0
91173.181818	86.13	106.93	20.80	1000.0	1000.000	152.0	H	164.0
91173.181818	---	106.93	8.43	1000.0	1000.000	152.0	H	164.0
91292.727273	86.06	106.93	20.87	1000.0	1000.000	152.0	H	94.0
91292.727273	---	106.93	7.33	1000.0	1000.000	152.0	H	94.0
91886.818182	---	106.93	8.00	1000.0	1000.000	152.0	H	323.0
91886.818182	86.01	106.93	20.92	1000.0	1000.000	152.0	H	323.0
92614.545455	---	106.93	13.57	1000.0	1000.000	152.0	H	352.0
92614.545455	80.55	106.93	26.37	1000.0	1000.000	152.0	H	352.0
92776.363636	82.67	106.93	24.26	1000.0	1000.000	152.0	H	238.0
92776.363636	---	106.93	11.50	1000.0	1000.000	152.0	H	238.0
104878.181818	72.29	106.93	34.63	1000.0	1000.000	152.0	H	40.0
104878.181818	---	106.93	21.80	1000.0	1000.000	152.0	H	40.0
128740.437500	---	106.93	12.95	1000.0	1000.000	152.0	H	308.0
128740.437500	80.94	106.93	25.98	1000.0	1000.000	152.0	H	308.0
128962.687500	81.17	106.93	25.76	1000.0	1000.000	152.0	H	305.0
128962.687500	---	106.93	12.81	1000.0	1000.000	152.0	H	305.0

90GHz – 140GHz (Vertical): Area CH1

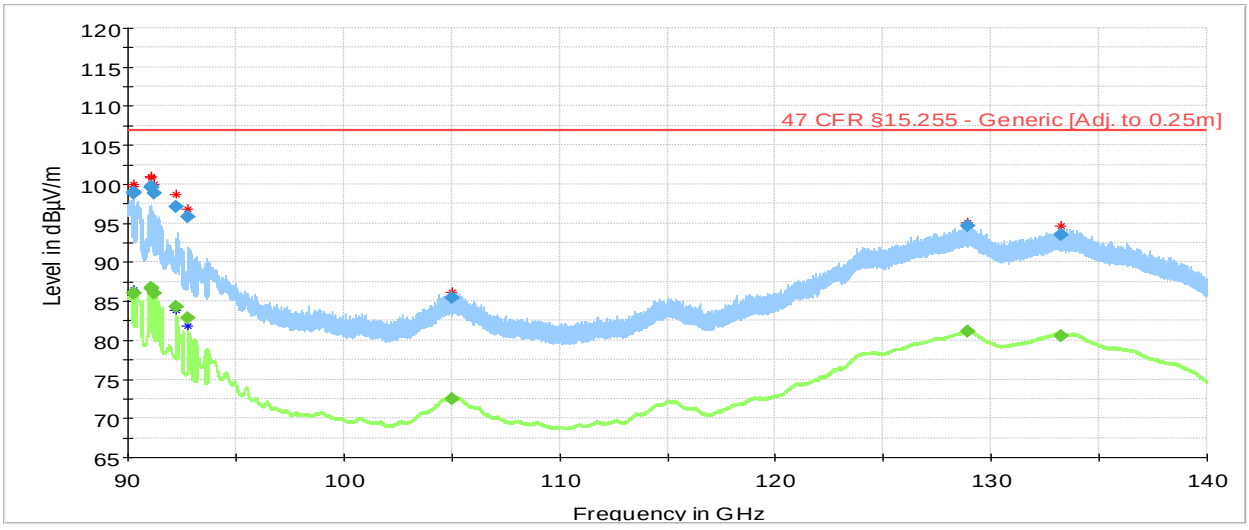
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Vertical	
Sweep frequency	90 GHz – 140 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.05.01
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
90055.909091	---	106.93	8.63	1000.0	1000.000	152.0	H	280.0
90055.909091	85.51	106.93	21.42	1000.0	1000.000	152.0	H	280.0
90263.181818	85.75	106.93	21.18	1000.0	1000.000	152.0	H	40.0
90263.181818	---	106.93	8.40	1000.0	1000.000	152.0	H	40.0
90953.181818	---	106.93	6.51	1000.0	1000.000	152.0	H	149.0
90953.181818	87.11	106.93	19.82	1000.0	1000.000	152.0	H	149.0
91100.000000	---	106.93	6.91	1000.0	1000.000	152.0	H	259.0
91100.000000	86.51	106.93	20.41	1000.0	1000.000	152.0	H	259.0
91208.636364	---	106.93	7.55	1000.0	1000.000	152.0	H	308.0
91208.636364	86.08	106.93	20.85	1000.0	1000.000	152.0	H	308.0
91289.545455	86.18	106.93	20.75	1000.0	1000.000	152.0	H	280.0
91289.545455	---	106.93	6.98	1000.0	1000.000	152.0	H	280.0
91909.545455	---	106.93	8.74	1000.0	1000.000	152.0	H	107.0
91909.545455	85.43	106.93	21.49	1000.0	1000.000	152.0	H	107.0
92225.454546	84.14	106.93	22.79	1000.0	1000.000	152.0	H	232.0
92225.454546	---	106.93	9.74	1000.0	1000.000	152.0	H	232.0
92261.818182	---	106.93	9.94	1000.0	1000.000	152.0	H	155.0
92261.818182	83.90	106.93	23.02	1000.0	1000.000	152.0	H	155.0
92770.000000	---	106.93	11.14	1000.0	1000.000	152.0	H	203.0
92770.000000	82.66	106.93	24.26	1000.0	1000.000	152.0	H	203.0
104889.545455	---	106.93	20.69	1000.0	1000.000	152.0	H	106.0
104889.545455	72.31	106.93	34.61	1000.0	1000.000	152.0	H	106.0
128812.187500	---	106.93	12.69	1000.0	1000.000	152.0	H	312.0
128812.187500	81.05	106.93	25.88	1000.0	1000.000	152.0	H	312.0
128985.875000	---	106.93	12.37	1000.0	1000.000	152.0	H	124.0
128985.875000	81.14	106.93	25.79	1000.0	1000.000	152.0	H	124.0

90GHz – 140GHz (Horizontal): Area CH2

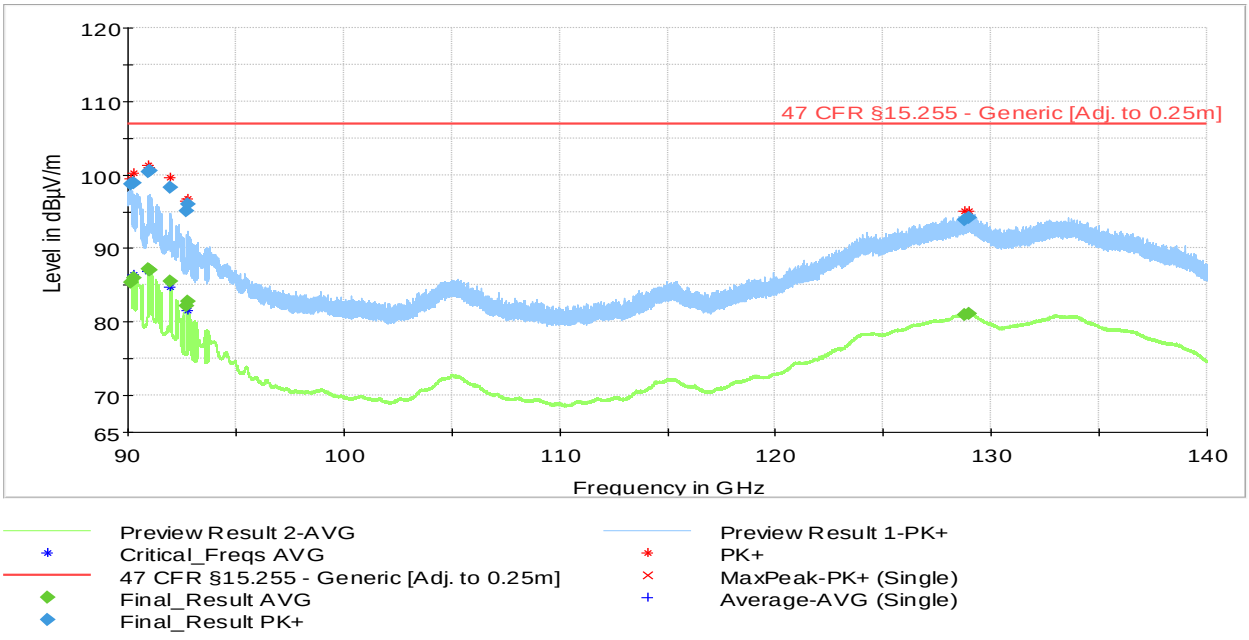
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 2	
Antenna orientation	Horizontal	
Sweep frequency	90 GHz – 140 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.04.30
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
90276.363636	86.02	106.93	20.91	1000.0	1000.000	152.0	H	353.0
90276.363636	---	106.93	8.15	1000.0	1000.000	152.0	H	353.0
90276.818182	85.98	106.93	20.95	1000.0	1000.000	152.0	H	204.0
90276.818182	---	106.93	7.97	1000.0	1000.000	152.0	H	204.0
91072.272727	86.74	106.93	20.19	1000.0	1000.000	152.0	H	0.0
91072.272727	---	106.93	7.29	1000.0	1000.000	152.0	H	0.0
91089.090909	86.66	106.93	20.27	1000.0	1000.000	152.0	H	52.0
91089.090909	---	106.93	7.41	1000.0	1000.000	152.0	H	52.0
91213.181818	---	106.93	8.10	1000.0	1000.000	152.0	H	274.0
91213.181818	86.07	106.93	20.86	1000.0	1000.000	152.0	H	274.0
92240.000000	84.28	106.93	22.65	1000.0	1000.000	152.0	H	243.0
92240.000000	---	106.93	9.84	1000.0	1000.000	152.0	H	243.0
92772.727273	---	106.93	11.18	1000.0	1000.000	152.0	H	174.0
92772.727273	82.83	106.93	24.10	1000.0	1000.000	152.0	H	174.0
105053.636364	---	106.93	21.49	1000.0	1000.000	152.0	H	296.0
105053.636364	72.47	106.93	34.45	1000.0	1000.000	152.0	H	296.0
128911.500000	81.11	106.93	25.81	1000.0	1000.000	152.0	H	320.0
128911.500000	---	106.93	12.29	1000.0	1000.000	152.0	H	320.0
133247.727273	80.58	106.93	26.35	1000.0	1000.000	152.0	H	49.0
133247.727273	---	106.93	13.36	1000.0	1000.000	152.0	H	49.0

90GHz – 140GHz (Vertical): Area CH2

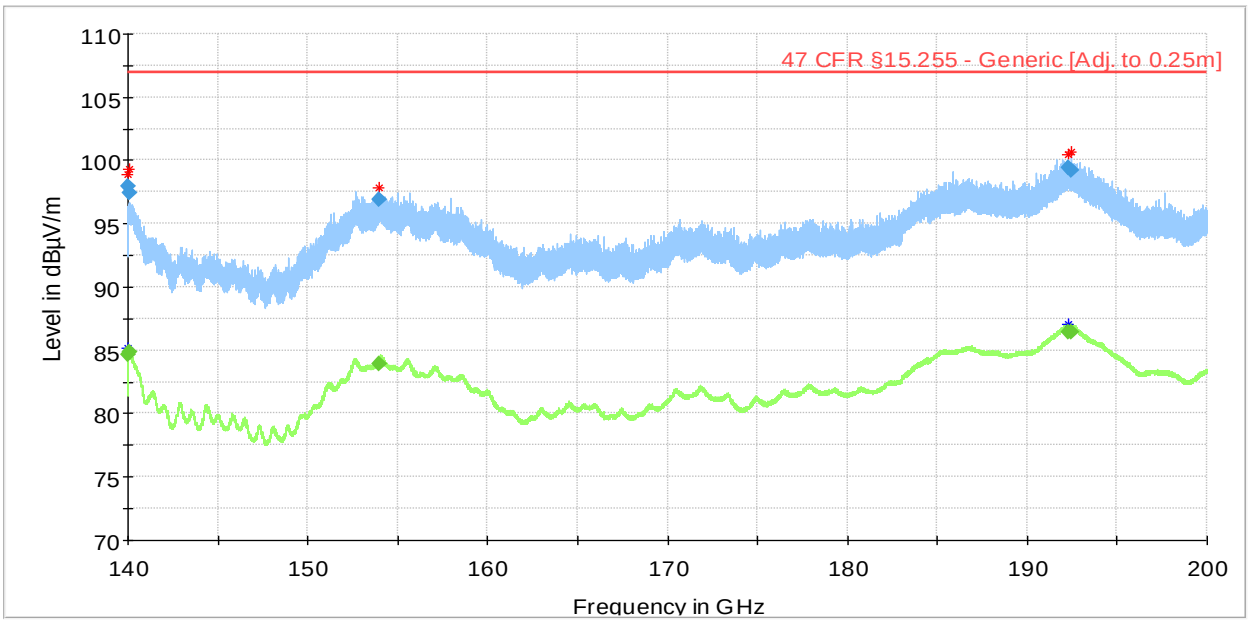
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 2	
Antenna orientation	Vertical	
Sweep frequency	90 GHz – 140 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.05.01
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
90134.090909	---	106.93	8.23	1000.0	1000.000	152.0	H	230.0
90134.090909	85.41	106.93	21.51	1000.0	1000.000	152.0	H	230.0
90281.363636	---	106.93	8.04	1000.0	1000.000	152.0	H	270.0
90281.363636	86.03	106.93	20.90	1000.0	1000.000	152.0	H	270.0
90935.454546	87.12	106.93	19.81	1000.0	1000.000	152.0	H	350.0
90935.454546	---	106.93	6.49	1000.0	1000.000	152.0	H	350.0
91002.727273	87.03	106.93	19.90	1000.0	1000.000	152.0	H	116.0
91002.727273	---	106.93	6.32	1000.0	1000.000	152.0	H	116.0
91930.909091	85.44	106.93	21.48	1000.0	1000.000	152.0	H	208.0
91930.909091	---	106.93	8.65	1000.0	1000.000	152.0	H	208.0
92694.090909	82.21	106.93	24.72	1000.0	1000.000	152.0	H	89.0
92694.090909	---	106.93	11.85	1000.0	1000.000	152.0	H	89.0
92776.818182	82.72	106.93	24.20	1000.0	1000.000	152.0	H	341.0
92776.818182	---	106.93	10.94	1000.0	1000.000	152.0	H	341.0
128770.625000	80.98	106.93	25.95	1000.0	1000.000	152.0	H	57.0
128770.625000	---	106.93	13.04	1000.0	1000.000	152.0	H	57.0
128952.625000	81.15	106.93	25.77	1000.0	1000.000	152.0	H	320.0
128952.625000	---	106.93	12.72	1000.0	1000.000	152.0	H	320.0

140 GHz – 200GHz (Horizontal): Area CH1

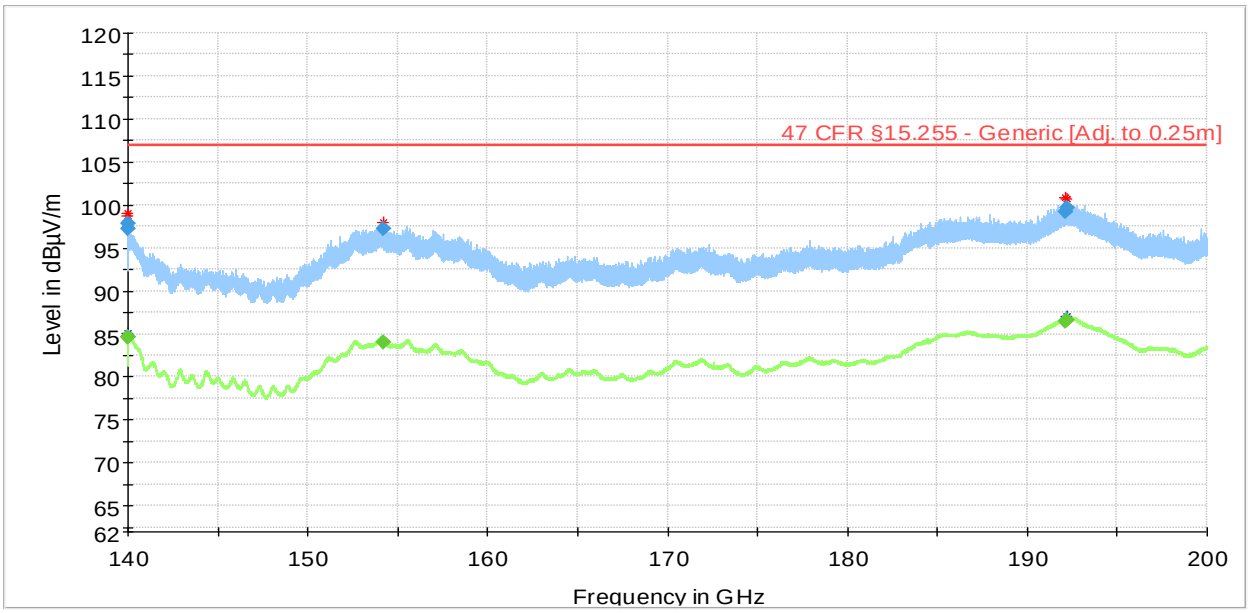
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Horizontal	
Sweep frequency	140 GHz – 200 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.05.03
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
140017.272727	84.70	106.93	22.22	1000.0	1000.000	152.0	H	202.0
140017.272727	---	106.93	8.97	1000.0	1000.000	152.0	H	202.0
140057.272727	---	106.93	9.48	1000.0	1000.000	152.0	H	313.0
140057.272727	84.82	106.93	22.11	1000.0	1000.000	152.0	H	313.0
153964.545455	83.95	106.93	22.98	1000.0	1000.000	152.0	H	292.0
153964.545455	---	106.93	10.06	1000.0	1000.000	152.0	H	292.0
192317.727273	86.46	106.93	20.47	1000.0	1000.000	152.0	H	178.0
192317.727273	---	106.93	7.49	1000.0	1000.000	152.0	H	178.0
192415.000000	---	106.93	7.73	1000.0	1000.000	152.0	H	21.0
192415.000000	86.47	106.93	20.46	1000.0	1000.000	152.0	H	21.0

140 GHz – 200GHz (Vertical): Area CH1

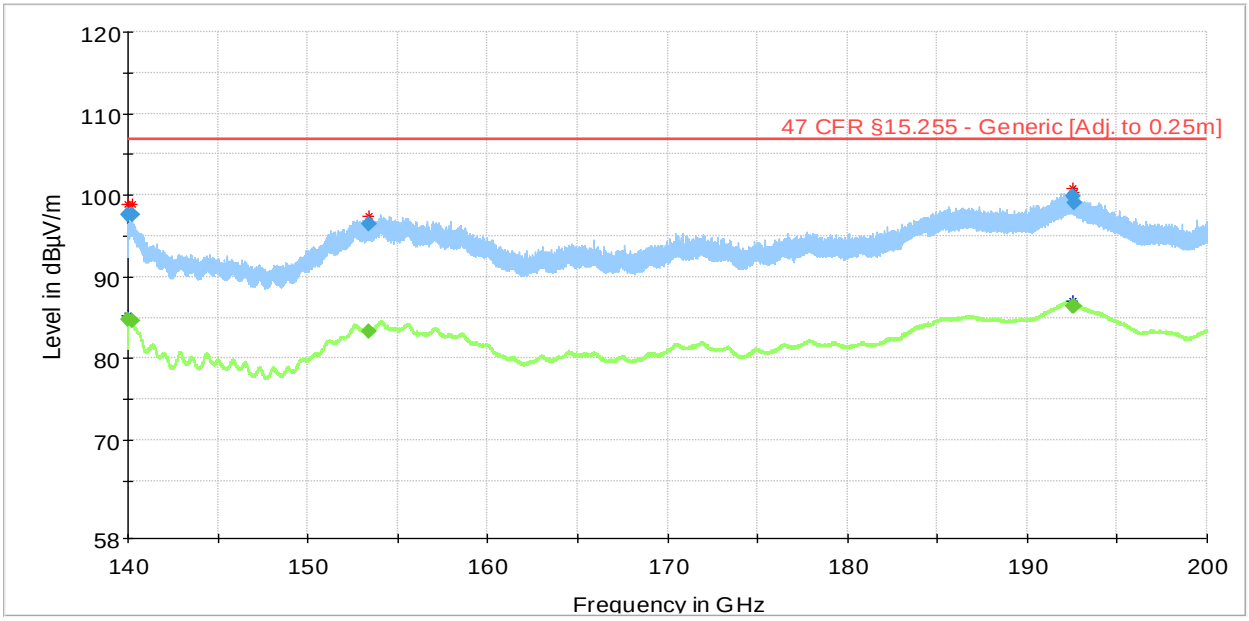
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 1	
Antenna orientation	Vertical	
Sweep frequency	140 GHz – 200 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.05.04
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
140010.454546	84.66	106.93	22.26	1000.0	1000.000	152.0	H	27.0
140010.454546	---	106.93	9.75	1000.0	1000.000	152.0	H	27.0
140016.818182	84.66	106.93	22.27	1000.0	1000.000	152.0	H	135.0
140016.818182	---	106.93	9.11	1000.0	1000.000	152.0	H	135.0
154242.727273	---	106.93	9.72	1000.0	1000.000	152.0	H	24.0
154242.727273	83.94	106.93	22.98	1000.0	1000.000	152.0	H	24.0
192150.909091	86.47	106.93	20.46	1000.0	1000.000	152.0	H	191.0
192150.909091	---	106.93	7.78	1000.0	1000.000	152.0	H	191.0
192224.545455	---	106.93	7.24	1000.0	1000.000	152.0	H	142.0
192224.545455	86.54	106.93	20.39	1000.0	1000.000	152.0	H	142.0

140 GHz – 200GHz (Horizontal): Area CH2

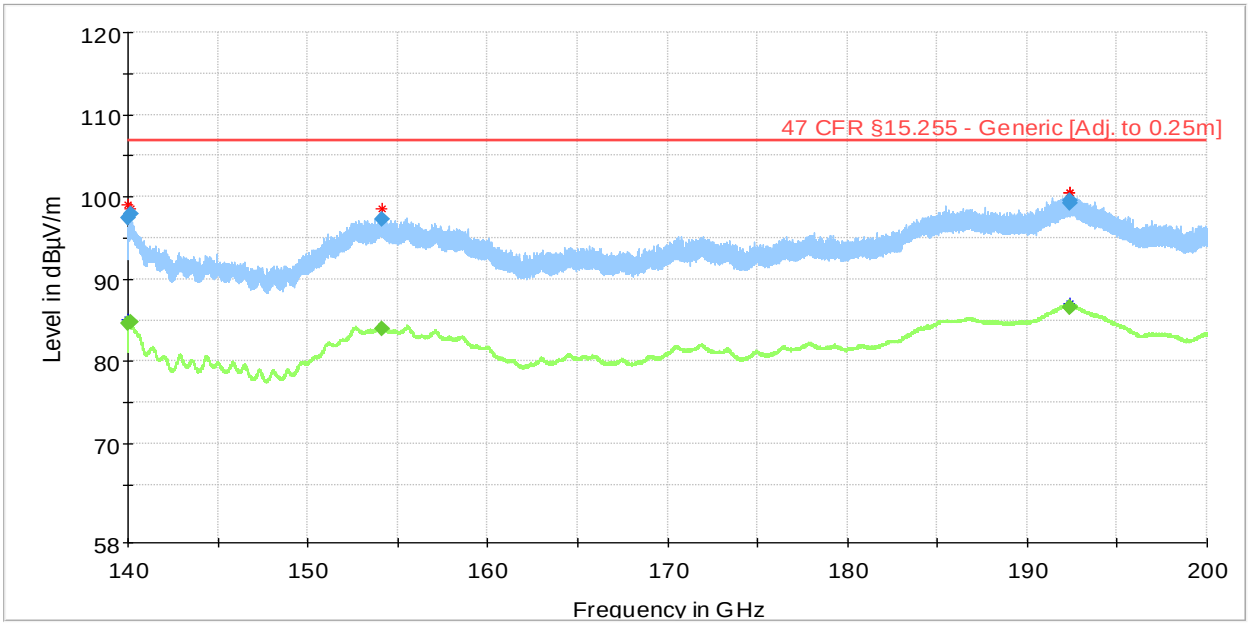
Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 2	
Antenna orientation	Horizontal	
Sweep frequency	140 GHz – 200 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.05.04
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
140033.636364	84.71	106.93	22.21	1000.0	1000.000	152.0	H	238.0
140033.636364	---	106.93	9.24	1000.0	1000.000	152.0	H	238.0
140222.727273	84.55	106.93	22.38	1000.0	1000.000	152.0	H	36.0
140222.727273	---	106.93	9.31	1000.0	1000.000	152.0	H	36.0
153393.181818	---	106.93	10.48	1000.0	1000.000	152.0	H	312.0
153393.181818	83.29	106.93	23.63	1000.0	1000.000	152.0	H	312.0
192559.090909	86.48	106.93	20.45	1000.0	1000.000	152.0	H	327.0
192559.090909	---	106.93	6.97	1000.0	1000.000	152.0	H	327.0
192647.272727	---	106.93	7.83	1000.0	1000.000	152.0	H	57.0
192647.272727	86.48	106.93	20.44	1000.0	1000.000	152.0	H	57.0

140 GHz – 200GHz (Vertical): Area CH2

Test mode condition	Shielded Twisted Pair Ethernet Cable Power Over Ethernet Area Profile Channel 2	
Antenna orientation	Vertical	
Sweep frequency	140 GHz – 200 GHz	
Standard	47 CFR FCC Part 15 subpart C	
EUT	A003653502-001	
Ancillary Equipment	A003624354-002 PoE injector	
Test Engineer	Fariborz Abasi	Date: 2024.05.04
Chamber details	Chamber: SAC 5	



Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
140011.363636	84.65	106.93	22.28	1000.0	1000.000	152.0	H	306.0
140011.363636	---	106.93	9.55	1000.0	1000.000	152.0	H	306.0
140158.181818	---	106.93	8.99	1000.0	1000.000	152.0	H	346.0
140158.181818	84.73	106.93	22.20	1000.0	1000.000	152.0	H	346.0
154094.090909	83.99	106.93	22.93	1000.0	1000.000	152.0	H	56.0
154094.090909	---	106.93	9.62	1000.0	1000.000	152.0	H	56.0
192357.272727	---	106.93	7.63	1000.0	1000.000	152.0	H	245.0
192357.272727	86.56	106.93	20.37	1000.0	1000.000	152.0	H	245.0
192368.636364	86.51	106.93	20.42	1000.0	1000.000	152.0	H	41.0
192368.636364	---	106.93	7.43	1000.0	1000.000	152.0	H	41.0

4.5 Test Results – Frequency Tolerance

4.5.1 Frequency Tolerance – Test Summary

Test Specification	FCC 47 CFR 15.255 (f) (Part 15 Subpart C)	
Test Engineer & Date	Håkan Ahlberg/Per Isacsson	2024-05-16, 2024-05-17, 2024-05-20
EUT and Ancillary Equipment IDs	A003653502-001	A003624354-002 PoE injector
EUT Operation Mode(s)	Default (PoE)	
EUT Wireless Configuration(s)	“Area CH1”, “Area CH2”: see below	
EUT Hardware Configuration(s)	-	
Overall Result	PASS	

Test Parameter	**Wireless Configuration**	**Measured Frequency (MHz)**				**Result**
		F_{low} GHz	**Limit (GHz)**	**F_{high} GHz**	**Limit (GHz)**	
Frequency @ 115V -40°C	Area CH1 Area CH2	61.250277 61.022288	>61.0	61.477792 61.251272	<61.5	PASS
Frequency @ 115V -30°C	Area CH1 Area CH2	61.249901 61.021722	>61.0	61.479192 61.252464	<61.5	PASS
Frequency @ 115V -20C	Area CH1 Area CH2	61.250080 61.021846	>61.0	61.479133 61.252342	<61.5	PASS
Frequency @ 115V -10°C	Area CH1 Area CH2	61.249859 61.021693	>61.0	61.478981 61.252249	<61.5	PASS
Frequency @ 115V 0°C	Area CH1 Area CH2	61.249732 61.021643	>61.0	61.478818 61.25115	<61.5	PASS
Frequency @ 115V 10°C	Area CH1 Area CH2	61.249638 61.021077	>61.0	61.478814 61.252055	<61.5	PASS
Frequency @ 115V 20°C	Area CH1 Area CH2	61.249499 61.021255	>61.0	61.478511 61.251553	<61.5	PASS
Frequency @ 98V 25°C	Area CH1 Area CH2	61.249202 61.020975	>61.0	61.47851 61.251581	<61.5	PASS
Frequency @ 115V 25°C	Area CH1 Area CH2	61.249230 61.021003	>61.0	61.478531 61.251609	<61.5	PASS
Frequency @ 132V 25°C	Area CH1 Area CH2	61.249179 61.020967	>61.0	61.478504 61.251588	<61.5	PASS
Frequency @ 115V 30°C	Area CH1 Area CH2	61.249144 61.020848	>61.0	61.478692 61.251391	<61.5	PASS
Frequency @ 115V 40C	Area CH1 Area CH2	61.248797 61.020756	>61.0	61.478195 61.251320	<61.5	PASS
Frequency @ 115V 50°C	Area CH1 Area CH2	61.248645 61.020593	>61.0	61.478214 61.251140	<61.5	PASS
Frequency @ 115V 60°C	Area CH1 Area CH2	61.248581 61.020568	>61.0	61.477848 61.251121	<61.5	PASS

4.5.2 Frequency Tolerance – Test Details (Example Plot: “Area CH1” @115V / -40°C)

01:17:09 PM 05/16/2024

5. TEST EQUIPMENT STATUS

5.1 List of Hardware with Calibration Dates

5.1.1 Hardware List – SAC5 System

Type	Manufacturer	Model	Serial Number / ID	Calibration Date	Calibration Due
EMI Test Receiver	Rohde & Schwarz	ESW44	101760 2881044	2023.08.04	2024.08.04
Ultra Broadband Antenna	Rohde & Schwarz	HL562E	100988 2823181	2023.07.18	2025.07.18
Double Ridged Waveguide Horn Antenna	Rohde & Schwarz	HF907	102678 2823164	2023.07.27	2025.07.27
Control Device	Maturo	NCD	NCD/393/2372.01 2884216	N/A	N/A
Open Switch & Control Unit	Rohde & Schwarz	OSP150	100081 2884198	2023.08.29	2024.08.29
Open Switch & Control Unit	Rohde & Schwarz	OSP120	100084 2761253	2023.08.29	2024.08.29
Shielded Filter Unit	Rohde & Schwarz	OSP-F Extension 1	101333 2761265	2023.08.29	2024.08.29
Shielded Filter Unit	Rohde & Schwarz	OSP-F Extension 2	101335 2761266	2023.08.29	2024.08.29
Shielded Filter Unit	Rohde & Schwarz	OSP-F Base Unit	101330 2761262	2023.08.29	2024.08.29
Humidity Temperature Probe	Lufft	OPUS 20	146.0216.0802.030 2703980	2022.07.27	2024.07.27
Horn Antenna 40GHz	ETS Lindgren	UG-600A/U	20623 2814834	2022.07.26	2024.07.26
Horn Antenna	ETS Lindgren	UG-596A/U	20898 2814839	2022.07.26	2024.07.26

5.1.2 Hardware List – Conducted Emissions System

Type	Manufacturer	Model	Serial Number / ID	Calibration Date	Calibration Due
Two-Line V-network	Rohde & Schwarz	ENV216	101090 2704076	2023.07.03	2024.07.03
Test Receiver 9KHz to 3.5 GHz	Rohde & Schwarz	ESR3	101674 2704016	2023.06.29	2024.06.29
Humidity Temperature Probe	Lufft	OPUS 20	146.0216.0802.030 2703980	2022.07.27	2024.07.27
Multimeter	FLUKE	325	40860701WS 2877011	2023.06.08	2024.06.08

5.2 Software / Firmware Versions

Equipment	Software / Firmware Name	Version
Conducted Emissions System	EMC 32	V10.60.20
SAC 5	EMC 32	V10.60.20

6. MEASUREMENT UNCERTAINTY

6.1 Measurement Uncertainty for Conducted Emissions

Parameter	Uncertainty (Coverage Factor k=2)
Conducted emissions with LISN 150KHz to 30 MHz	2.98 dB

6.2 Measurement Uncertainty for SAC 5 (Radiated Emissions)

Parameter	Uncertainty (Coverage Factor k=2)
Field Strength 10 Hz -9 kHz	3.38 dB
Field Strength 9 kHz -30 MHz	3.38 dB
Field Strength 30 MHz -1000 MHz	3.38 dB
Field Strength 1 GHz -18 GHz	4.88 dB
Field Strength 18 GHz - 40 GHz	5.14 dB
Field Strength 40 GHz - 60 GHz	5.43 dB
Field Strength 60 GHz - 90 GHz	5.43 dB
Field Strength 90 GHz - 140 GHz	5.43 dB
Field Strength 140 GHz - 220 GHz	5.43 dB

7. PHOTOGRAPHS

7.1 Photographs of the EUT

For photographs, see Appendix 1