RF Exposure Assessment

Report Reference:
2024-0451-EMC-TR-25-0067-V01; 2024-0451-EMC-TR-25-0069-V01;
2024-0451-EMC-TR-25-0071-V01; 2024-0451-EMC-TR-25-0072-V01;
2024-0450-EMC-TR-25-0092-V01; 2024-0450-EMC-TR-25-0093-V01;
2024-0450-EMC-TR-25-0094-V01; 2024-0450-EMC-TR-25-0095-V01

Commscope Inc.
ERA UAP-XR; ERA UAP-R

FCC ID: XS5-IONEUAPR

According to:

OET Bulletin 65 Edition 97-01: August 1997
Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields

			Signature:
Date of issue:	16.06.2025	Technical Reviewer:	Thomas Gerngroß Test Engineer Digitally signed by Thomas Gerngroß DN: cn=Thomas Gerngroß, o=Bureau Veritas CPS Germany GmbH, ou=ECL, email=thomas.gerngross@bureauveritas.com, c=DE Date: 2025.06.16 09:18:39 +02'00'
Version:	01	Report Reviewer:	Thomas Hufnagel Test Engineer Digitally signed by Thomas Hufnagel Date: 2025.06.16 09:38:06 +02'00'

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Contents

1 Summary

The RF-exposure assessment according to OET Bulletin 65 Edition 97-01: August 1997 shows, that the worst-case RF exposure values of the assessed radio technologies and bands are below the Limits for General Population/Uncontrolled Exposure:

- Table 1 (B) of OET Bulletin 65
- Table 1 (II) to § 1.1310(E)(1) of 47 CFR Ch. I (10–1–21 Edition).

COMMENTS:

- Assessment limited to supported North American frequency bands
- Prediction distance R = 26 cm
- The calculation is based on nominal levels of p = 18 dBm for each band plus a tolerance of 2 dB, so that the sum level is p = 20 dBm per band: These are the values for the type UAP-XR which is the type with the most output level.
  The type UAP-R has less output level each band so that the prediction distance of UAP-XR is also valid for UAP-R in each case.

2 Administrative Data

2.1 Testing Laboratory

Company Name:	Bureau Veritas Consumer Products Services Germany GmbH
Address:	Thurn-und-Taxis-Straße 18 90411 Nürnberg Germany

2.2 Applicant Data

Company Name:	CommScope Andrew Wireless Systems GmbH
Address:	Industriering 10 86675 Buchdorf Germany
Contact Person:	Mr. Jiri Čečka

2.3 Manufacturer Data

Company Name:	CommScope Andrew Wireless Systems GmbH
Address:	Industriering 10 86675 Buchdorf Germany
Contact Person:	Mr. Jiri Čečka

2.4 Versions Management

V 01.00	Initial release.

3 Test object Data

Declared EUT data by the supplier	
Kind of Device product description	The ERA product is a digital distribution system with focus on flexibility, easy installing, commissioning, and reliable operation. The system is designed in a way to satisfy all of today's needs as well as unknown future standards and requirements. The ERA system comprises of two main parts. A base station interface (Master or Head End Unit) that takes RF signals as well as digital signals from the base stations, conditions the signals for the given application and assigns them to the coverage zones. The coverage side is built of one or more Remote Units. The "Remote Unit" (hereinafter referred to as "RU") is connected via a 10GBASE SFP+ fiber optical link to the ERA Master Unit. This link gives a total RF bandwidth of up to 320 MHz. For higher bandwidth requirements up to 640 MHz, a secondary 10G link can be used in parallel. RF signals between Master Unit and Remote Units are sent digitally over the fiber optical link. At the receiver side these signals are converted back to analog and amplified up to appropriate transmit levels.
Product name	Universal Access Point
Type	UAP.XR
Hardware version	7862380-00 Rev: 00
Software version	01.03.0012
Integrated transmitter	Universal Access Point
Supported Radio technologies	AWS 1700; BRS; PCS 1900; WCS 2300; 5G n77
Antenna	None.
Supplied document(s)	-

4 Assessment

4.1 Assessment method and subject of assessment

Calculation of power density and comparison with reference levels for general public exposure.
Applicability area and limitations: Power density can be calculated in far field region.

Applied Standards:

- IEEE Std C95.3-2021, D.4.2 Antennas – Main beam on-axis, general method for determining the power density at points in the radiating near-field and far-field antenna regions.
- IEEE Std C95.1-2019, D.2 Multifrequency exposures (exposures to multiple sources)

Specific information:

- Values used for calculation are based on supplied documents.
- Output power values are based on the supplied test reports and technical data sheet + tolerances.
- Antenna gain values are taken from the supplied data sheets.

Worst case considerations:

- Main beams of the antennas are directed to the same point in the prediction distance.
- Cable loss of internal antenna cables set to 0.
- Duty factor GSM/GPRS/EDGE = 0.5 (4 of 8 active time slots),
- Duty factor Bluetooth low energy = 0.5 (1 of 2 active time slots),
- Duty factor WLAN 2.4 GHz = 1,
- Duty factor UMTS = 1,
- Duty factor LTE = 1.
- The radio modules can transmit independently from each other:
  (1 cellular band + WLAN 2,4 GHz + Bluetooth low energy).
  Selected bands for multi frequency exposure calculations:
  worst case of each cellular technology + WLAN 2.4 GHz + Bluetooth low energy
  and WLAN 2,4 GHz + Bluetooth low energy.

4.2 Exposure limits

Extract of
- Table 1 (B) of OET Bulletin 65
- Table 1 (II) to § 1.1310(E)(1) of 47 CFR Ch. I (10–1–21 Edition).

Frequency range	*Power density*	*Power density*
MHz	*W/m²*	*mW/cm²*
300 – 1500	f/150	f/1500
1500 - 100000	10	1

Note:
f as indicated in the frequency range column

4.3 Formulas used for calculation

4.3.1 Single-frequency exposures (exposures to one source)

Table D.2—Determining power density on antenna main beam axis:

$$S_{FF} = \frac{G_i P_{in}}{4\pi d^2}$$

In this report is the power density S_i at frequency i calculated in mW/cm^2.
G_i is the (isotropic) far-field antenna gain (power ratio) at frequency i.
P_{in} is the power into the antenna in mW => P_{mW}.
d is the distance to the antenna in cm.

4.3.2 Multi-frequency exposures (exposures to multiple sources)

Summation based on IEEE Std C95.1-2019, D.2

$$\sum_{i=1}^{n} \frac{exposure_i}{ERL_i} < 1$$

In this report is the power density calculated. In the tables below is "*exposure*" = S_i = power density at frequency i.
ERL_i is the corresponding exposure reference level at frequency i.

IEEE Std C95.1-2019:
exposure reference level (ERL): The maximum exposure level relative to ambient electric and/or magnetic field strength or power density, induced and/or contact current, or contact voltage.
NOTE 1— ERLs provide an adequate margin of safety against established adverse health effects.
NOTE 6— In some documents, ERLs are called reference levels, derived limits, permissible exposure limits, maximum permissible exposure values, action levels, or investigation levels.

4.4 Calculation

4.4.1 Calculation of single-frequency exposures

4.4.2 Calculation of multi-frequency exposures

Multi-frequency exposures (exposures to multiple sources), Summation based on IEEE Std C95.1-2005

Limit: FCC OET Bulletin 65 Edition 97-01, Table 1 (B) Limits for General Population/Uncontrolled Exposure

Prediction distance d in cm =>	**26**	TX frequ. band	Prediction frequ.	Duty factor (lin.)	Max power (log.)	Average (temporal) power (log.)	Average (temporal) power (lin.)	Gain (log.)	Gain (lin.)	Power density at prediction distance d	Power density limit at frequenc y f_i	Ratio to exposure reference level	Sum of S_i / ERL_i	Compliance , if Sum of S_i / ERL_i < 1	Minimum distance to be ensured
		f_{Band}	f_i	-	P_{dBm}	P_{dBm}	$\mathbf{P_{mW}}$	g_{dBi}	$\mathbf{G_i}$	S_i	ERL_i	S_i / ERL_i	-	-	-
Radio technology	Repeater configuration	MHz	MHz	-	dBm	dBm	mW	dBi	-	mW/cm²	mW/cm²	-	-	-	cm
5G MIMO: 4 bands simultaneously on 1 antenna port	PCS 1900 ANT 1 carrier	1930 - 1995	1962,5	1	20,0	20,00	100,00	13,00	19,95	0,235	1,000	0,235	0,940	Pass	25,201
	AWS 1700 ANT 1 carrier	2110 - 2180	2145	1	20,0	20,00	100,00	13,00	19,95	0,235	1,000	0,235			
	WCS 2300 1 carrier	2350 - 2360	2355	1	20,0	20,00	100,00	13,00	19,95	0,235	1,000	0,235			
	BRS 1 carrier	2496 -2690	2593	1	20,0	20,00	100,00	13,00	19,95	0,235	1,000	0,235			

Information: 10 W m^{-2} = 1 mW cm^{-2}

END OF REPORT