



RF Exposure Assessment

Report Reference: 2023-0314-MPE-TR-24-0001-V01

on

Commscope Inc.
ERA CAP M2 17E 19 23 25T F-AC-F1
Medium Power Carrier Access Point

FCC ID: XS5-CAPM217192325

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:	30.01.2024	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: 2024.01.30 16:26:24 +01'00'
Version:	01	Report Reviewer:	 Thomas Hufnagel Test Engineer	Digitally signed by Thomas Hufnagel Date: 2024.01.31 06:59:16 +01'00'

The test results relate only to the tested item. The sample has been provided by the client.

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Contents

1	Summary.....	3
2	Administrative Data.....	4
2.1	Testing Laboratory	4
2.2	Applicant Data	4
2.3	Manufacturer Data.....	4
3	Test object Data	5
4	Assessment.....	6
4.1	Assessment method and subject of assessment	6
4.2	Exposure limits	7
4.3	Formulas used for calculation.....	7
4.4	Calculation	8

Version History

Version no. of report

01

Changes to previous version

Initial version.

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 = 196 cm

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: Andrew Wireless Systems GmbH
Address: Industriering 10
86675 Buchdorf
Germany
Contact Person: Mr. Jiri Cecka

2.3 Manufacturer Data

Company Name: Andrew Wireless Systems GmbH
Address: Industriering 10
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Contact Person: Mr. Jiri Cecka

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	Medium Power Carrier Access Point
Type	ERA CAP M2 17E 19 23 25T F-AC-F1
Hardware version	7856326-1010 Rev.: 00
Software version	V5.0.0.196
Integrated transmitter	Medium Power Carrier Access Point
Supported radio technologies	Bands AWS 1700, PCS 1900, WCS 2300, BRS UBS and BRS LBS
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.

Considerations regarding for calculation of maximum output power:

- 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:

- The maximum output power is the sum of each cellular technology + 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).

<i>Frequency range</i>	<i>Power density</i>	<i>Power density</i>
<i>MHz</i>	<i>W/m²</i>	<i>mW/cm²</i>
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

Calculation of multi-frequency exposures

Prediction Distance d in cm =>	196	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 distance d	Power density limit at frequency 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}	P_{mW}	g_{dBi}	G_i	S_i	ERL_i	S_i / ERL_i	-	-	-
Radio technology	Repeater configuration	MHz	MHz	-	dBm	dBm	mW	dBi	-	mW/cm ²	mW/cm ²	-	-	-	cm
5G MIMO 2*2	17E ANT 1	2110 - 2180	2145,0	1	33,0	33,00	1995,26	15,00	31,62	0,131	1,000	0,131	0,992	Pass	195,199
	17E ANT 2	2110 - 2180	2145,0	1	33,0	33,00	1995,26	15,00	31,62	0,131	1,000	0,131			
	19 ANT 1	1930 - 1995	1962,5	1	33,0	33,00	1995,26	15,00	31,62	0,131	1,000	0,131			
	19 ANT 2	1930 - 1995	1962,5	1	33,0	33,00	1995,26	15,00	31,62	0,131	1,000	0,131			
	25T ANT 1	2496 - 2690	2593,0	1	33,0	33,00	1995,26	15,00	31,62	0,131	1,000	0,131			
	25T ANT 2	2496 - 2690	2593,0	1	33,0	33,00	1995,26	15,00	31,62	0,131	1,000	0,131			
	23 ANT 1	2350 - 2360	2355,0	1	32,0	32,00	1584,89	15,00	31,62	0,104	1,000	0,104			
	23 ANT 2	2350 - 2360	2355,0	1	32,0	32,00	1584,89	15,00	31,62	0,104	1,000	0,104			

END OF REPORT