

Prüfbericht-Nr.: <i>Test report no.:</i>	S22116D-001	Auftrags-Nr.: <i>Order no.:</i>	P00627053	Seite 1 von 6 Page 1 of 6
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	2380811	Auftragsdatum: <i>Order date:</i>	2022.03.14	
Auftraggeber: <i>Client:</i>	Axis Communications AB			
Prüfgegenstand: <i>Test item:</i>	Network surveillance camera including 60GHz radar sensor			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	Axis Q1656-DLE / FCC ID: PNB-AXISQ1656-DLE			
Auftrags-Inhalt: <i>Order content:</i>	RF Exposure Evaluation			
Prüfgrundlage: <i>Test specification:</i>	FCC 47 CFR 2.1091 IEEE Std. C95.1:2019			
Wareneingangsdatum: <i>Date of sample receipt:</i>	N/A			
Prüfmuster-Nr.: <i>Test sample no.:</i>	N/A			
Prüfzeitraum: <i>Testing period:</i>	N/A -			
Ort der Prüfung: <i>Place of testing:</i>	Lund, Sweden			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland Sweden			
Prüfergebnis*: <i>Test result*:</i>	Siehe Sonstiges / See Other			
überprüft von: <i>reviewed by:</i>	genehmigt von: <i>authorized by:</i>			
Datum: 2022.09.01 <i>Date:</i>	Datum: 2022.09.01 <i>Date:</i>			
Stellung / Position:	Senior Technical Expert	Stellung / Position:	Lab Manager	
Sonstiges / Other:	See details below			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* 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				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts.</i>				

V05

Revision HistoryS22116D-001S22116D-001

Revision	Date	Remarks	Author
001	2022.08.25		Niall Forrester
Note: Latest revision report will replace all previous reports			
This report based on RF Exposure FCC 47CFR 2-1091 IEEE C95 Template version 1.1			

Statement of Compliance

Evaluation was performed based on FCC 47 CFR 2.1091 and IEEE C95.1:2019, together with the “General Population / Uncontrolled” requirements set out in FCC 47 CFR 1.1310 Table 1 (B)

The calculations below show that the PNB-AXISQ1656-DLE device is compliant with these requirements at a distance of 20cm for all supported wireless transmitter technologies.

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1. GENERAL INFORMATION

1.1 Test Site

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

1.2 Client Information

Company Name:	Axis Communications AB
Address:	Gränden 1
	22369 Lund
	Sweden
Contact Person:	Dag Mårtensson / Johan Lundqvist
Contact e-Mail / Telephone	Dag.martensson@axis.com Johan.lundqvist@axis.com

2. PRODUCT INFORMATION

2.1 General Description

Model name:	Axis Q1656-DLE
Manufacturer:	Axis Communications AB
Model number / Marketing name:	Axis Q1656-DLE
FCC ID:	PNB-AXISQ1656-DLE
Description:	Network surveillance camera including 60GHz radar sensor
Ancillary Equipment:	N/A

2.2 Device Usage and Evaluation Distance

The device is a network surveillance camera including a 60GHz radar sensor, used in a wall or ceiling-mounted configuration. An evaluation distance of 20cm has been selected.

2.3 Wireless Technologies and Bands Supported by the EUT

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

2.4 Simultaneous Transmission Configurations

No simultaneous transmission configurations are supported by the device

2.5 Conducted Power and Antenna Gain

Technology	Band	Max. Conducted Output Power (dBm)	Max. Time-Averaged Output Power (dBm)*	Antenna Gain (dBi)
FMCW radar	61 GHz	2.45	2.45	6.0

3. TEST METHODS

3.1 Test Standards

Testing was performed according to the following standards / references

Standard	Version	Description
47 CFR 2.1091	-	Radiofrequency radiation exposure evaluation: mobile devices.

3.2 Additional references

Standard	Version	Description
IEEE Std. C95.1	2019	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 0 Hz to 300 GHz
IEEE Std. C95.3	2021	IEEE Recommended Practice for Measurements and Computations of Electric, Magnetic, and Electromagnetic Fields with Respect to Human Exposure to Such Fields, 0 Hz to 300 GHz

3.3 Limits

Extract from 47 CFR 1.1310 - Radiofrequency radiation exposure limits

Table 1B

Limits for Maximum Permissible Exposure (MPE)
(Limits for general Population / Uncontrolled Exposure)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3 - 1.34	614	1.63	*100	30
1.34 - 30	824/f	2-19/f	*180/f ²	30
30 - 300	27.5	0.073	0.2	30
300 - 1500	-	-	f/1500	30
1500 - 10000	-	-	1.0	30

Notes:

1. f = frequency in MHz
2. * = Plane-wave equivalent power density

4. EVALUATION DETAILS

4.1 Power Density (S) at 20cm Distance for Each Band and Technology

The Power Density at 20cm separation distance has been calculated for each of the transmitter technologies supported by the device according to a re-arrangement of the Friis formula, as below:

$$S = (1 + \Gamma)^2 \frac{P * G}{4\pi * r^2}$$

Where:

- “S” is power density in mW/cm²
- “P” is maximum avg. conducted power (incl. tolerances) in mW according to data from the manufacturer
- “G” is the peak antenna gain (numerical) according to data from the manufacturer
- “Γ” is the reflection coefficient for a reflecting surface. A “typical” value of 0.6 has been used
- “r” is the separation distance (20 cm)

In the case of radar transmitters, the reflected wave may not strictly be relevant, but has been included here to ensure a conservative evaluation of exposure.

Technology	Band	Freq* (MHz)	Power (dBm)	P (mW)	Gain (dBi)	G (Num.)	r (cm)	S (mW/cm ²)	Limit ** (mW/cm ²)
FMCW radar	61 GHz	61000	2.45	1.76	6.00	3.98	20	0.004	1.000

*The lowest frequency in each band has been chosen, to give the most conservative limit

**The limits listed are from FCC 47 CFR §1.1310 Table 1 (B): “Limits for General Population/Uncontrolled”

From 1500MHz to 100000MHz, the limit is 1.0 mW/cm²