

#### 4.5 OUT-OF-BAND EMISSION LIMITS

Standard FCC Part §2.1051, §27.53

**The test was performed according to:**  
ANSI C63.26, KDB KDB 935210 D05 v01r04: 3.6

**Test date:** 2022-07-19, 2022-07-21 and 2022-08-01

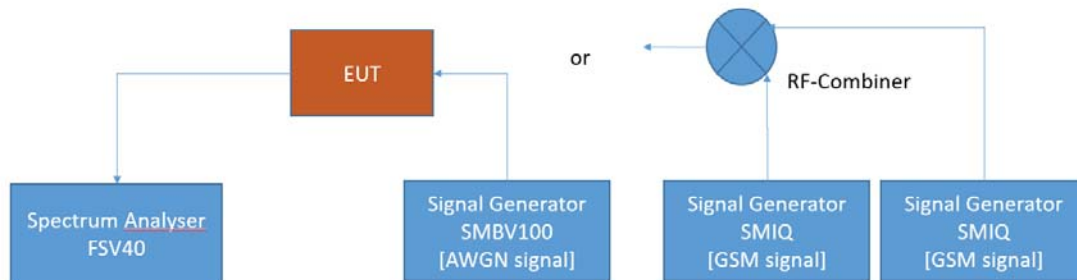
**Environmental conditions:** 23 ° C ± 5 K; 40 % r. F. ± 20 % r. F.

**Test engineer:** Thomas Hufnagel

##### 4.5.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the out-of-band emission limit for industrial signal boosters. The limits itself come from the applicable rule part for each operating band.

The EUT was connected to the test setup according to the following diagram:



FCC Part 22/24/27/90 Industrial signal booster – Test Setup; Out-of-band emissions

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

The Spectrum Analyzer settings can be directly found in the measurement diagrams.

## 4.5.2 TEST REQUIREMENTS/LIMITS

### Part 27; Miscellaneous Wireless Communication Services

#### Subpart C – Technical standards

#### §27.53 – Emission limits

- (l) **3.7 GHz Service.** The following emission limits apply to stations transmitting in the 3700-3980 MHz band:
- (1) For base station operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed  $-13$  dBm/MHz. Compliance with this paragraph (l)(1) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
  - (2) For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed  $-13$  dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.



### 4.5.3 TEST PROTOCOL

C-Band, segment 1, downlink, Number of input signals = 1							
Signal Type	Input Power	Band Edge	Signal Frequency [MHz]	Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
Wideband	0.3 dB < AGC	upper	3797.50	-4.5	-28.1	-13.0	15.1
Wideband	3 dB > AGC	upper	3797.50	-1.2	-27.4	-13.0	14.4
Narrowband	0.3 dB < AGC	upper	3799.80	-3.1	-25.0	-13.0	12.0
Narrowband	3 dB > AGC	upper	3799.80	0.2	-24.2	-13.0	11.2
Wideband	0.3 dB < AGC	lower	3702.50	-4.7	-26.8	-13.0	13.8
Wideband	3 dB > AGC	lower	3702.50	-1.4	-27.9	-13.0	14.9
Narrowband	0.3 dB < AGC	lower	3700.20	-4.3	-26.7	-13.0	13.7
Narrowband	3 dB > AGC	lower	3700.20	-1.0	-26.6	-13.0	13.6

C-Band, segment 1, downlink, Number of input signals = 2								
Signal Type	Input Power	Band Edge	Signal Frequency f1 [MHz]	Signal Frequency f2 [MHz]	Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
WB	0.3 dB < AGC	upper	3797.50	3795.00	-4.7	-29.3	-13.0	16.3
WB	3 dB > AGC	upper	3797.50	3795.00	-1.4	-29.2	-13.0	16.2
NB	0.3 dB < AGC	upper	3799.80	3799.60	-3.9	-27.5	-13.0	14.5
NB	3 dB > AGC	upper	3799.80	3799.60	-0.6	-27.5	-13.0	14.5
WB	0.3 dB < AGC	lower	3702.50	3705.00	-4.5	-29.6	-13.0	16.6
WB	3 dB > AGC	lower	3702.50	3705.00	-1.2	-29.6	-13.0	16.6
NB	0.3 dB < AGC	lower	3700.20	3700.40	-4.3	-29.2	-13.0	16.2
NB	3 dB > AGC	lower	3700.20	3700.40	-1.0	-30.0	-13.0	17.0

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<b>C-Band, segment 2, downlink, Number of input signals = 1</b>							
Signal Type	Input Power	Band Edge	Signal Frequency [MHz]	Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
Wideband	0.3 dB < AGC	upper	3887.50	-5.1	-25.8	-13.0	12.8
Wideband	3 dB > AGC	upper	3887.50	-1.8	-24.0	-13.0	11.0
Narrowband	0.3 dB < AGC	upper	3889.80	-4.1	-24.4	-13.0	11.4
Narrowband	3 dB > AGC	upper	3889.80	-0.8	-25.6	-13.0	12.6
Wideband	0.3 dB < AGC	lower	3792.50	-5.1	-28.2	-13.0	15.2
Wideband	3 dB > AGC	lower	3792.50	-1.8	-27.1	-13.0	14.1
Narrowband	0.3 dB < AGC	lower	3790.20	-3.7	-25.4	-13.0	12.4
Narrowband	3 dB > AGC	lower	3790.20	-0.4	-24.7	-13.0	11.7

<b>C-Band, segment 2, downlink, Number of input signals = 2</b>								
Signal Type	Input Power	Band Edge	Signal Frequency f1 [MHz]	Signal Frequency f2 [MHz]	Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
WB	0.3 dB < AGC	upper	3887.50	3885.00	-4.9	-28.3	-13.0	15.3
WB	3 dB > AGC	upper	3887.50	3885.00	-1.6	-28.3	-13.0	15.3
NB	0.3 dB < AGC	upper	3889.80	3889.60	-4.5	-28.0	-13.0	15.0
NB	3 dB > AGC	upper	3889.80	3889.60	-1.2	-27.9	-13.0	14.9
WB	0.3 dB < AGC	lower	3792.50	3795.00	-4.9	-29.1	-13.0	16.1
WB	3 dB > AGC	lower	3792.50	3795.00	-1.6	-29.3	-13.0	16.3
NB	0.3 dB < AGC	lower	3790.20	3790.40	-4.7	-28.1	-13.0	15.1
NB	3 dB > AGC	lower	3790.20	3790.40	-1.4	-28.0	-13.0	15.0

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C-Band, segment 3, downlink, Number of input signals = 1							
Signal Type	Input Power	Band Edge	Signal Frequency [MHz]	Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
Wideband	0.3 dB < AGC	upper	3977.50	-5.1	-23.9	-13.0	10.9
Wideband	3 dB > AGC	upper	3977.50	-1.8	-21.8	-13.0	8.8
Narrowband	0.3 dB < AGC	upper	3979.80	-4.5	-25.3	-13.0	12.3
Narrowband	3 dB > AGC	upper	3979.80	-1.2	-24.4	-13.0	11.4
Wideband	0.3 dB < AGC	lower	3882.50	-4.7	-26.8	-13.0	13.8
Wideband	3 dB > AGC	lower	3882.50	-1.4	-26.1	-13.0	13.1
Narrowband	0.3 dB < AGC	lower	3880.20	-4.1	-25.1	-13.0	12.1
Narrowband	3 dB > AGC	lower	3880.20	-0.8	-24.9	-13.0	11.9

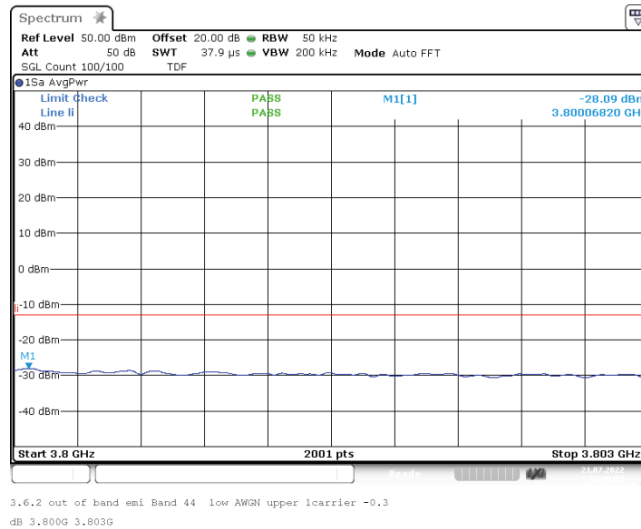
C-Band, segment 3, downlink, Number of input signals = 2								
Signal Type	Input Power	Band Edge	Signal Frequency f1 [MHz]	Signal Frequency f2 [MHz]	Input Power [dBm]	Maximum Out-of-band Power [dBm]	Limit Out-of-band Power [dBm]	Margin to Limit [dB]
WB	0.3 dB < AGC	upper	3977.50	3977.50;3975.00	-5.1	-27.9	-13.0	14.9
WB	3 dB > AGC	upper	3977.50	3977.50;3975.00	-1.8	-24.1	-13.0	11.1
NB	0.3 dB < AGC	upper	3979.80	3979.80;3979.60	-4.9	-27.9	-13.0	14.9
NB	3 dB > AGC	upper	3979.80	3979.80;3979.60	-1.6	-27.7	-13.0	14.7
WB	0.3 dB < AGC	lower	3882.50	3882.50;3885.00	-4.7	-28.6	-13.0	15.6
WB	3 dB > AGC	lower	3882.50	3882.50;3885.00	-1.4	-28.0	-13.0	15.0
NB	0.3 dB < AGC	lower	3880.20	3880.20;3880.40	-4.7	-28.0	-13.0	15.0
NB	3 dB > AGC	lower	3880.20	3880.20;3880.40	-1.4	-28.2	-13.0	15.2

Remark: Please see next sub-clause for the measurement plot.

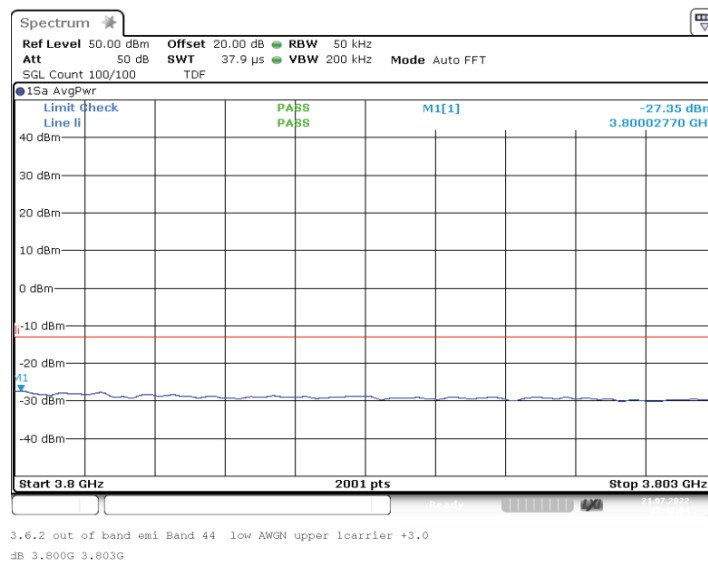


### 4.5.4 MEASUREMENT PLOT

Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: upper; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 1



Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: upper; Mod: Wideband;  
Input Power = 3 dB > AGC; Number of signals 1



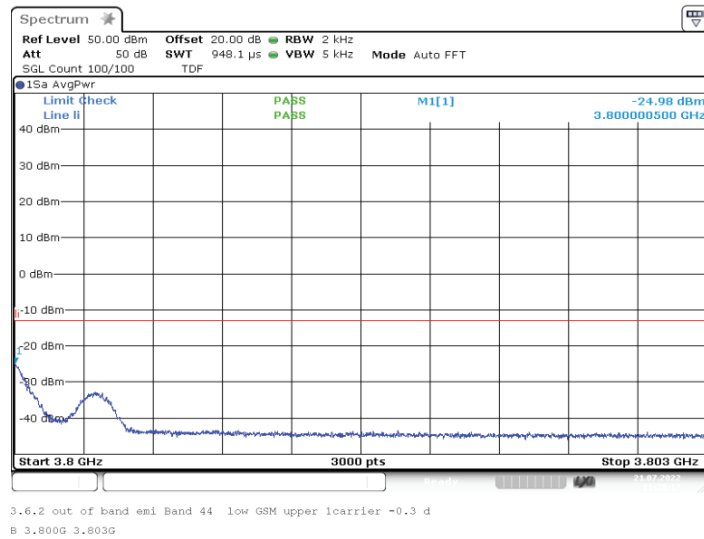
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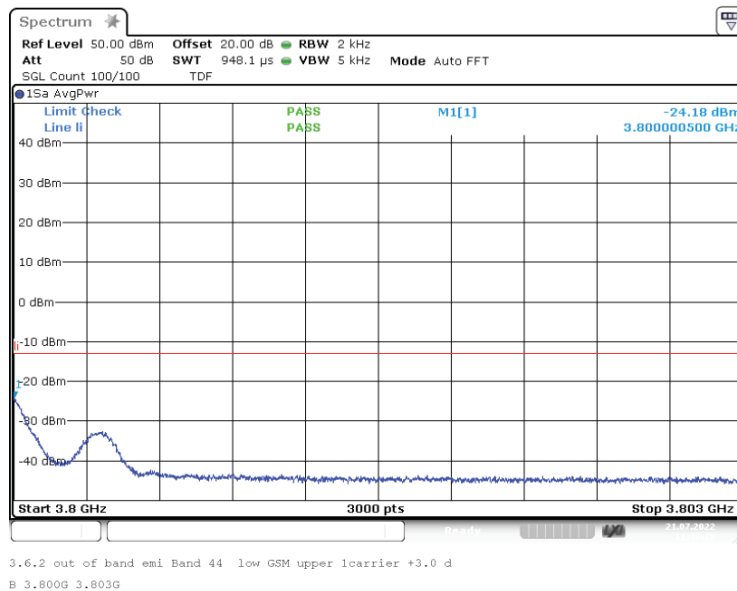
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**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: upper; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 1



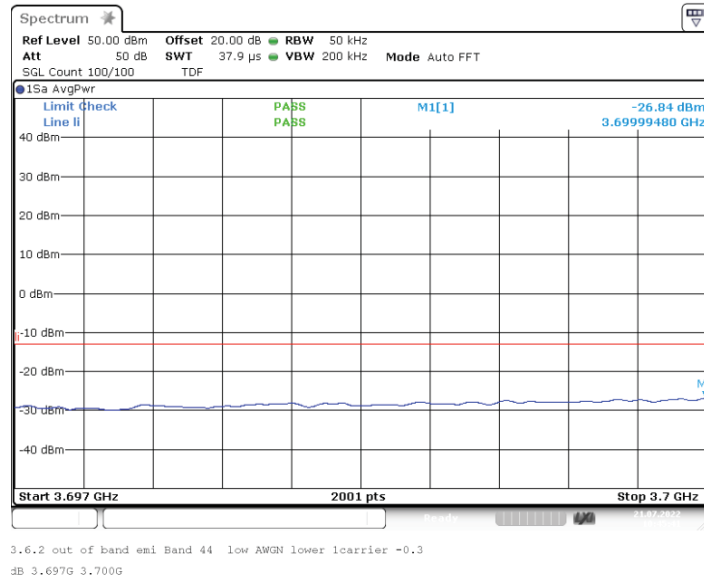
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Input Power = 3 dB > AGC; Number of signals 1



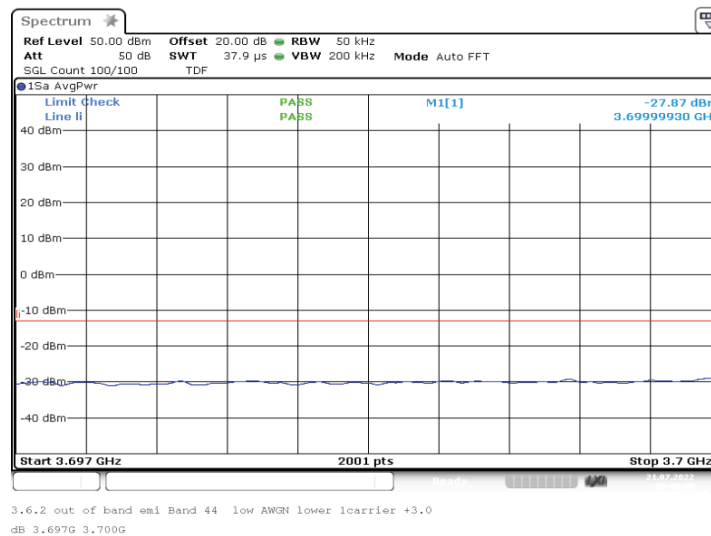
The test results relate only to the tested item. The sample has been provided by the client.  
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Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 1



Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 3 dB > AGC; Number of signals 1



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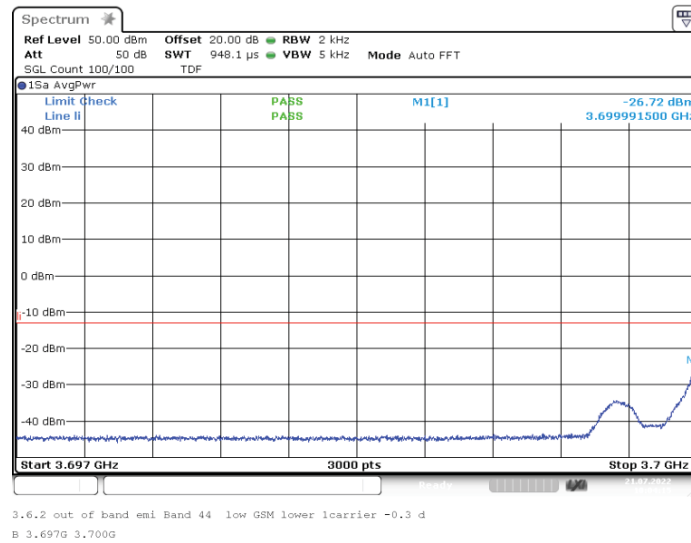




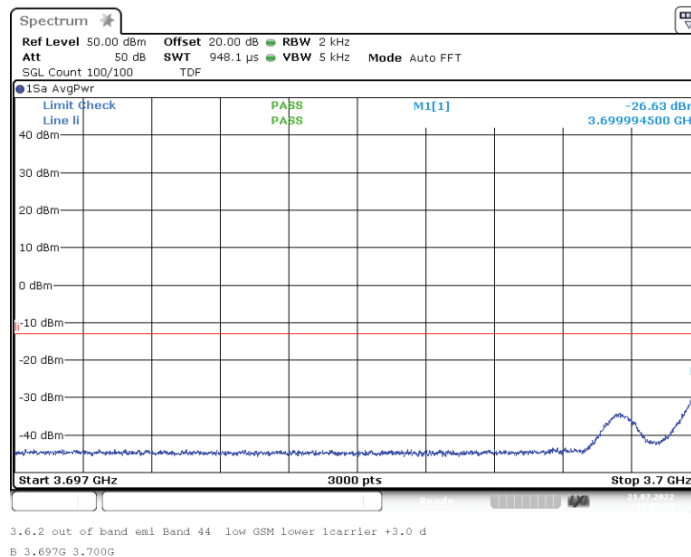
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**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 1



Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 3 dB > AGC; Number of signals 1



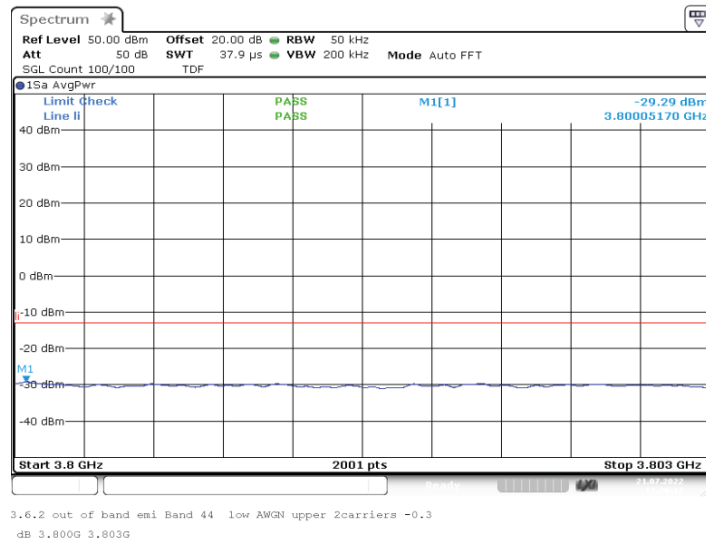
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Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: upper; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 2



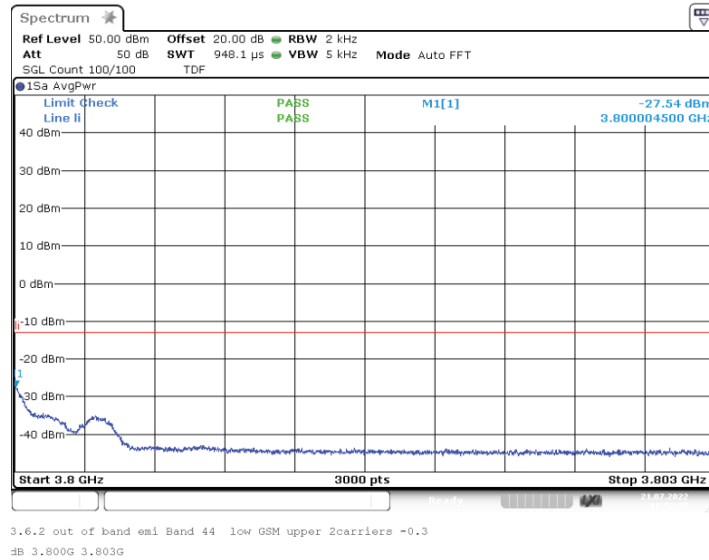
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Input Power = 3 dB > AGC; Number of signals 2



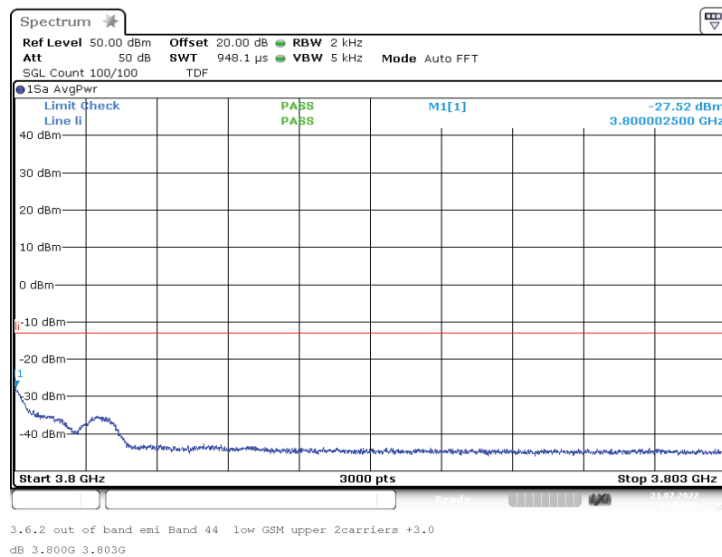
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Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: upper; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 2



Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: upper; Mod: Narrowband;  
Input Power = 3 dB > AGC; Number of signals 2



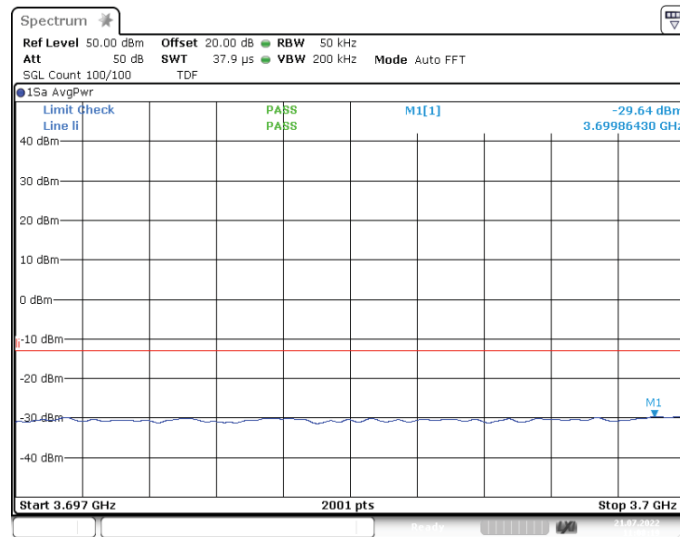
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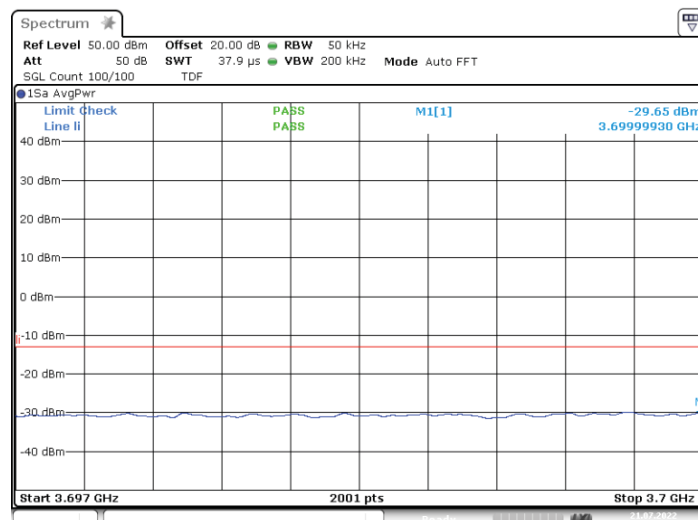
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EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 2



3.6.2 out of band emi Band 44 low AWGN lower 2carriers -0.3  
dB 3.697G 3.700G

Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 3 dB > AGC; Number of signals 2

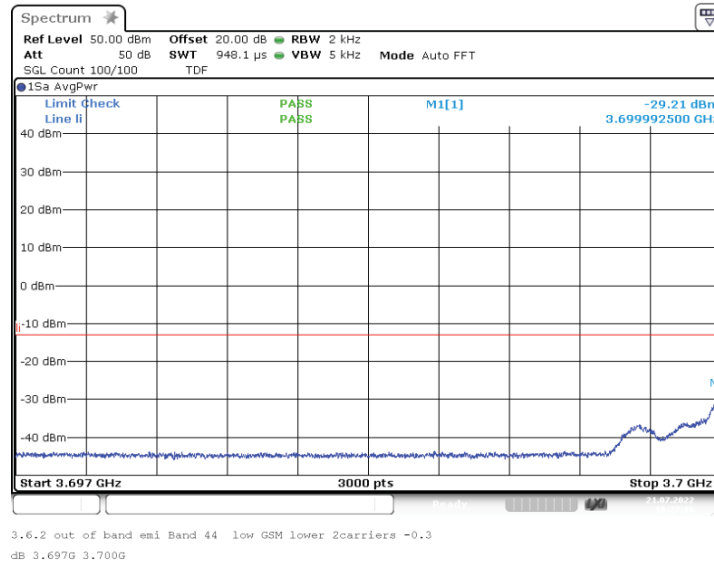


3.6.2 out of band emi Band 44 low AWGN lower 2carriers +3.0  
dB 3.697G 3.700G

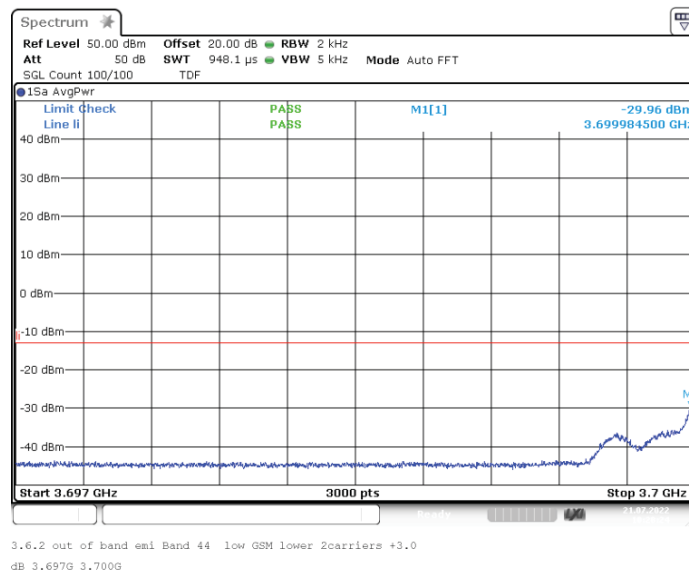
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Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 2



Band C, Segment 1; Frequency: 3.7000 GHz to 3.8000 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 3 dB > AGC; Number of signals 2



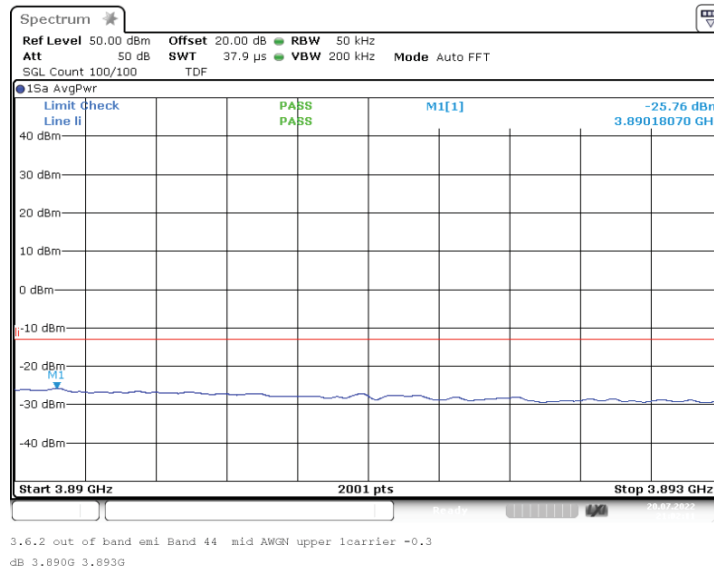
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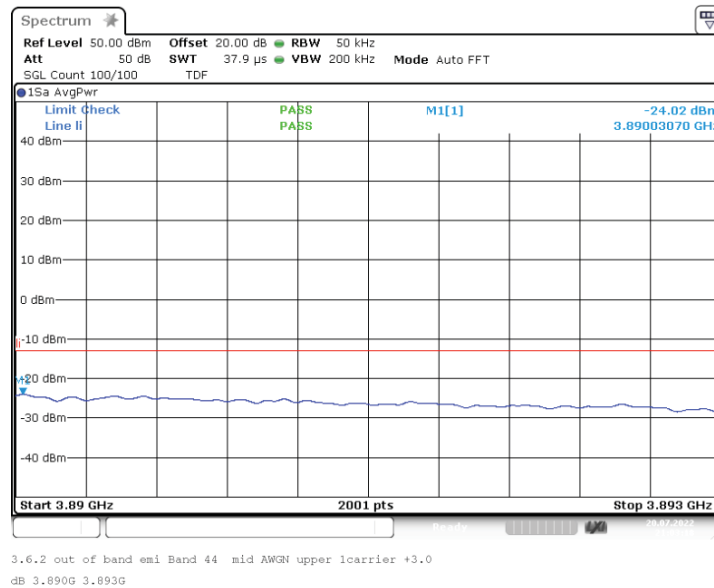
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EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: upper; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 1



Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: upper; Mod: Wideband;  
Input Power = 3 dB > AGC; Number of signals 1



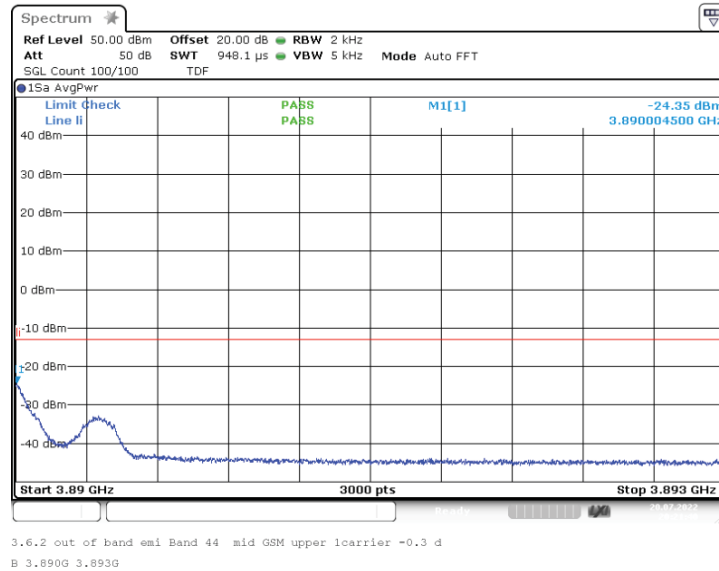
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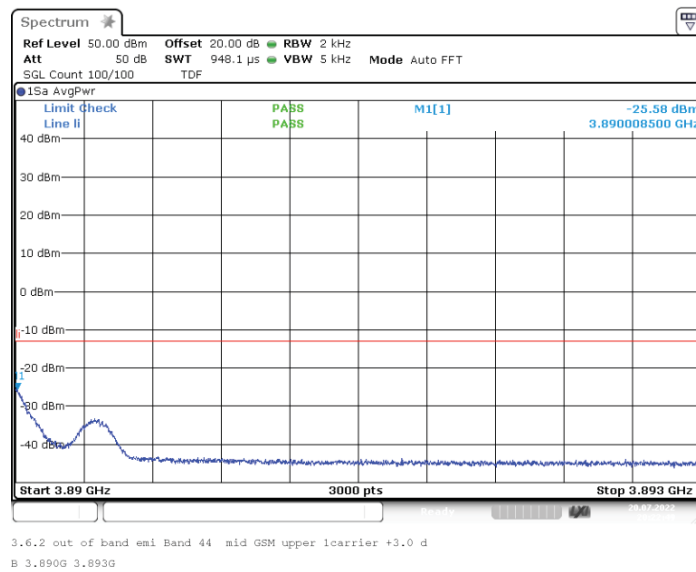
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**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: upper; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 1



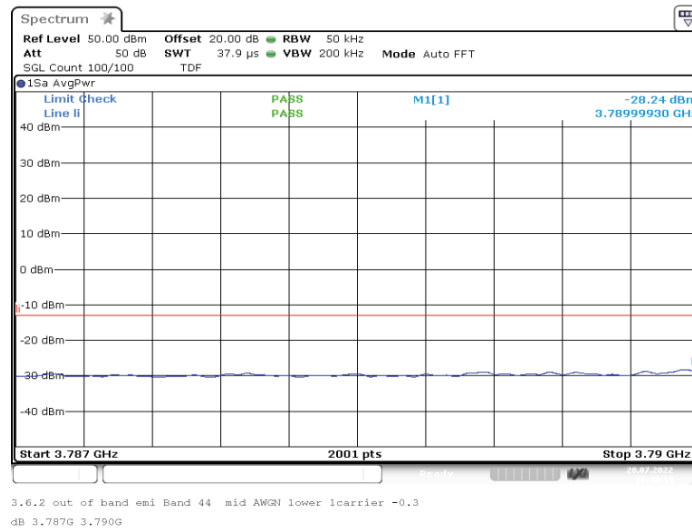
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Input Power = 3 dB > AGC; Number of signals 1



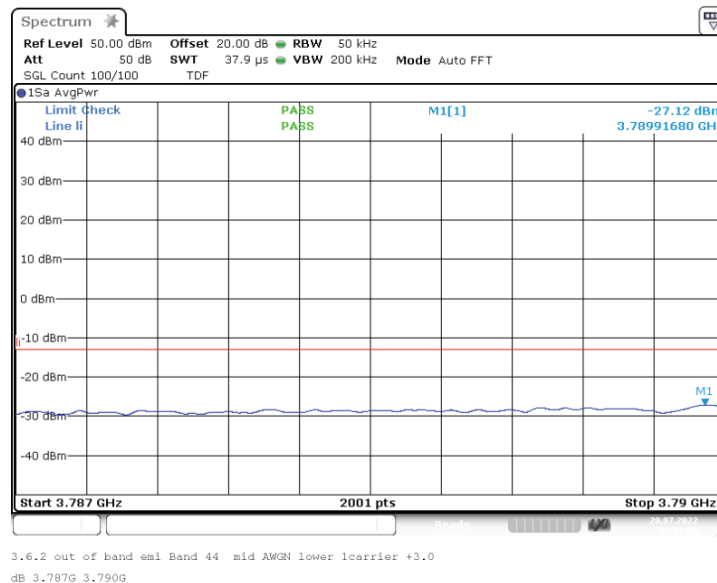
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Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 1



Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 3 dB > AGC; Number of signals 1



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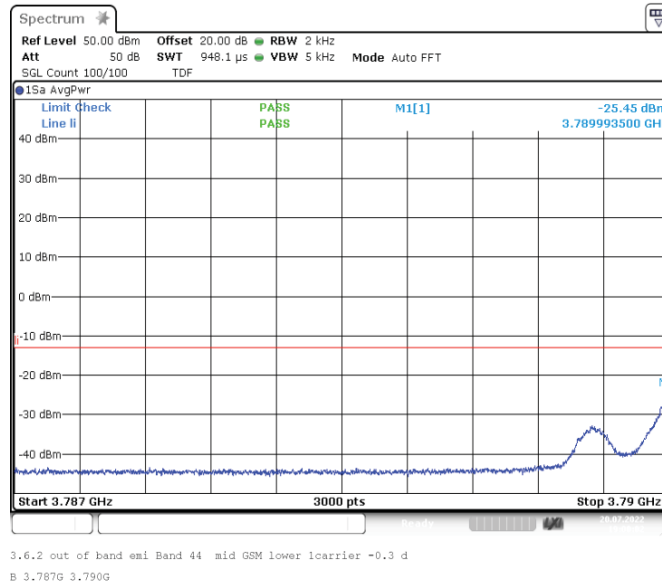




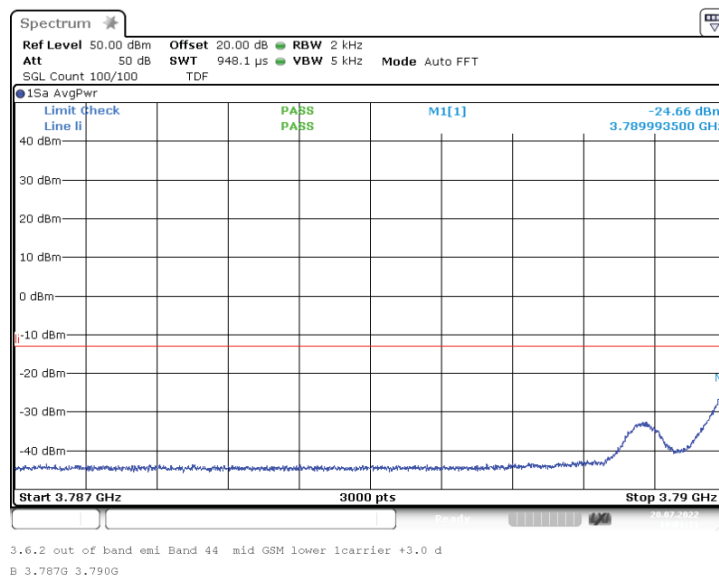
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EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 1



Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 3 dB > AGC; Number of signals 1



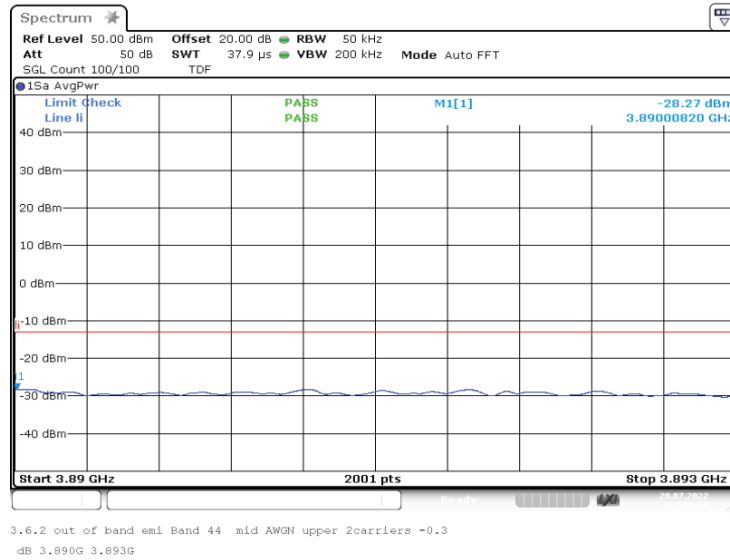
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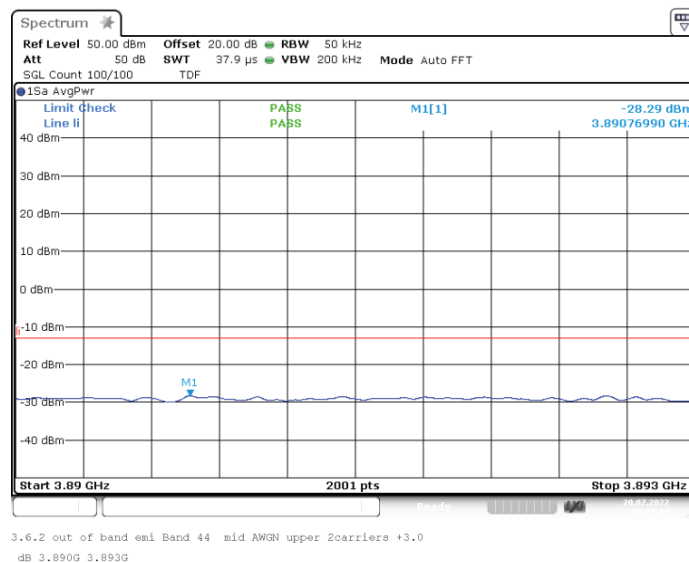
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EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: upper; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 2



Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: upper; Mod: Wideband;  
Input Power = 3 dB > AGC; Number of signals 2



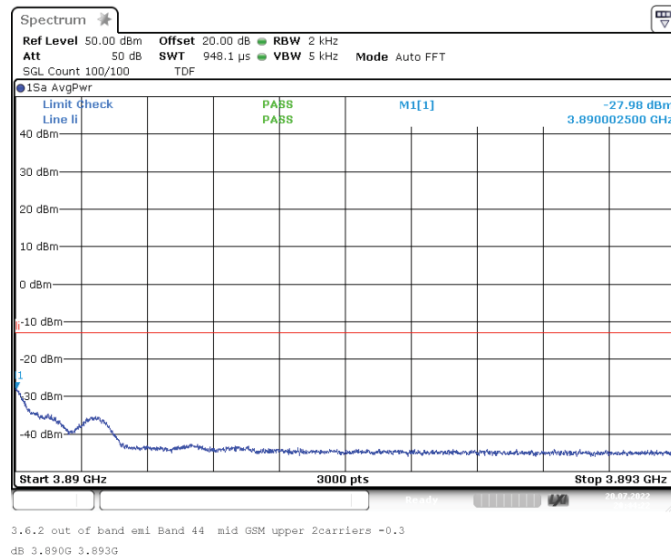
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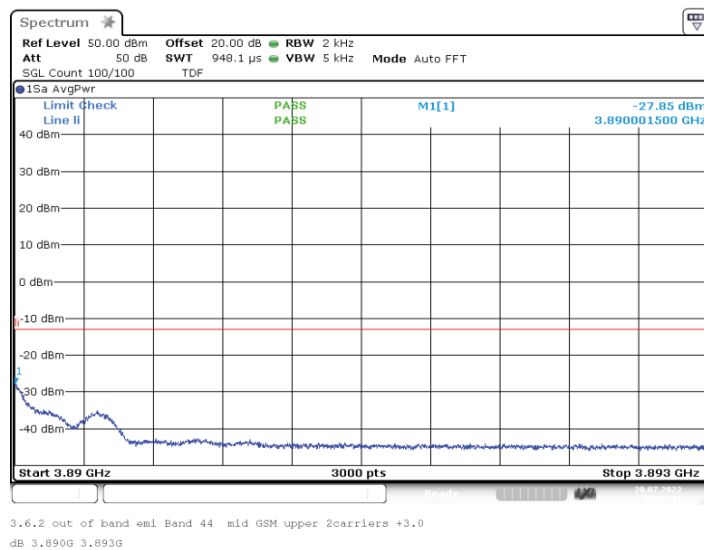
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Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: upper; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 2



Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: upper; Mod: Narrowband;  
Input Power = 3 dB > AGC; Number of signals 2



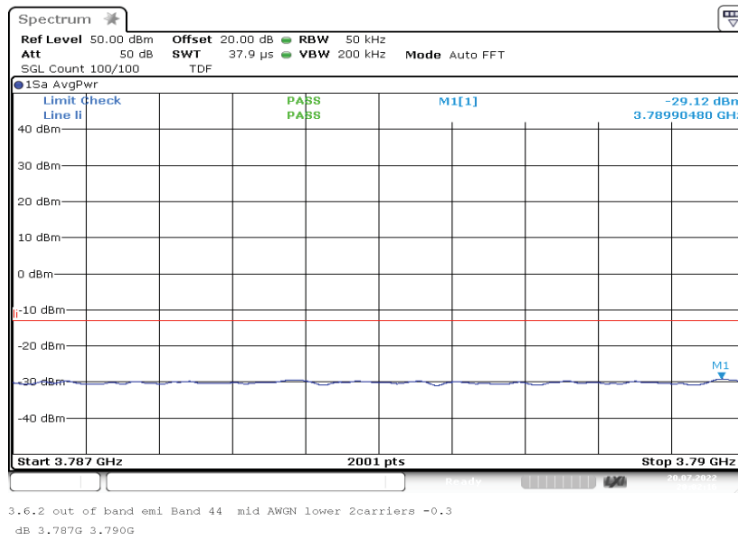
The test results relate only to the tested item. The sample has been provided by the client.  
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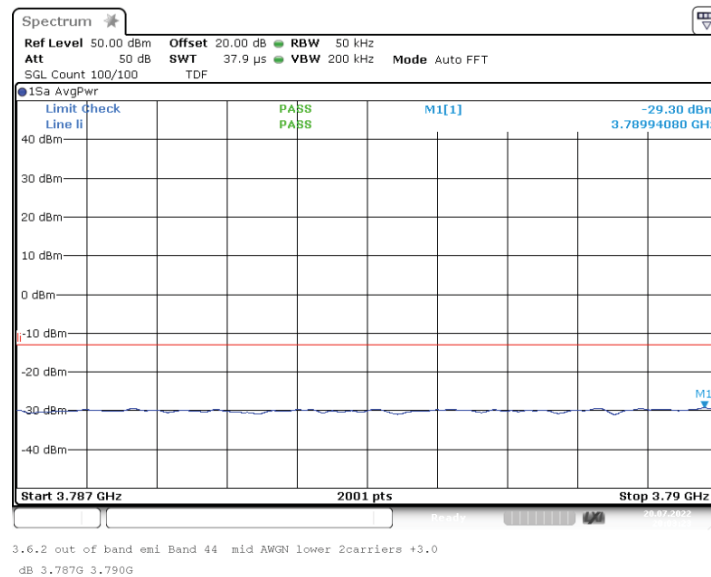
BUREAU  
VERITAS

**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 2



Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 3 dB > AGC; Number of signals 2



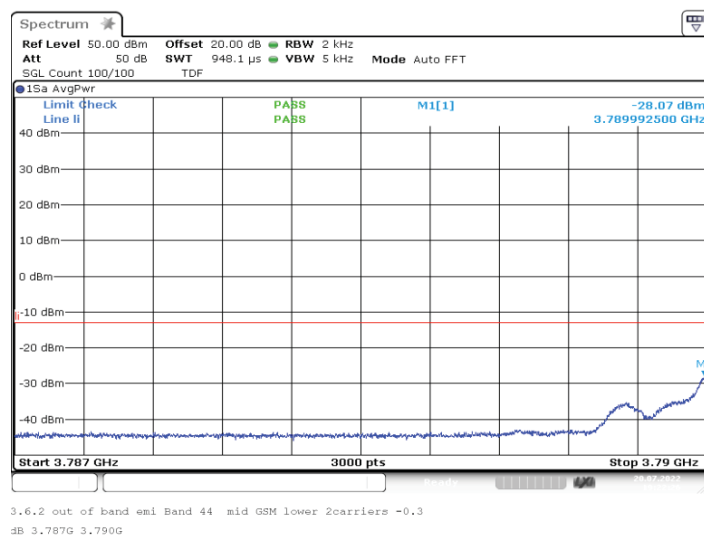
The test results relate only to the tested item. The sample has been provided by the client.  
Without the written consent of Bureau Veritas Consumer Products Services Germany GmbH excerpts of this report shall not be reproduced.



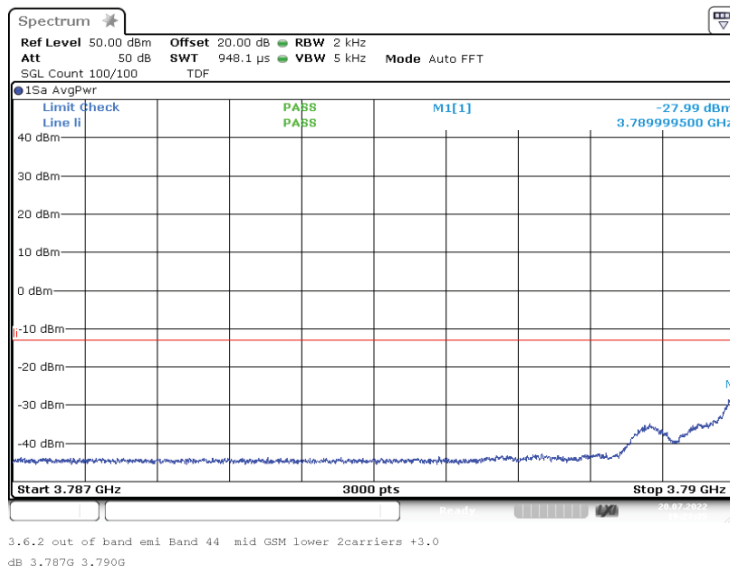
BUREAU  
VERITAS

**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 2



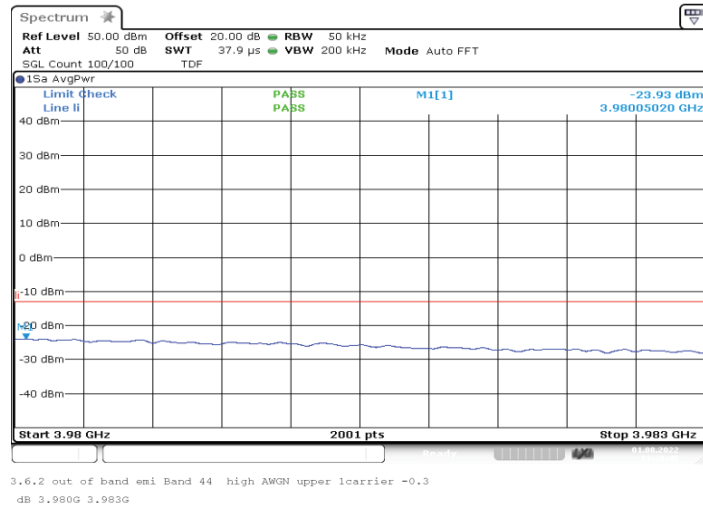
Band C, Segment 2; Frequency: 3.7900 GHz to 3.8900 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 3 dB > AGC; Number of signals 2



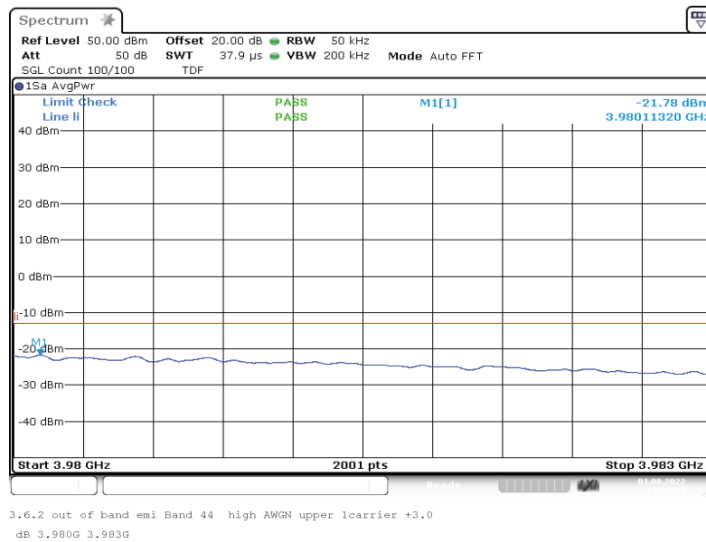
The test results relate only to the tested item. The sample has been provided by the client.  
Without the written consent of Bureau Veritas Consumer Products Services Germany GmbH excerpts of this report shall not be reproduced.



Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: upper; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 1



Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: upper; Mod: Wideband;  
Input Power = 3 dB > AGC; Number of signals 1



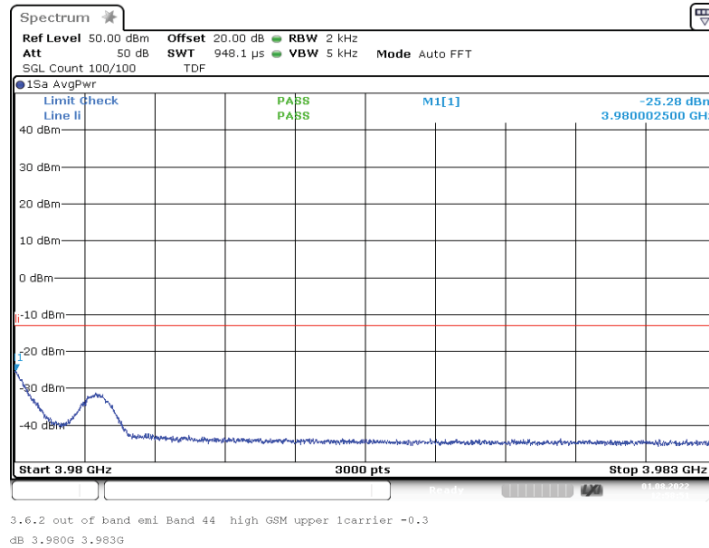
The test results relate only to the tested item. The sample has been provided by the client.  
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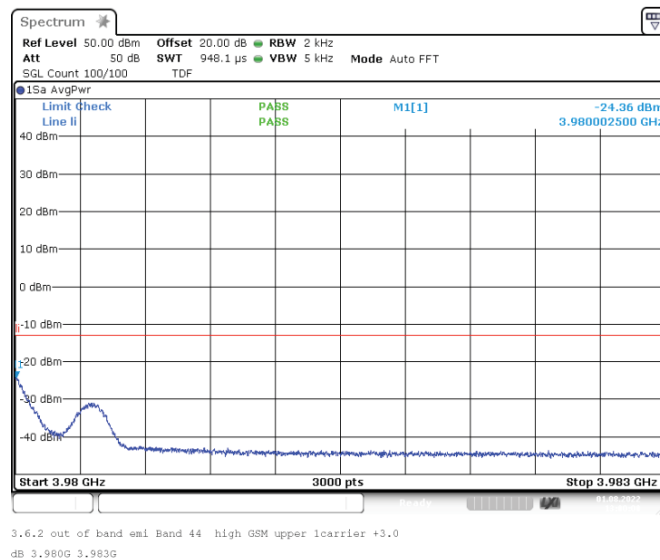
BUREAU  
VERITAS

**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: upper; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 1



Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: upper; Mod: Narrowband;  
Input Power = 3 dB > AGC; Number of signals 1



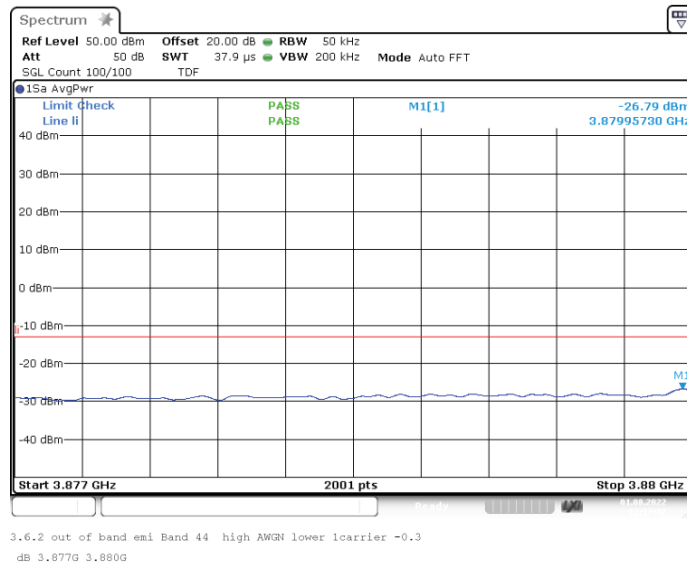
The test results relate only to the tested item. The sample has been provided by the client.  
Without the written consent of Bureau Veritas Consumer Products Services Germany GmbH excerpts of this report shall not be reproduced.



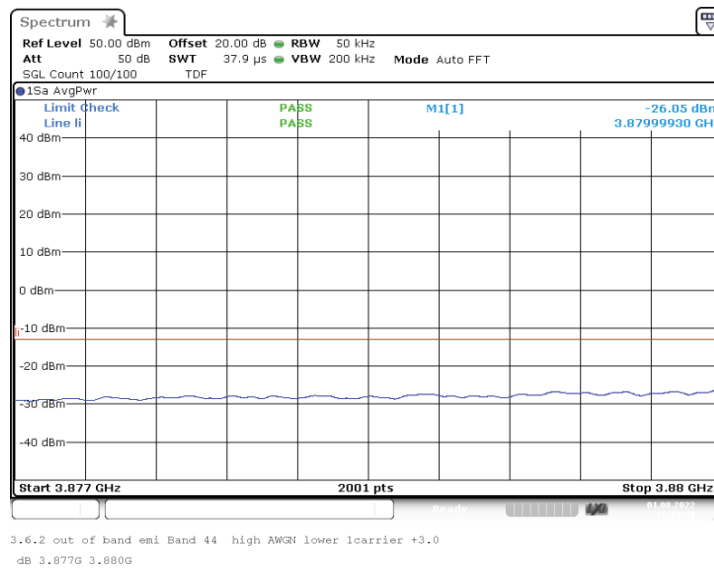
BUREAU  
VERITAS

**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 1



Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 3 dB > AGC; Number of signals 1



The test results relate only to the tested item. The sample has been provided by the client.  
Without the written consent of Bureau Veritas Consumer Products Services Germany GmbH excerpts of this report shall not be reproduced.

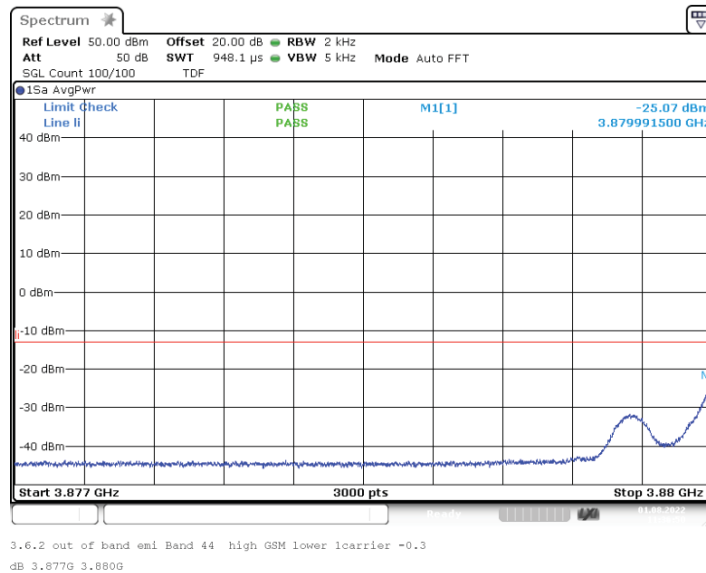




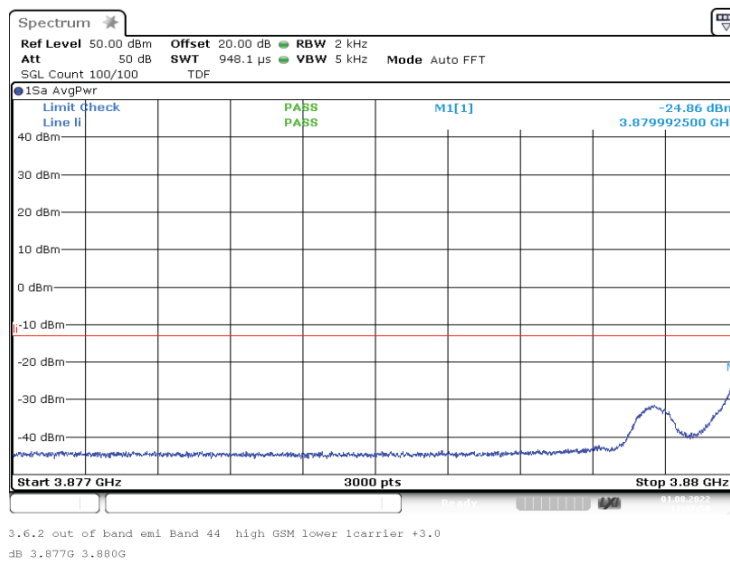
BUREAU  
VERITAS

**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 1



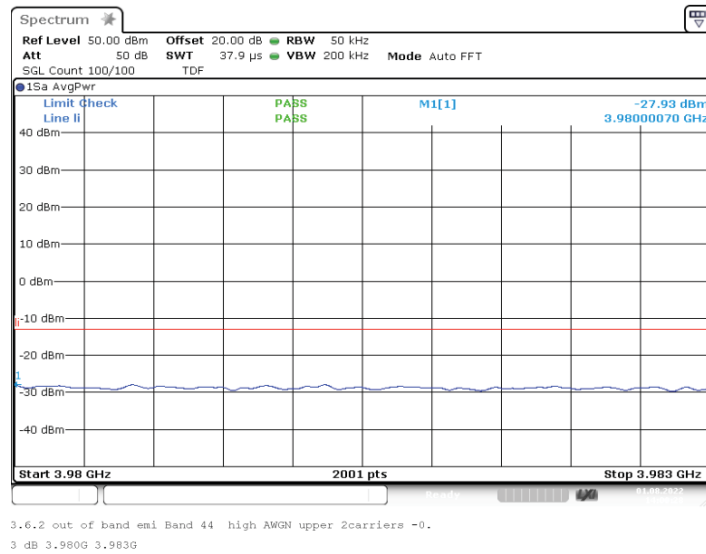
Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 3 dB > AGC; Number of signals 1



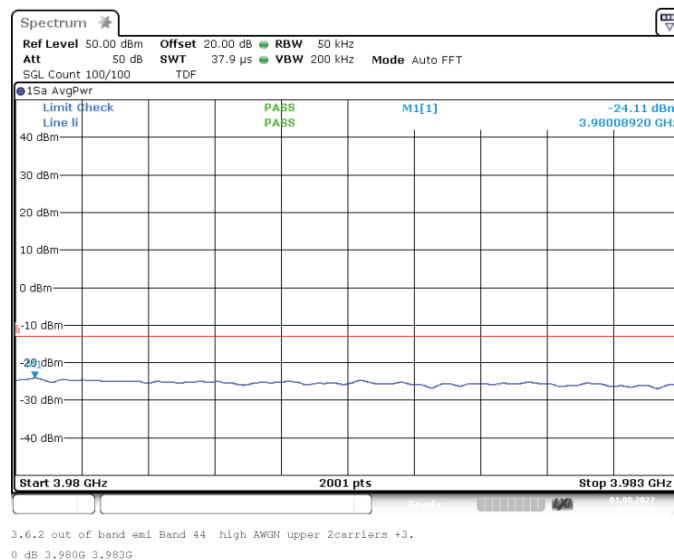
The test results relate only to the tested item. The sample has been provided by the client.  
Without the written consent of Bureau Veritas Consumer Products Services Germany GmbH excerpts of this report shall not be reproduced.



Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: upper; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 2



Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: upper; Mod: Wideband;  
Input Power = 3 dB > AGC; Number of signals 2



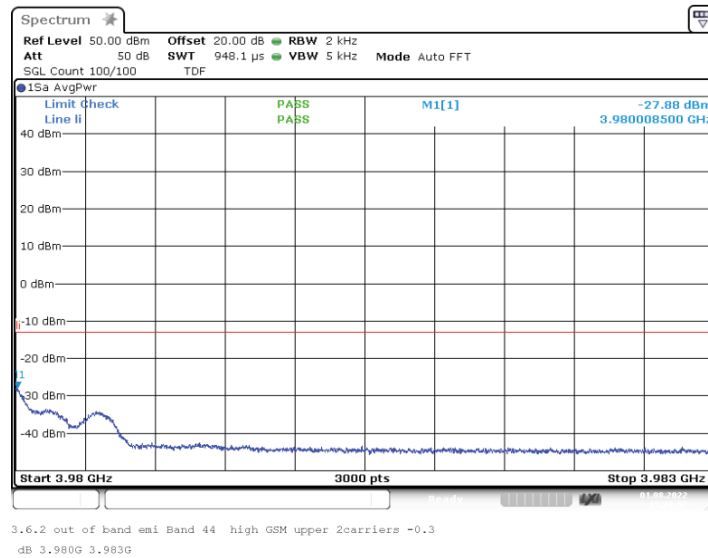
The test results relate only to the tested item. The sample has been provided by the client.  
Without the written consent of Bureau Veritas Consumer Products Services Germany GmbH excerpts of this report shall not be reproduced.



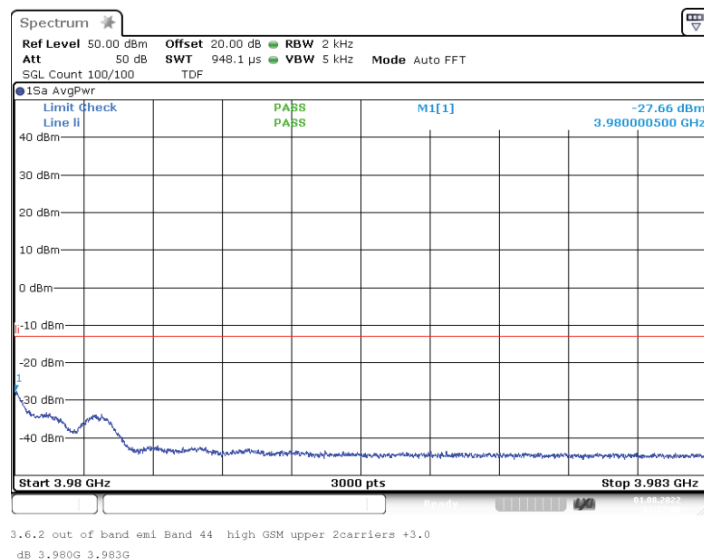
BUREAU  
VERITAS

**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: upper; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 2



Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: upper; Mod: Narrowband;  
Input Power = 3 dB > AGC; Number of signals 2



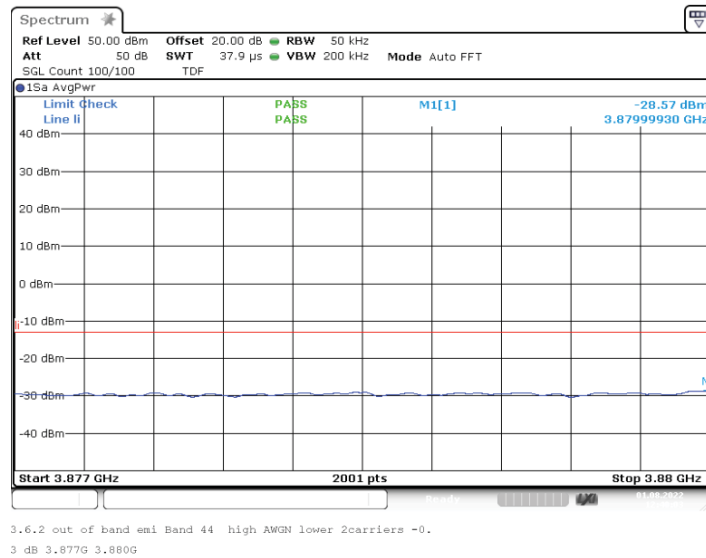
The test results relate only to the tested item. The sample has been provided by the client.  
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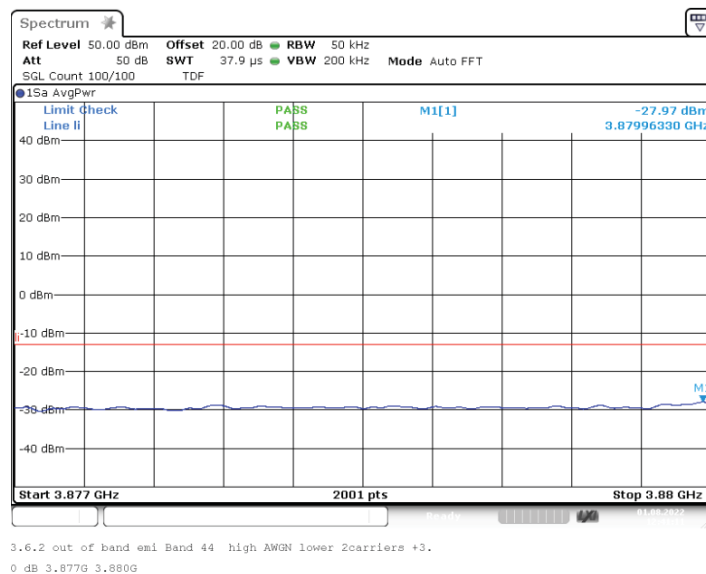
BUREAU  
VERITAS

**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 0.3 dB < AGC; Number of signals 2



Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: lower; Mod: Wideband;  
Input Power = 3 dB > AGC; Number of signals 2



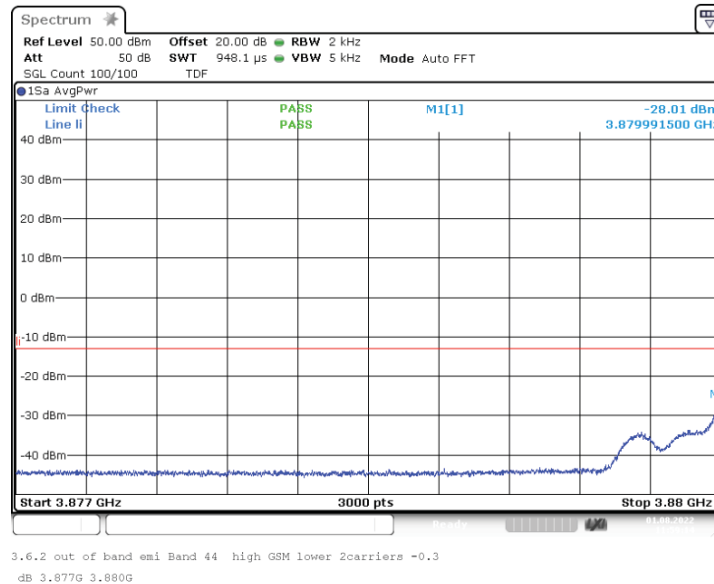
The test results relate only to the tested item. The sample has been provided by the client.  
Without the written consent of Bureau Veritas Consumer Products Services Germany GmbH excerpts of this report shall not be reproduced.



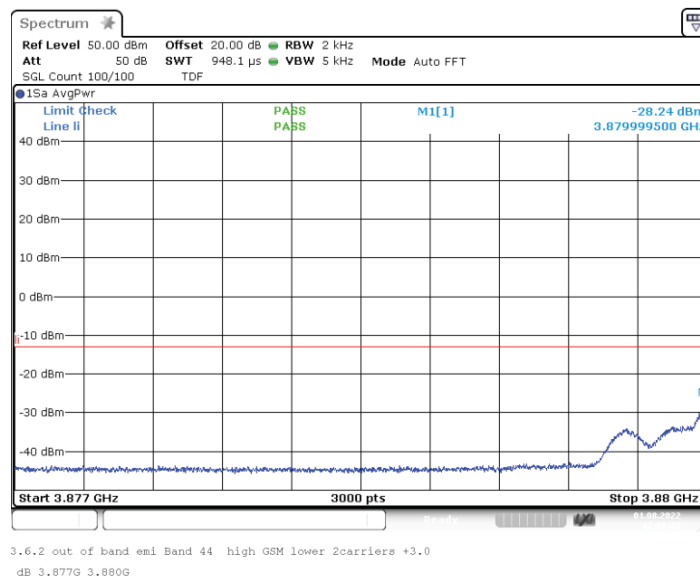
BUREAU VERITAS

EMC Test Report No.: 22-0168  
EMC tests on Andrew CAP M2 C-Band F-DC

Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 0.3 dB < AGC; Number of signals 2



Band C, Segment 3; Frequency: 3.8800 GHz to 3.9800 GHz; Band Edge: lower; Mod: Narrowband;  
Input Power = 3 dB > AGC; Number of signals 2



#### 4.5.5 TEST EQUIPMENT USED

- Conducted

The test results relate only to the tested item. The sample has been provided by the client.  
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**EMC Test Report No.: 22-0168**

EMC tests on Andrew CAP M2 C-Band F-DC

#### 4.6 OUT-OF-BAND REJECTION

Standard FCC Part 27

**The test was performed according to:**  
ANSI C63.26

**Test date:** 2022-07-20, 2022-07-21 and 2022-08-01

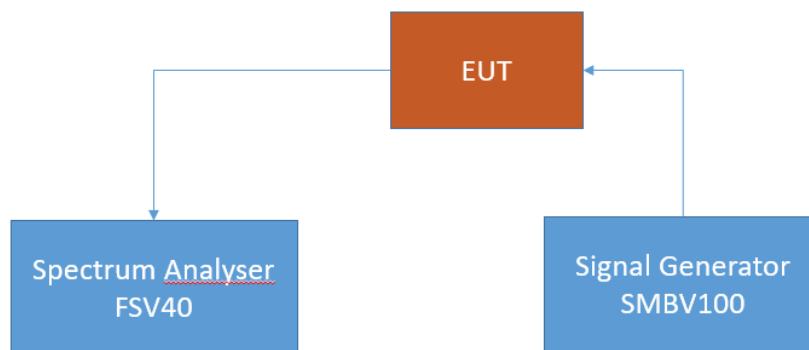
**Environmental conditions:** 23 ° C ± 5 K; 40 % r. F. ± 20 % r. F.

**Test engineer:** Thomas Hufnagel

##### 4.6.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the out-of-band rejection test case for industrial signal boosters.

The EUT was connected to the test setup according to the following diagram:



FCC Part 22/24/27/90 Industrial signal booster – Test Setup; Out-of-band rejection

The attenuation of the measuring and stimulus path are known for each measured frequency and are considered.

The Spectrum Analyzer settings can be directly found in the measurement diagrams.

##### 4.6.2 TEST REQUIREMENTS/LIMITS

For this test case exists no applicable limit



### 4.6.3 TEST PROTOCOL

C-Band, segment 1, downlink				
Highest Power Frequency [MHz]	Output Power [dBm]	Lower Highest Power -20 dB Frequency [MHz]	Upper Highest Power -20 dB Frequency [MHz]	20 dB Bandwidth [MHz]
3793.60	24.18	3696.475	3803.825	107.35

C-Band, segment 2, downlink				
Highest Power Frequency [MHz]	Output Power [dBm]	Lower Highest Power -20 dB Frequency [MHz]	Upper Highest Power -20 dB Frequency [MHz]	20 dB Bandwidth [MHz]
3793.40	24.43	3786.225	3893.775	107.55

C-Band, segment 3, downlink				
Highest Power Frequency [MHz]	Output Power [dBm]	Lower Highest Power -20 dB Frequency [MHz]	Upper Highest Power -20 dB Frequency [MHz]	20 dB Bandwidth [MHz]
3997.40	24.95	3876.275	3983.775	107.50

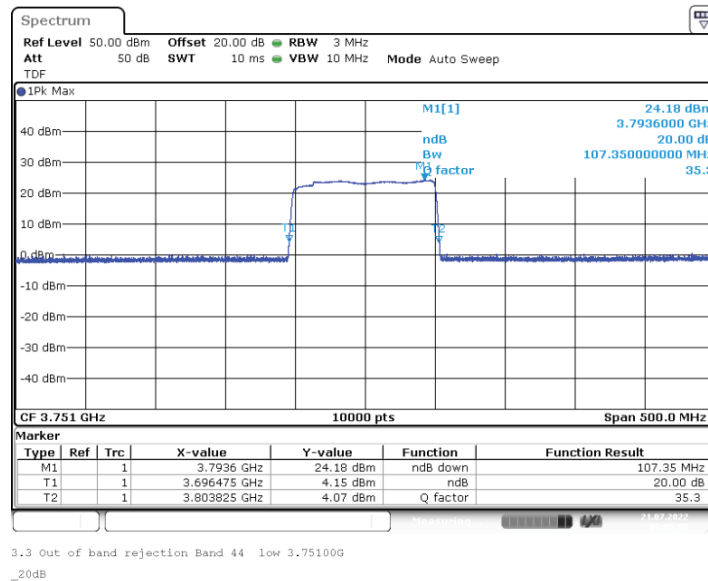
Remark: Please see next sub-clause for the measurement plots.

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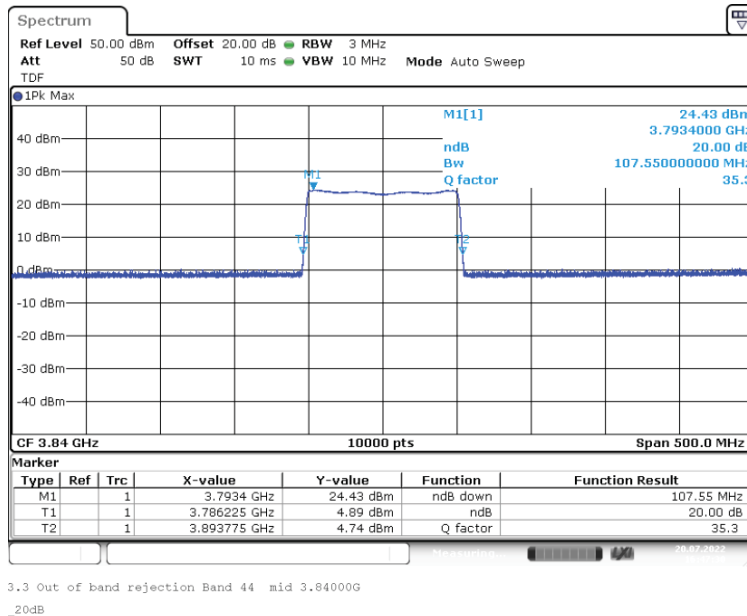


### 4.6.4 MEASUREMENT PLOTS

Frequency band = C-Band, segment 1, Direction = RF downlink



Frequency band = C-Band, segment 2, Direction = RF downlink

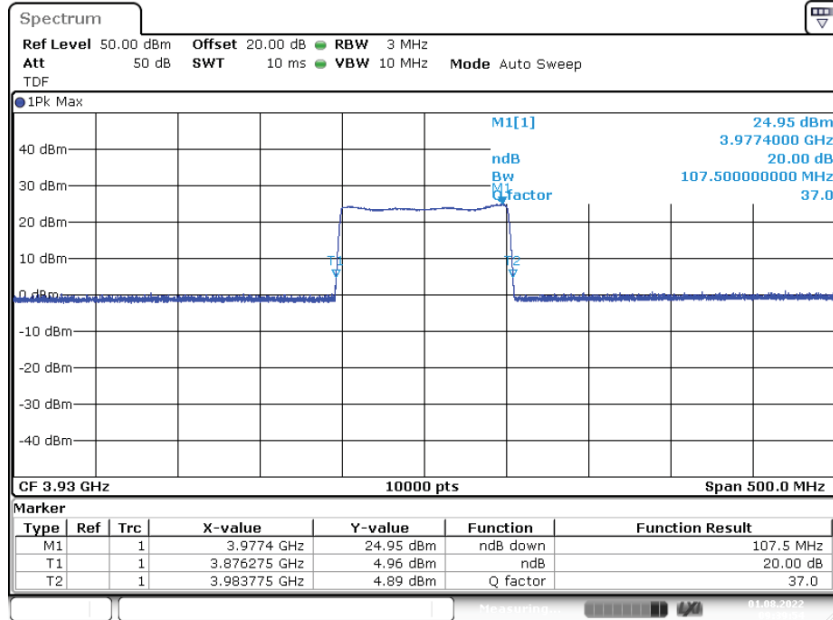


The test results relate only to the tested item. The sample has been provided by the client.  
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Frequency band = C-Band, segment 3, Direction = RF downlink



3.3 Out of band rejection Band 44 high 3.93000G  
\_20dB

#### 4.6.5 TEST EQUIPMENT USED

- Conducted

The test results relate only to the tested item. The sample has been provided by the client.  
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**EMC Test Report No.: 22-0168**

EMC tests on Andrew CAP M2 C-Band F-DC

#### 4.7 FIELD STRENGTH OF SPURIOUS RADIATION

Standard FCC Part 27, §27.53

**The test was performed according to:**  
ANSI C63.26

**Test date:** 2022-08-03 to 2022-08-05

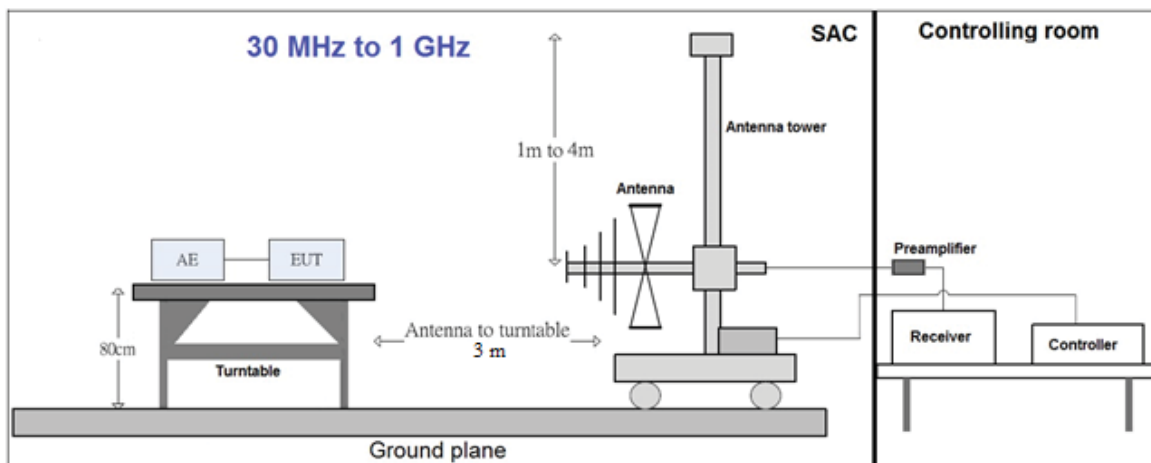
**Environmental conditions:** 23 ° C ± 5 K; 40 % r. F. ± 20 % r. F.

**Test engineer:** Thomas Hufnagel

##### 4.7.1 TEST DESCRIPTION

This test case is intended to demonstrate compliance to the applicable radiated spurious emission measurements per § 2.1053

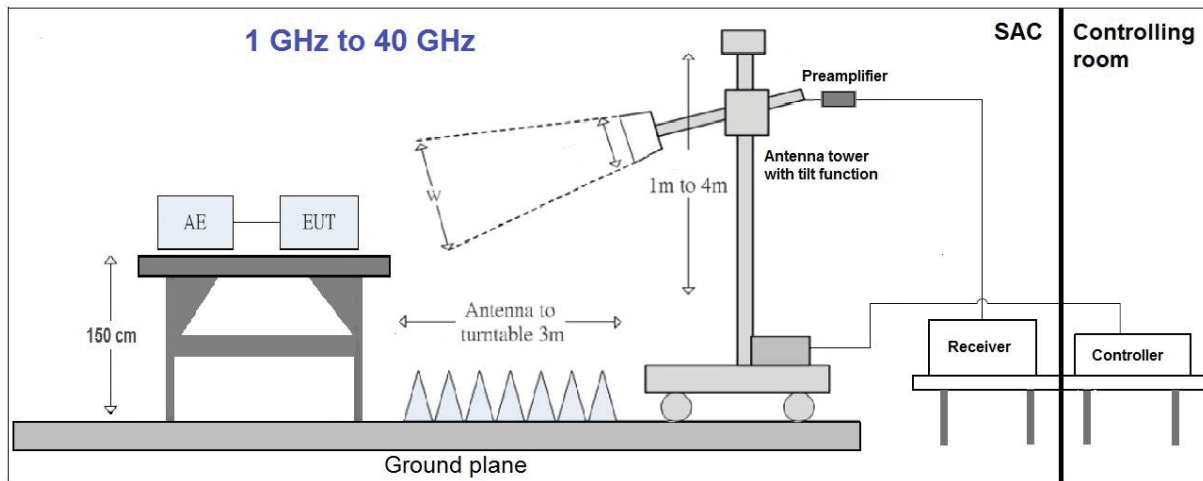
The EUT was connected to the test setup according to the following diagram:



The test results relate only to the tested item. The sample has been provided by the client.  
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EMC tests on Andrew CAP M2 C-Band F-DC



The test set-up was made in accordance to the general provisions of ANSI C63.4 in a typical installation configuration. The Equipment Under Test (EUT) was set up on a non-conductive table  $1.5 \times 1.5 \text{ m}^2$  in the semi-anechoic chamber, 0.8 meter above the ground or floor-standing arrangement shall be placed on the horizontal ground reference plane.. The influence of the EUT support table that is used between 30–1000 MHz was evaluated. For the initial measurements, the receiving antenna is varied from 1-4 meter height and is changed in the vertical plane from vertical to horizontal polarization at each frequency. The highest emissions between 30 MHz to 1000 MHz were analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions.

The measurement procedure is implemented into the EMI test software BAT EMC from NEXIO. Exploratory tests are performed at 3 orthogonal axes to determine the worst-case orientation of a body-worn or handheld EUT. The final test on all kind of EUTs is also performed at 3 axes. A pre-check is performed while the EUT is powered by a DC power source.

## 1. Measurement above 30 MHz and up to 1 GHz

### Step 1: Preliminary scan

This is a preliminary test to identify the highest amplitudes relative to the limit.

Settings for step 1:

- Antenna distance: 3 m
- Detector: PEAK
- Frequency range: 30 – 1000 MHz
- Frequency steps: 30 kHz
- IF-Bandwidth: 120 kHz
- Turntable angle range:  $-180^{\circ}$  to  $180^{\circ}$
- Turntable step size:  $15^{\circ}$
- Height variation range: 1 – 4 m
- Height variation step size: 2 m
- Polarisation: Horizontal + Vertical

Intention of this step is, to determine the radiated EMI-profile of the EUT. Afterwards the relevant emissions for the final measurement are identified.

### Step 2: Adjustment measurement

In this step the accuracy of the turntable azimuth and antenna height will be improved. This is necessary to find out the maximum value of every frequency.

For each frequency, which was determined the turntable azimuth and antenna height will be adjusted. The turntable azimuth will slowly vary by  $\pm 45^{\circ}$  around this value. During this action, the value of emission is continuously measured. The turntable azimuth at the highest emission will be recorded and adjusted. In this position, the antenna height will also slowly vary by  $\pm 100$  cm around the antenna height determined. During this action, the value of emission is also continuously measured. The antenna height of the highest emission will also be recorded and adjusted.

- Detector: PEAK
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz
- Turntable angle range:  $\pm 30^{\circ}$  around the determined value
- Antenna Polarisation: max. value determined in step 1

### Step 3: Final measurement with PEAK detector

With the settings determined in step 3, the final measurement will be performed:

EMI receiver settings for step 4:

- Detector: PEAK ( $< 1$  GHz)
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 120 kHz

After the measurement a plot will be generated which contains a diagram with the results of the preliminary scan and a chart with the frequencies and values of the results of the final measurement.



**EMC Test Report No.: 22-0168**

EMC tests on Andrew CAP M2 C-Band F-DC

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**3. Measurement above 1 GHz**

The following modifications apply to the measurement procedure for the frequency range above 1 GHz:

**Step 1:**

The Equipment Under Test (EUT) was set up on a non-conductive support at 1.5 m height in the semi-anechoic chamber. Absorbers are placed around and between the turn table and the antenna tower.

All steps were performed with one height (1.5 m) of the receiving antenna only.

The EUT is turned during the preliminary measurement across the elevation axis, with a step size of 30 °.

The turn table step size (azimuth angle) for the preliminary measurement is 15 °.

**Step 2:**

The maximum RFI field strength was determined during the measurement by rotating the turntable ( $\pm 180$  degrees) and varying the height of the receive antenna ( $h = 1 \dots 4$  m) with a additional tilt function of the antenna. The turn table azimuth will slowly vary by  $\pm 15^\circ$ .

EMI receiver settings (for all steps):

- Detector: PEAK
- IF Bandwidth = 1 MHz

**Step 3:**

Spectrum analyser settings for step 3:

- Detector: PEAK
- Measured frequencies: in step 1 determined frequencies
- IF – Bandwidth: 1 MHz

## 4.7.2 TEST REQUIREMENTS/LIMITS

### **FCC Part 2.1053; Measurement required: Field strength of spurious radiation:**

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of §2.1049, as appropriate.

### **Part 27; Miscellaneous Wireless Communication Services**

#### **Subpart C – Technical standards**

#### **§27.53 – Emission limits**

- (l) **3.7 GHz Service.** The following emission limits apply to stations transmitting in the 3700-3980 MHz band:
- (1) For base station operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed  $-13$  dBm/MHz. Compliance with this paragraph (l)(1) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.
  - (2) For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed  $-13$  dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.



**EMC Test Report No.: 22-0168**

EMC tests on Andrew CAP M2 C-Band F-DC

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### 4.7.3 TEST PROTOCOL

General considerations concerning the limits:

The measuring bandwidth of 1 MHz was chosen according the test requirements except at the bands from 30 MHz to 1 GHz: At these bands reducing of measurement bandwidth was done.

Also outside the downlink frequency band at lower frequencies the measurement bandwidths were reduced to have the possibility to record the spurious emissions at these lower frequencies.

At frequencies were measuring bandwidths were reduced also the limit lines were reduced according the given formula:

$$p_{RBWreduced} [dBm] = 10 * \log \left( RBWreduced [kHz] - 1000 kHz \right) + p_{RBW 1000 kHz} [dBm]$$

Hereby "p" are the limit lines' values.

Considerations to MIMO operation:

At this test the four output ports ANT 1 to ANT 4 are together in function according KDB 935210 D02 v04r02 chapter II (o) (2).



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At this tables the highest peak value of spurious radiation per frequency test band is shown.

<b>C-Band, segment 1, downlink;</b>						
<b>Spurious Freq. [MHz]</b>	<b>Spurious Level [dBm]</b>	<b>Pin [dBm]</b>	<b>Detector</b>	<b>RBW [kHz]</b>	<b>Limit [dBm]</b>	<b>Margin to Limit [dB]</b>
101.7/vert.	-54.1	-4.8	PEAK	120	-22.2	31.9
17748/hor.	-18.0	-4.8	PEAK	1000	-13.0	5.0
26892/vert.	-43.3	-4.8	PEAK	1000	-13.0	30.0
39928/hor.	-15.5	-4.8	PEAK	1000	-13.0	2.5

<b>C-Band, segment 2, downlink;</b>						
<b>Spurious Freq. [MHz]</b>	<b>Spurious Level [dBm]</b>	<b>Pin [dBm]</b>	<b>Detector</b>	<b>RBW [kHz]</b>	<b>Limit [dBm]</b>	<b>Margin to Limit [dB]</b>
101.7/vert.	-55.3	-4.8	PEAK	120	-22.2	33.1
17840/hor.	-17.8	-4.8	PEAK	1000	-13.0	4.8
26774/hor.	-42.6	-4.8	PEAK	1000	-13.0	29.6
39851/hor.	-14.6	-4.8	PEAK	1000	-13.0	1.6

<b>C-Band, segment 3, downlink;</b>						
<b>Spurious Freq. [MHz]</b>	<b>Spurious Level [dBm]</b>	<b>Pin [dBm]</b>	<b>Detector</b>	<b>RBW [kHz]</b>	<b>Limit [dBm]</b>	<b>Margin to Limit [dB]</b>
101.8/vert.	-54.1	-4.8	PEAK	120	-22.2	31.9
17367/vert.	-17.4	-4.8	PEAK	1000	-13.0	4.4
26747/vert.	-40.0	-4.8	PEAK	1000	-13.0	27.0
39723/vert.	-15.0	-4.8	PEAK	1000	-13.0	2.0

**Abbreviations:**

Hor.: horizontal position

Vert.: vertical position

Remark: Please see next sub-clause for the measurement plot.

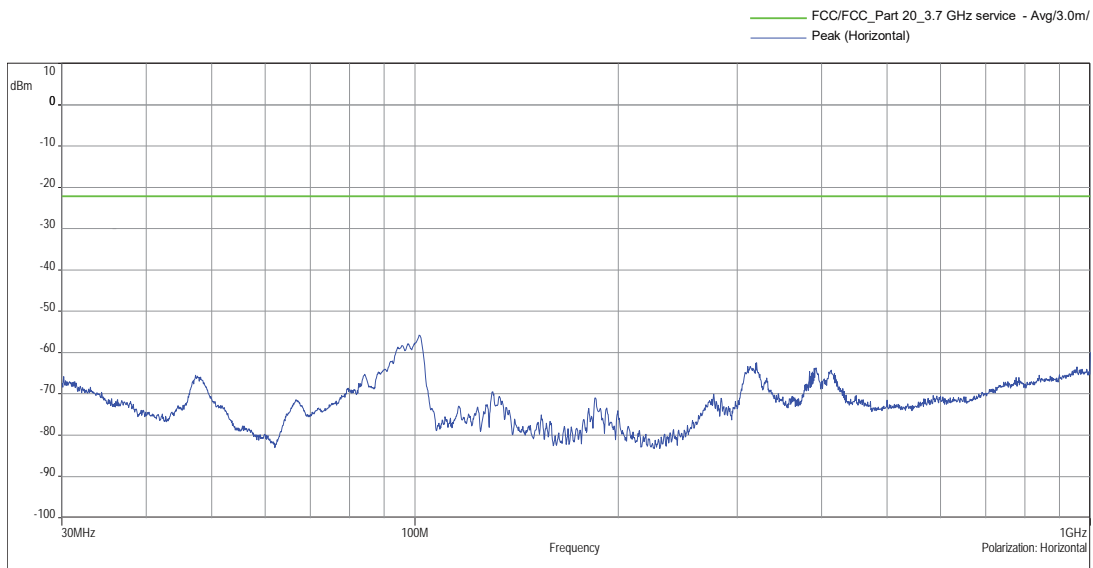




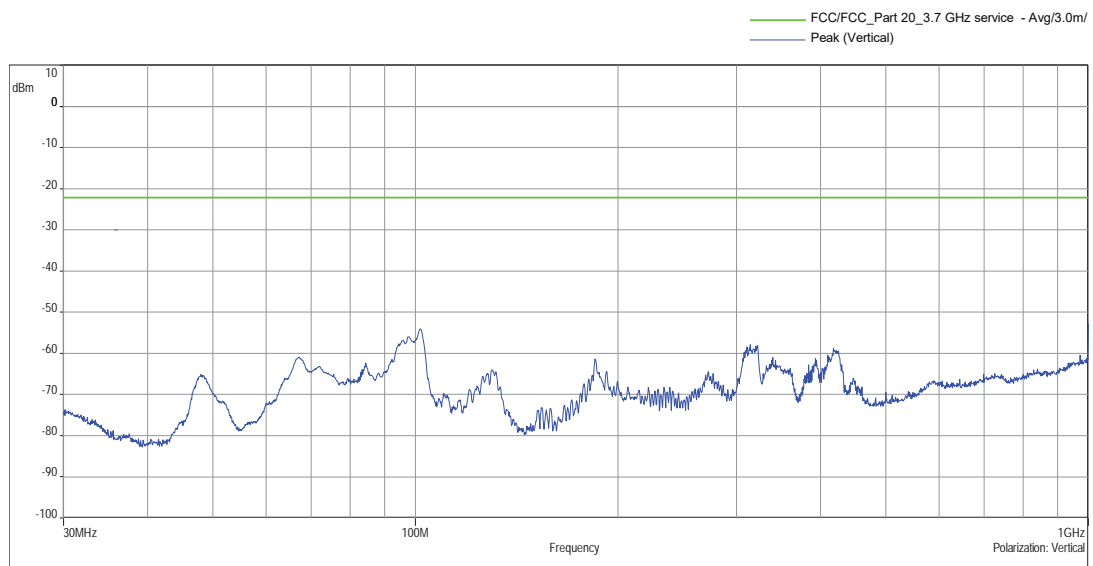
#### 4.7.4 MEASUREMENT PLOT (SHOWING THE HIGHEST VALUE, "WORST CASE")

4.7.4.1 Frequency Band = C-Band, Segment 1, ANT 1 to ANT 4, Direction = RF downlink

30 MHz - 1 GHz, horizontal



30 MHz - 1 GHz, vertical



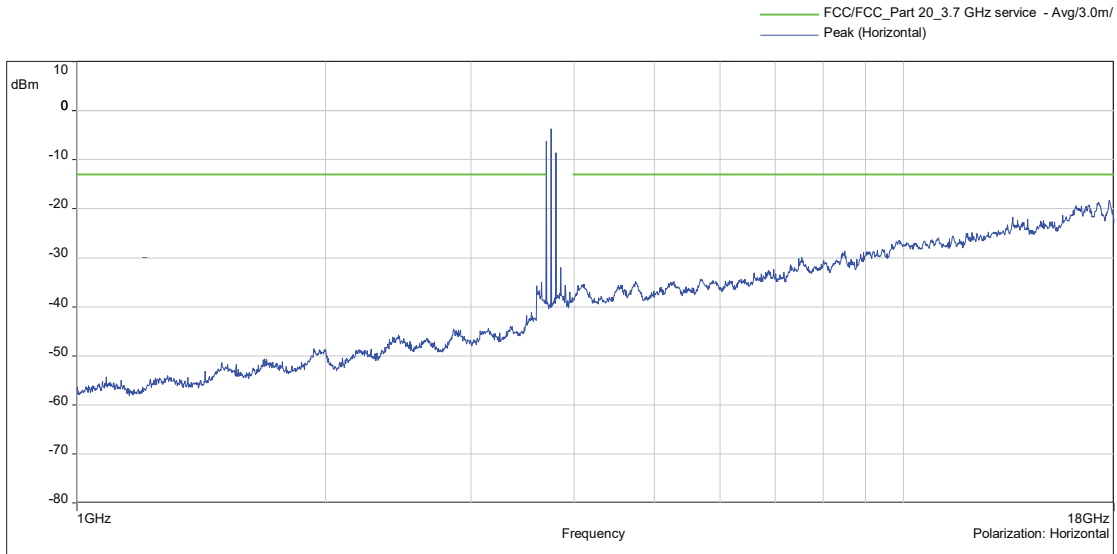
The test results relate only to the tested item. The sample has been provided by the client.  
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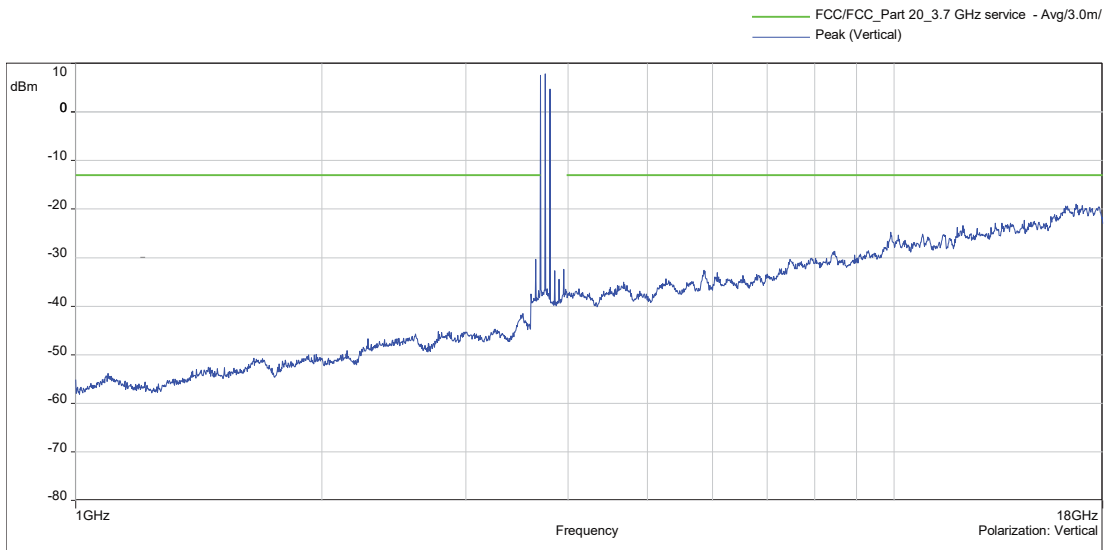
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**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

1 GHz - 18 GHz, horizontal



1 GHz - 18 GHz, vertical



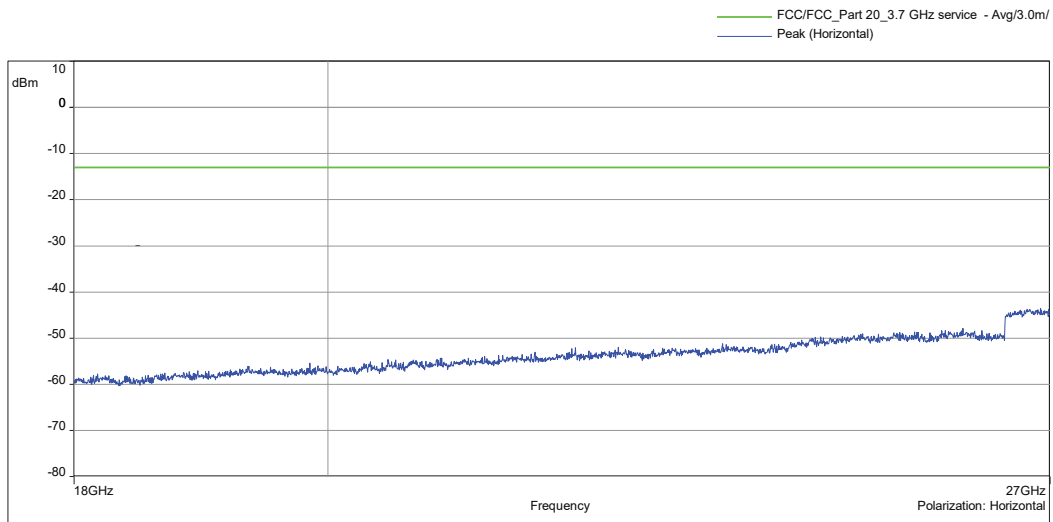
The test results relate only to the tested item. The sample has been provided by the client.  
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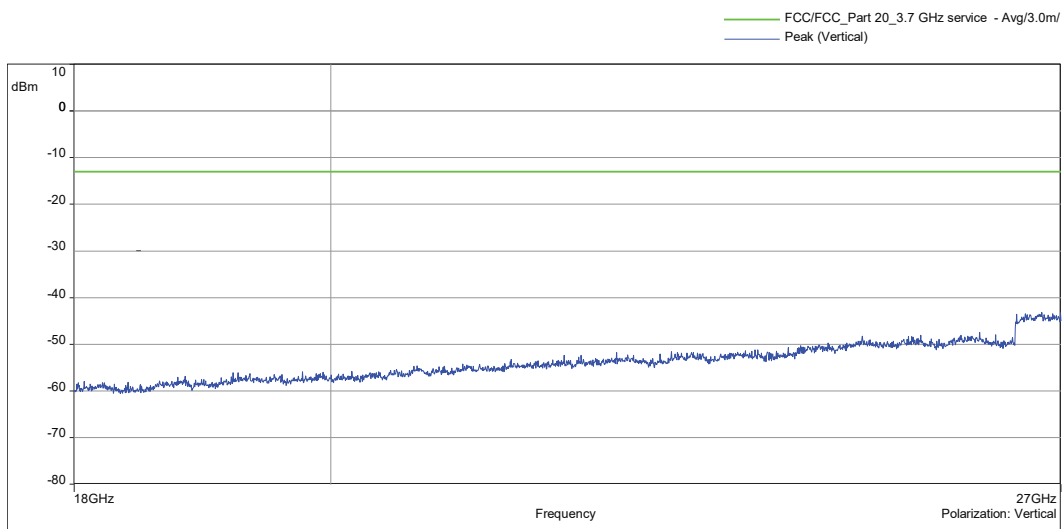
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**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

18 GHz - 27 GHz, horizontal



18 GHz - 27 GHz, vertical



The test results relate only to the tested item. The sample has been provided by the client.  
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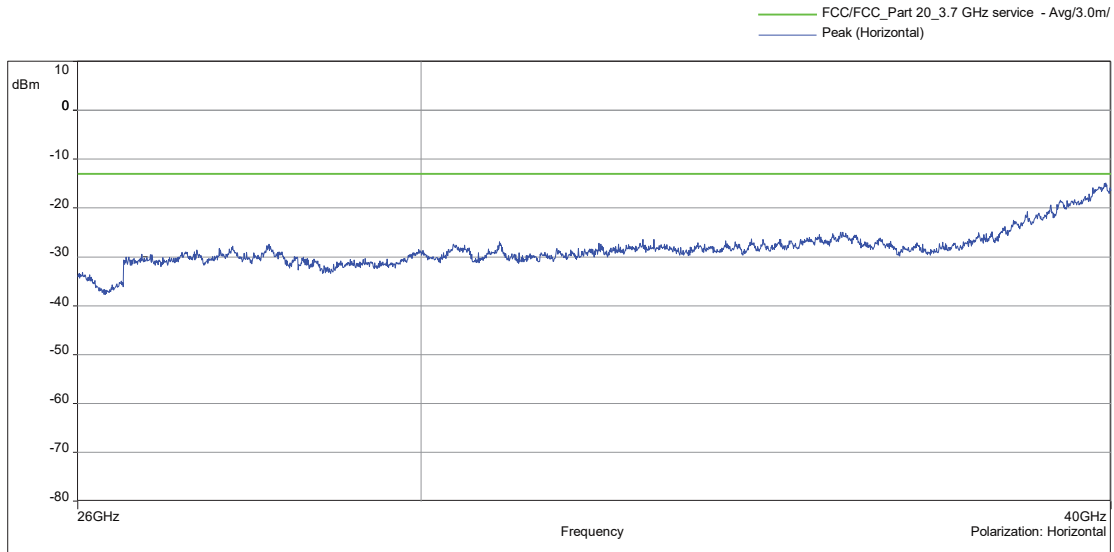
2022-0536-EMC-TR-22-0168-V02



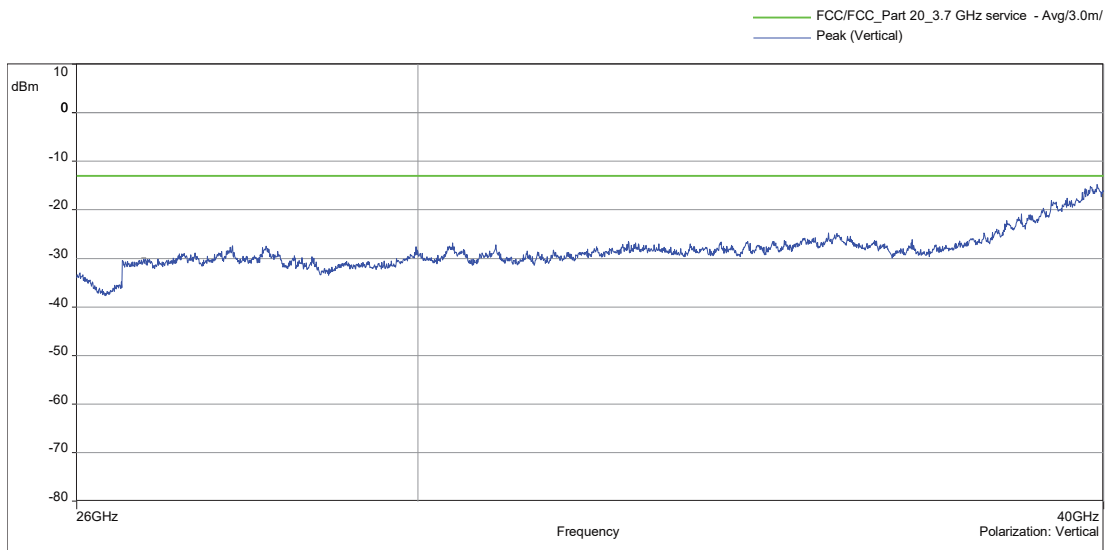
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**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

26 GHz - 40 GHz, horizontal



26 GHz - 40 GHz, vertical

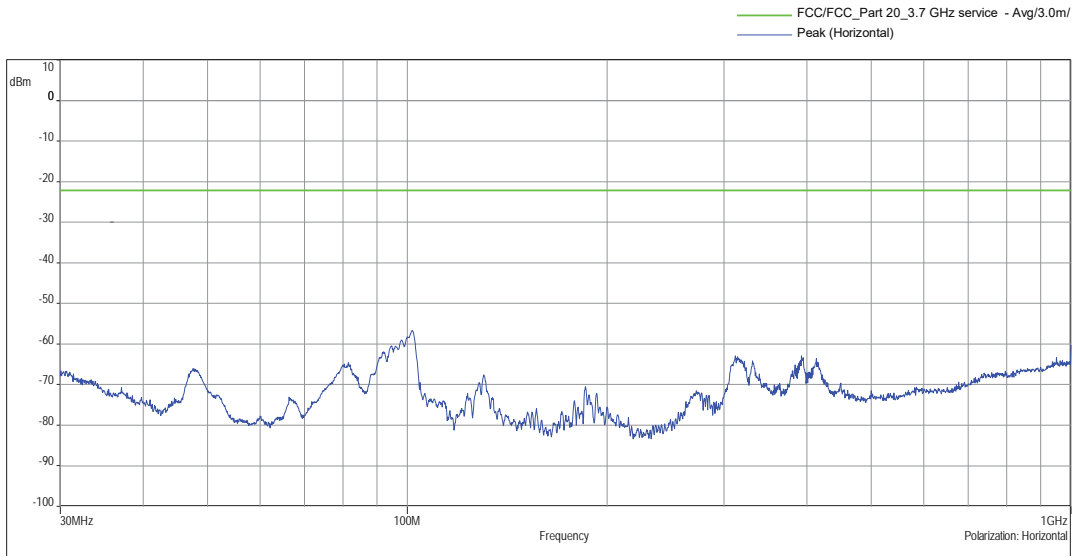


The test results relate only to the tested item. The sample has been provided by the client.  
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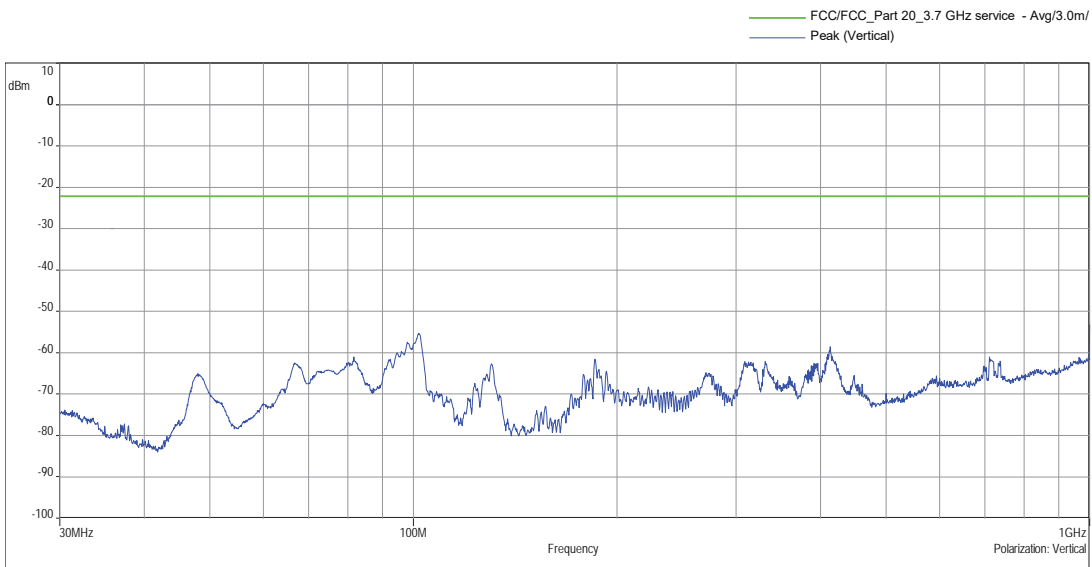


4.7.4.2 Frequency Band = C-Band, Segment 2, ANT 1 to ANT 4, Direction = RF downlink

30 MHz - 1 GHz, horizontal



30 MHz - 1 GHz, vertical



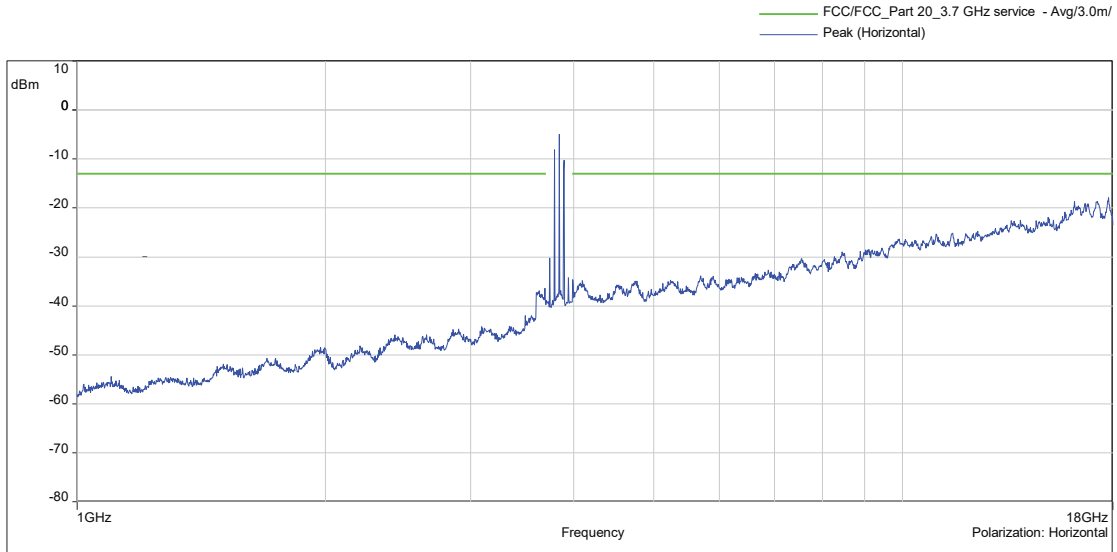
The test results relate only to the tested item. The sample has been provided by the client.  
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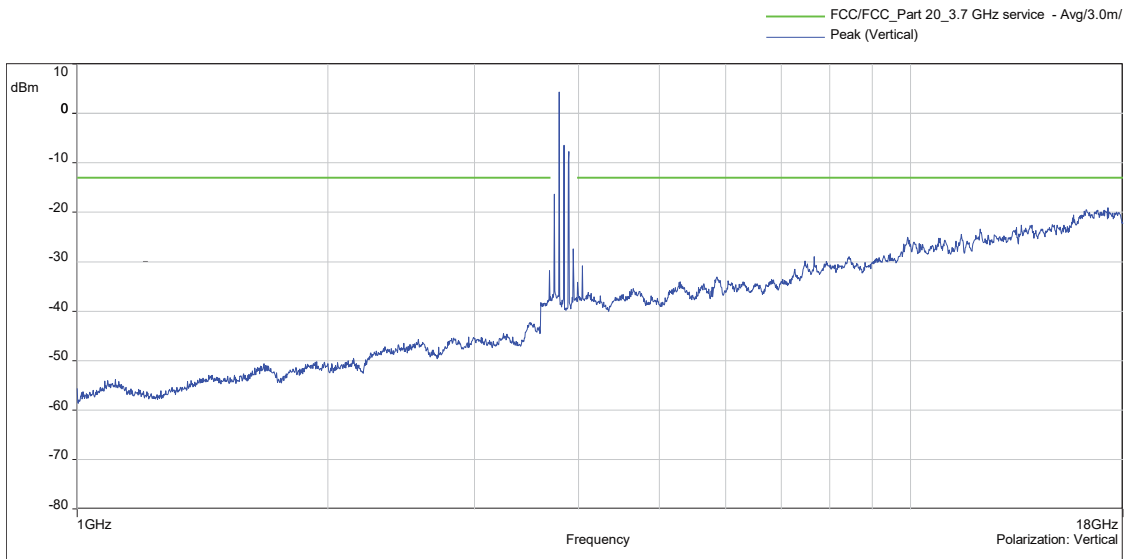
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**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

1 GHz - 18 GHz, horizontal



1 GHz - 18 GHz, vertical



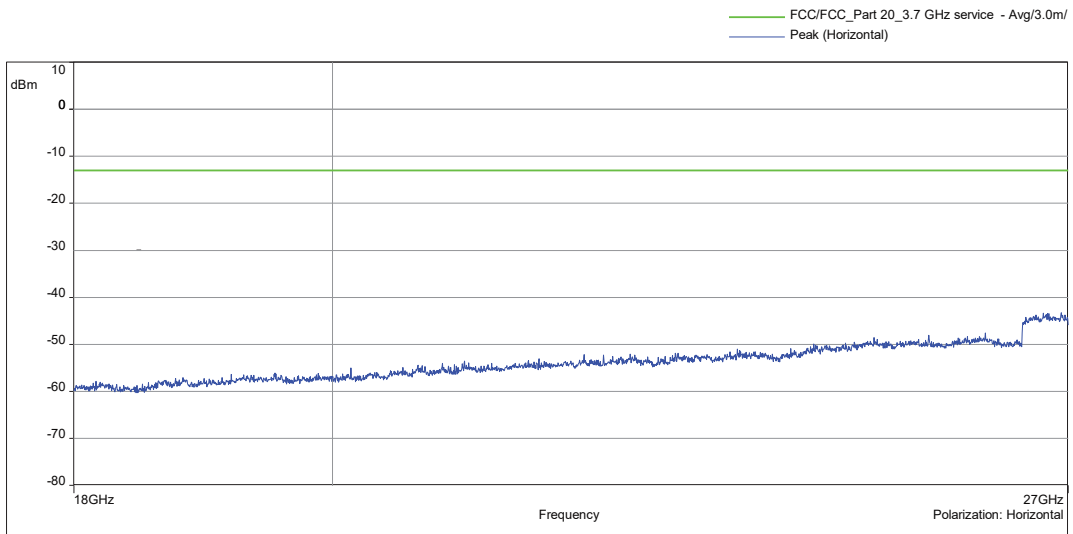
The test results relate only to the tested item. The sample has been provided by the client.  
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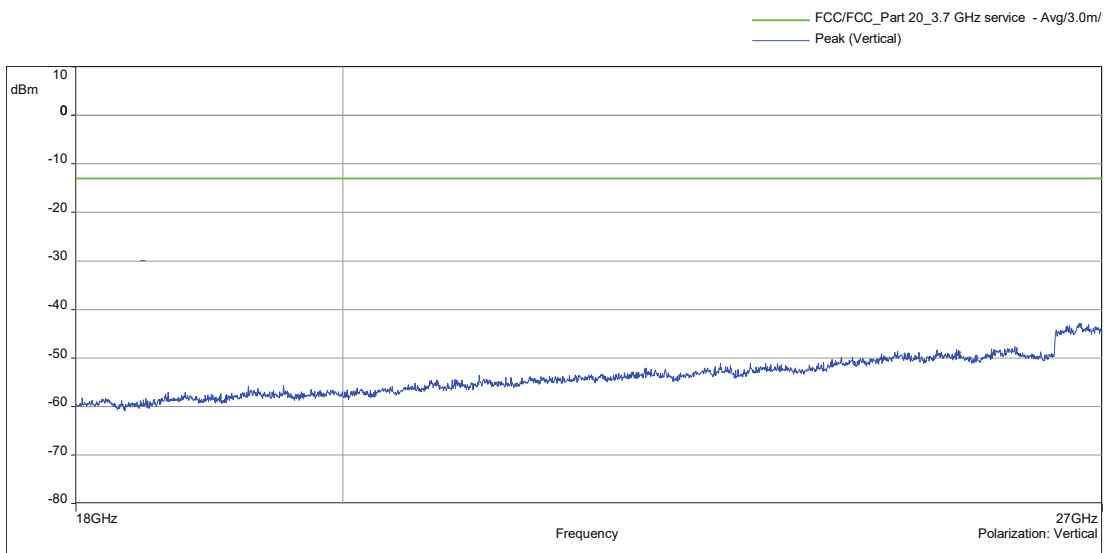
**BUREAU  
VERITAS**

**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

18 GHz - 27 GHz, horizontal



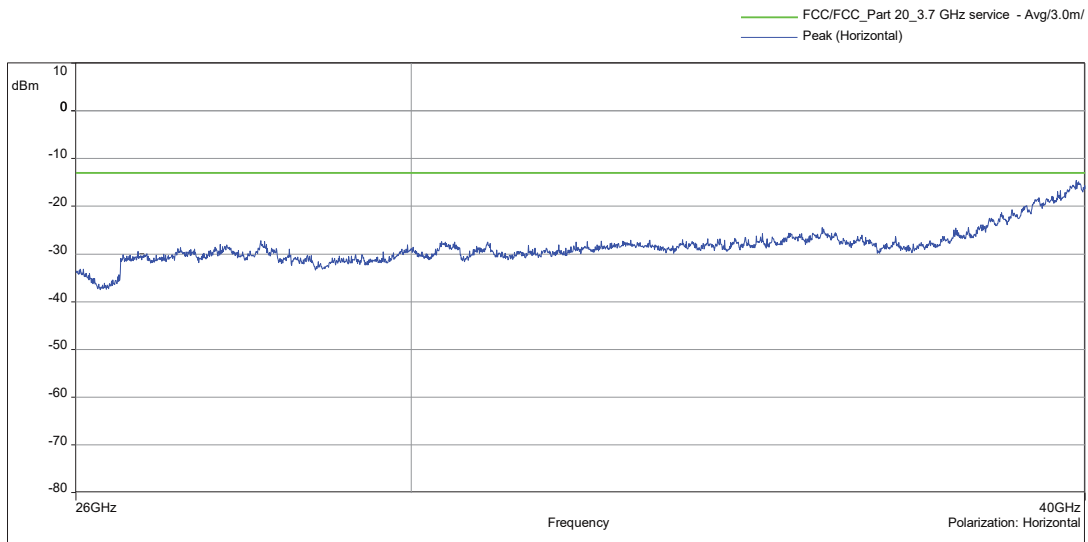
18 GHz - 27 GHz, vertical



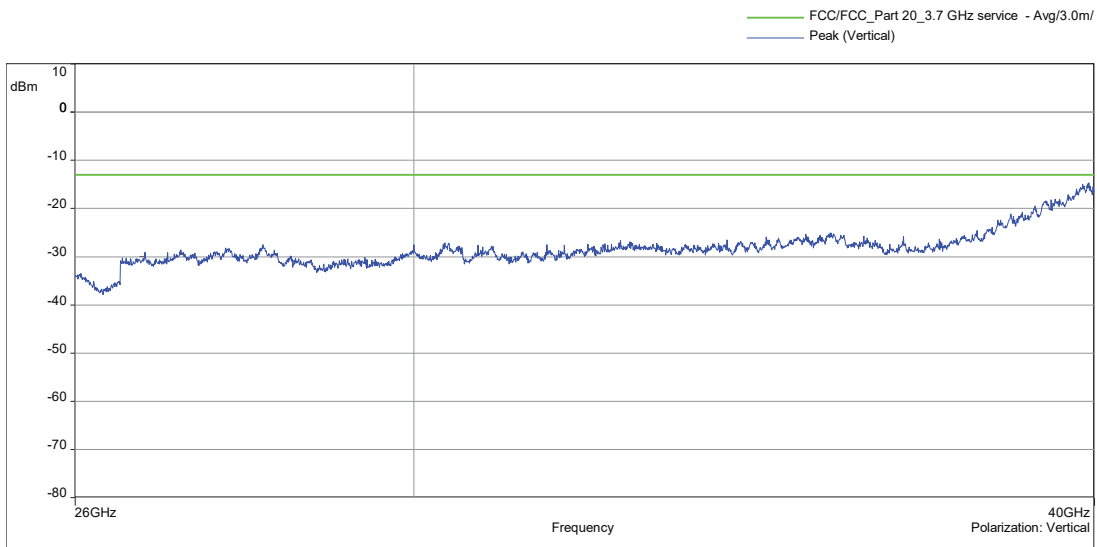
The test results relate only to the tested item. The sample has been provided by the client.  
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26 GHz - 40 GHz, horizontal



26 GHz - 40 GHz, vertical



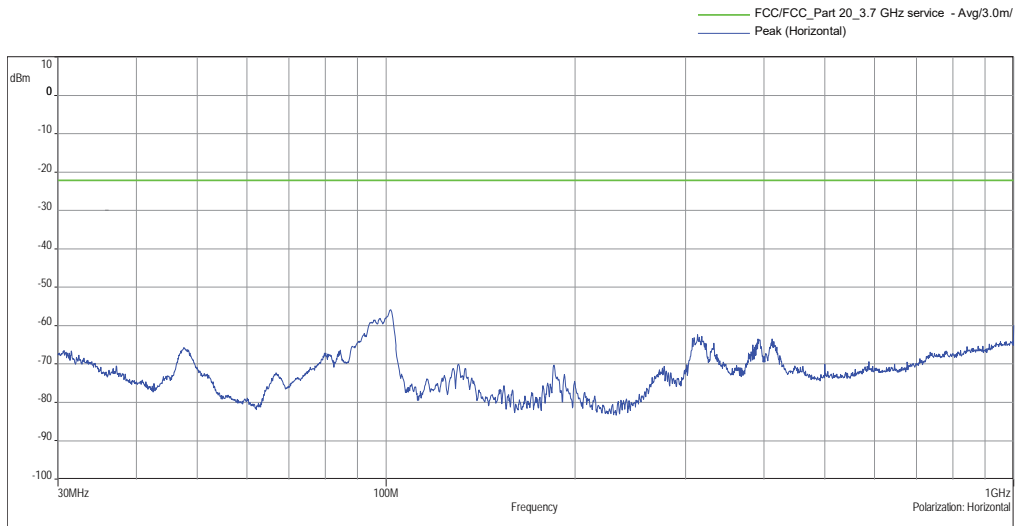
The test results relate only to the tested item. The sample has been provided by the client.  
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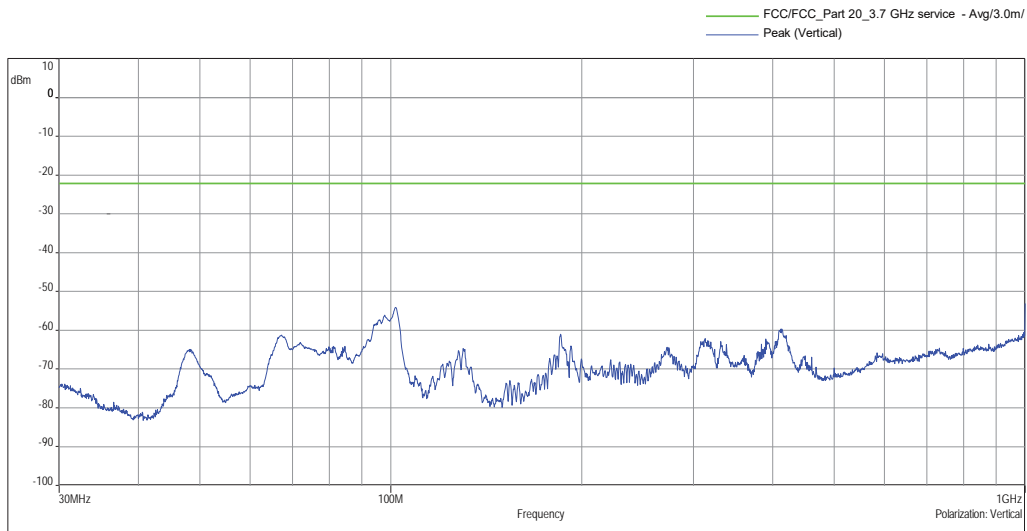


4.7.4.3 Frequency Band = C-Band, Segment 3, ANT 1 to ANT 4, Direction = RF downlink

30 MHz - 1 GHz, horizontal



30 MHz - 1 GHz, vertical



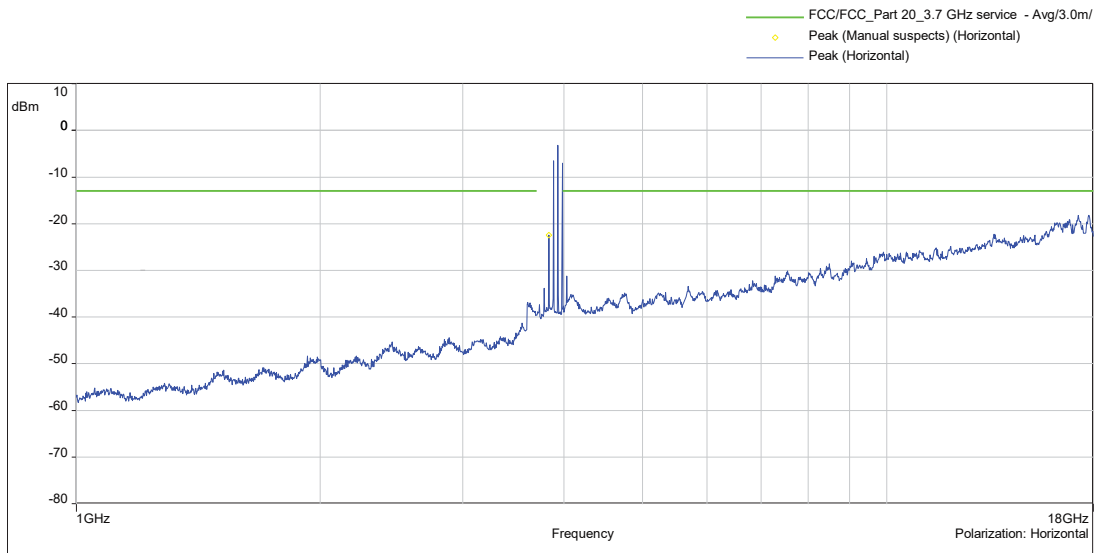
The test results relate only to the tested item. The sample has been provided by the client.  
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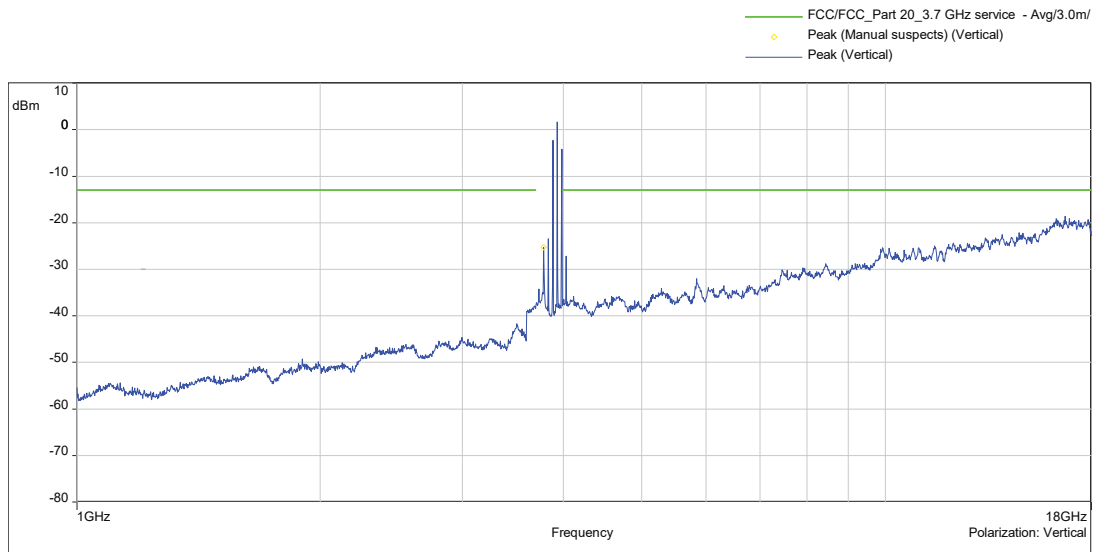
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**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

1 GHz - 18 GHz, horizontal



1 GHz - 18 GHz, vertical



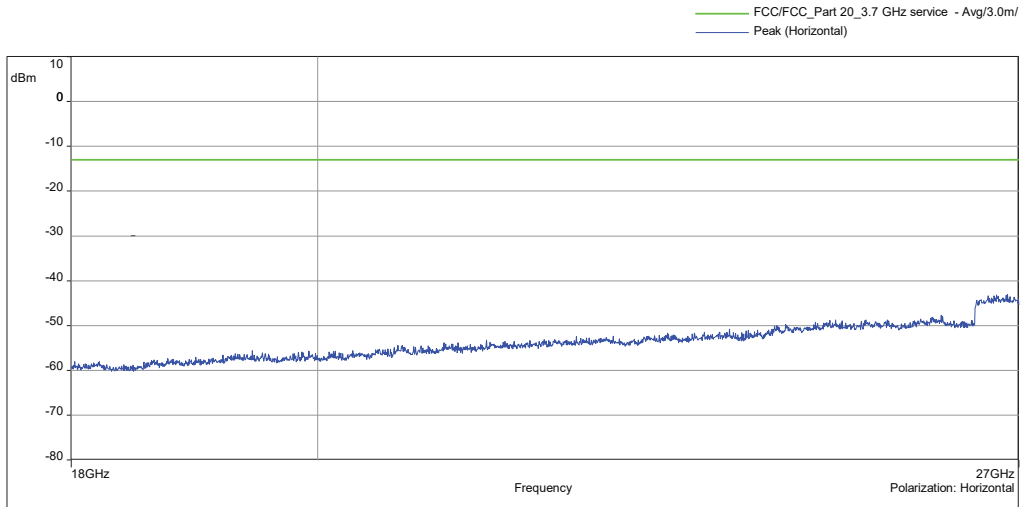
The test results relate only to the tested item. The sample has been provided by the client.  
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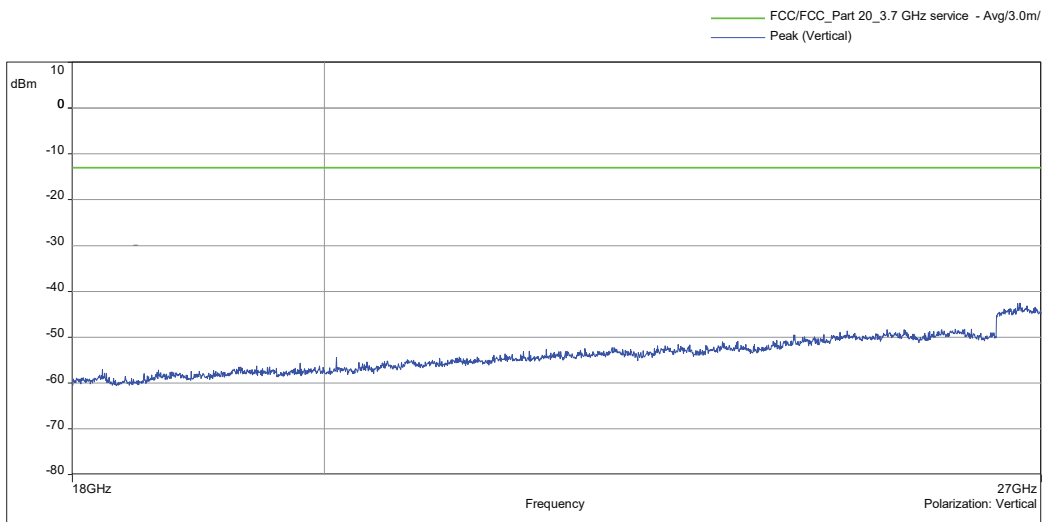
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**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

18 GHz - 27 GHz, horizontal



18 GHz - 27 GHz, vertical



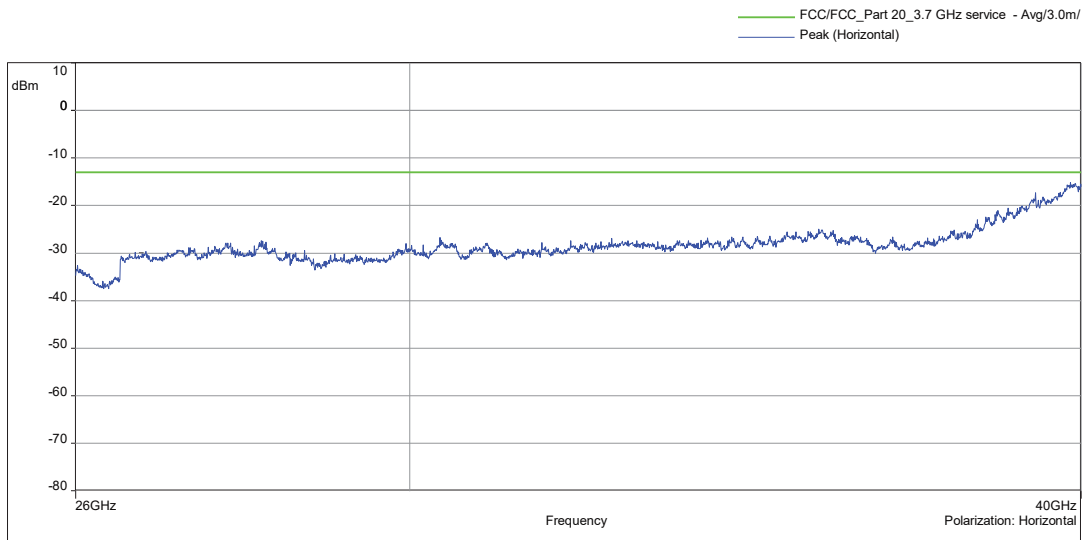
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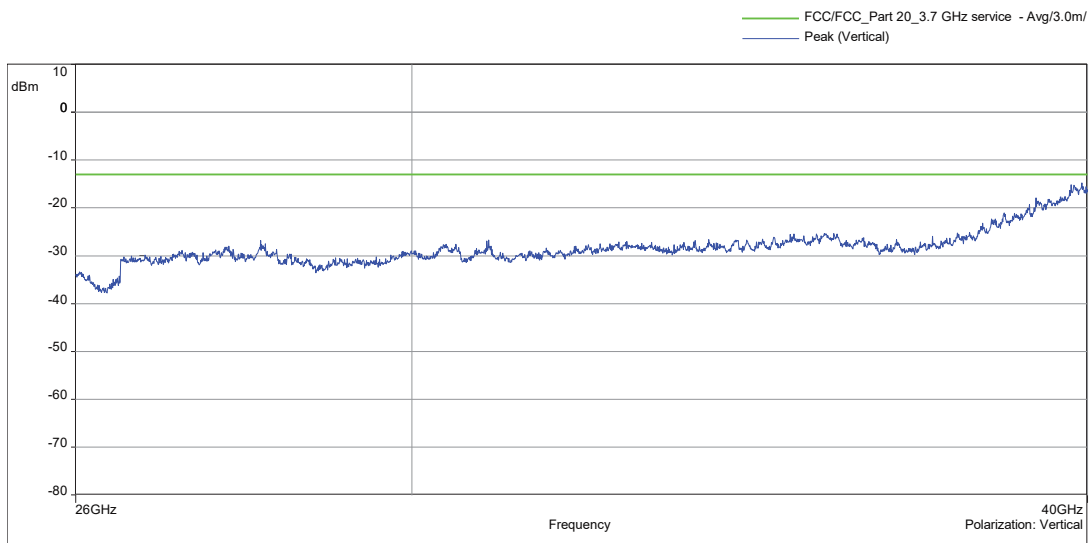
**BUREAU  
VERITAS**

**EMC Test Report No.: 22-0168**  
EMC tests on Andrew CAP M2 C-Band F-DC

26 GHz - 40 GHz, horizontal



26 GHz - 40 GHz, vertical



The test results relate only to the tested item. The sample has been provided by the client.  
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**EMC Test Report No.: 22-0168**

EMC tests on Andrew CAP M2 C-Band F-DC

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#### 4.7.5 FIELD STRENGTH CALCULATIONS

$$FS = SA + AF + CL + PA$$

Where as:

- FS** = Field strength
- SA** = EMC test receiver reading
- AF** = Antenna factor
- CL** = Cable loss
- PA** = Preamplifier

#### 4.7.6 TEST EQUIPMENT USED

- Radiated Emissions



**EMC Test Report No.: 22-0168**

EMC tests on Andrew CAP M2 C-Band F-DC

## 5 TEST EQUIPMENT

### 5.1 CONDUCTED EMISSIONS

Ref.No.	Type	Description	Manufacturer	Inventory no.	Last Calibration	Calibration Due
1.1	FSV40	Signal Analyzer 10 Hz - 40 GHz	Rohde & Schwarz	E-003138	2021-10	2022-10
1.2	SMBV100A	Vector Signal Generator 9 kHz - 6 GHz	Rohde & Schwarz	E-003206	2020-08	2023-08
1.3	BAT-EMC	Software	Nexio	V 2022.0.9.0	---	---

### 5.2 RADIATED EMISSIONS

Ref.No.	Type	Description	Manufacturer	Inventory no.	Last Calibration	Calibration Due
1.4	ESU40	EMI test receiver 10 Hz - 40 GHz	Rohde & Schwarz	E-003138	2021-10	2022-10
1.5	CBL 6111C	Antenna 30 MHz - 1 GHz	Chase	E-003226	2021-10	2024-10
1.6	HL 025	Antenna 1 GHz - 18 GHz	Rohde & Schwarz	E-003259	2022-01	2023-01
1.7	MWH-1826/B	Antenna 18 GHz - 26.5 GHz	ARA Inc.	E-003233	2020-10	2022-10
1.8	MWH-2640/B	Antenna 26 GHz - 40 GHz	ARA Inc.	E-003234	2020-10	2022-10
1.9	AM1431	Pre amplifier 10 kHz - 1 GHz	Miteq	E-003365	2021-10	2022-10
1.10	AFS4-00102000	Preamplifier 100 MHz - 20 GHz	Miteq	E-003633	2021-10	2022-10
1.11	JS43-1800-4000	Preamplifier 18 GHz - 40 GHz	Miteq	E-003249	2021-07	2023-07
1.12	CO3000	Controller SAC	Innco systems GmbH	E-003052 with Software 1.02.62	---	---
1.13	BAT-EMC	Software	Nexio	V 2022.0.9.0	---	---

The calibration interval is the time interval between "Last Calibration" and "Calibration Due".



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EMC tests on Andrew CAP M2 C-Band F-DC

**6 ANTENNA FACTORS, CABLE LOSS AND SAMPLE CALCULATIONS**

This chapter contains the antenna factors with their corresponding path loss of the used measurement path for all antennas as well as the insertion loss of the LISN.

**6.1 ANTENNA CHASE CBL 6111C (30 MHZ – 1 GHZ)**

( $d_{Limit} = 3\text{ m}$ )

Frequency	AF	Corr.
MHz	dB (1/m)	dB
30	18.6	0.6
50	6.0	0.9
100	9.7	1.2
150	7.9	1.6
200	7.6	1.9
250	9.5	2.1
300	11.0	2.3
350	12.4	2.6
400	13.6	2.9
450	14.7	3.1
500	15.6	3.2
550	16.3	3.5
600	17.2	3.5
650	18.1	3.6
700	18.5	3.6
750	19.1	4.1
800	19.6	4.1
850	20.1	4.4
900	20.8	4.7
950	21.1	4.8
1000	21.6	4.9

cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	cable loss 4 (to receiver)	distance corr. (-20 dB/decade)	$d_{Limit}$ (meas. distance (limit))	$d_{used}$ (meas. distance (used))
dB	dB	dB	dB	dB	m	m
0.29	0.04	0.23	0.02	0.0	3	3
0.39	0.09	0.32	0.08	0.0	3	3
0.56	0.14	0.47	0.08	0.0	3	3
0.73	0.20	0.59	0.12	0.0	3	3
0.84	0.21	0.70	0.11	0.0	3	3
0.98	0.24	0.80	0.13	0.0	3	3
1.04	0.26	0.89	0.15	0.0	3	3
1.18	0.31	0.96	0.13	0.0	3	3
1.28	0.35	1.03	0.19	0.0	3	3
1.39	0.38	1.11	0.22	0.0	3	3
1.44	0.39	1.20	0.19	0.0	3	3
1.55	0.46	1.24	0.23	0.0	3	3
1.59	0.43	1.29	0.23	0.0	3	3
1.67	0.34	1.35	0.22	0.0	3	3
1.67	0.42	1.41	0.15	0.0	3	3
1.87	0.54	1.46	0.25	0.0	3	3
1.90	0.46	1.51	0.25	0.0	3	3
1.99	0.60	1.56	0.27	0.0	3	3
2.14	0.60	1.63	0.29	0.0	3	3
2.22	0.60	1.66	0.33	0.0	3	3
2.23	0.61	1.71	0.30	0.0	3	3

**Sample calculation**

$E\text{ (dB } \mu\text{V/m)} = U\text{ (dB } \mu\text{V)} + AF\text{ (dB 1/m)} + Corr.\text{ (dB)}$   
 U = Receiver reading  
 AF = Antenna factor  
 Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)  
 distance correction =  $-20 * \text{LOG} (d_{Limit}/ d_{used})$   
 Linear interpolation will be used for frequencies in between the values in the table.  
 Tables show an extract of values.

The test results relate only to the tested item. The sample has been provided by the client.  
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6.2 ANTENNA ROHDE & SCHWARZ HL 025 (1 GHz – 18 GHz)

Frequency	AF	Corr.
MHz	dB (1/m)	dB
1000	24.4	-19.4
2000	28.5	-17.4
3000	31.0	-16.1
4000	33.1	-14.7
5000	34.4	-13.7
6000	34.7	-12.7
7000	35.6	-11.0

cable loss 1 (relay + cable inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit, attenuator & pre-amp)	cable loss 4 (to receiver)
dB	dB	dB	dB
0.99	0.31	-21.51	0.79
1.44	0.44	-20.63	1.38
1.87	0.53	-19.85	1.33
2.41	0.67	-19.13	1.31
2.78	0.86	-18.71	1.40
2.74	0.90	-17.83	1.47
2.82	0.86	-16.19	1.46

Frequency	AF	Corr.
MHz	dB (1/m)	dB
3000	31.0	-23.4
4000	33.1	-23.3
5000	34.4	-21.7
6000	34.7	-21.2
7000	35.6	-19.8

cable loss 1 (relay inside chamber)	cable loss 2 (inside chamber)	cable loss 3 (outside chamber)	cable loss 4 (switch unit, attenuator & pre-amp)	cable loss 5 (to receiver)	used for FCC 15.247
dB	dB	dB	dB	dB	
0.47	1.87	0.53	-27.58	1.33	
0.56	2.41	0.67	-28.23	1.31	
0.61	2.78	0.86	-27.35	1.40	
0.58	2.74	0.90	-26.89	1.47	
0.66	2.82	0.86	-25.58	1.46	

Frequency	AF	Corr.
MHz	dB (1/m)	dB
7000	35.6	-57.3
8000	36.3	-56.3
9000	37.1	-55.3
10000	37.5	-56.2
11000	37.5	-55.3
12000	37.6	-53.7
13000	38.2	-53.5
14000	39.9	-56.3
15000	40.9	-54.1
16000	41.3	-54.1
17000	42.8	-54.4
18000	44.2	-54.7

cable loss 1 (relay inside chamber)	cable loss 2 (High Pass)	cable loss 3 (pre-amp)	cable loss 4 (inside chamber)	cable loss 5 (outside chamber)	cable loss 6 (to receiver)
dB	dB	dB	dB	dB	dB
0.56	1.28	-62.72	2.66	0.94	1.46
0.69	0.71	-61.49	2.84	1.00	1.53
0.68	0.65	-60.80	3.06	1.09	1.60
0.70	0.54	-61.91	3.28	1.20	1.67
0.80	0.61	-61.40	3.43	1.27	1.70
0.84	0.42	-59.70	3.53	1.26	1.73
0.83	0.44	-59.81	3.75	1.32	1.83
0.91	0.53	-63.03	3.91	1.40	1.77
0.98	0.54	-61.05	4.02	1.44	1.83
1.23	0.49	-61.51	4.17	1.51	1.85
1.36	0.76	-62.36	4.34	1.53	2.00
1.70	0.53	-62.88	4.41	1.55	1.91

Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$   
 U = Receiver reading  
 AF = Antenna factor  
 Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)  
 Linear interpolation will be used for frequencies in between the values in the table.  
 Tables show an extract of values.

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EMC Test Report No.: 22-0168

EMC tests on Andrew CAP M2 C-Band F-DC

6.3 ANTENNA ARA INC. MWH-1826-B (18 GHZ – 26.5 GHZ) PARTIALLY IN CONJUNCTION WITH PRE-AMPLIFIER MITEQ JS43-1800-4000: THE USE OF THE PRE-AMPLIFIER IS DEPENDENT FROM THE FIELD STRENGTH

Frequency	AF	Corr.
MHz	dB (1/m)	dB
18000	40.2	-23.5
18500	40.2	-23.2
19000	40.2	-22.0
19500	40.3	-21.3
20000	40.3	-20.3
20500	40.3	-19.9
21000	40.3	-19.1
21500	40.3	-19.1
22000	40.3	-18.7
22500	40.4	-19.0
23000	40.4	-19.5
23500	40.4	-19.3
24000	40.4	-19.8
24500	40.4	-19.5
25000	40.4	-19.3
25500	40.5	-20.4
26000	40.5	-21.3
26500	40.5	-21.1

cable loss 1 (inside chamber)	cable loss 2 (pre-amp)	cable loss 3 (inside chamber)	cable loss 4 (switch unit)	cable loss 5 (to receiver)
dB	dB	dB	dB	dB
0.72	-35.85	6.20	2.81	2.65
0.69	-35.71	6.46	2.76	2.59
0.76	-35.44	6.69	3.15	2.79
0.74	-35.07	7.04	3.11	2.91
0.72	-34.49	7.30	3.07	3.05
0.78	-34.46	7.48	3.12	3.15
0.87	-34.07	7.61	3.20	3.33
0.90	-33.96	7.47	3.28	3.19
0.89	-33.57	7.34	3.35	3.28
0.87	-33.66	7.06	3.75	2.94
0.88	-33.75	6.92	3.77	2.70
0.90	-33.35	6.99	3.52	2.66
0.88	-33.99	6.88	3.88	2.58
0.91	-33.89	7.01	3.93	2.51
0.88	-33.00	6.72	3.96	2.14
0.89	-34.07	6.90	3.66	2.22
0.86	-35.11	7.02	3.69	2.28
0.90	-35.20	7.15	3.91	2.36

Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$   
 U = Receiver reading  
 AF = Antenna factor  
 Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)  
 Linear interpolation will be used for frequencies in between the values in the table.  
 Table shows an extract of values.

The test results relate only to the tested item. The sample has been provided by the client. Without the written consent of Bureau Veritas Consumer Products Services Germany GmbH excerpts of this report shall not be reproduced.



6.4 ANTENNA ARA INC. MWH-2640-B (26 GHZ – 40 GHZ ) PARTIALLY IN CONJUNCTION WITH PRE-AMPLIFIER MITEQ JS43-1800-4000: THE USE OF THE PRE-AMPLIFIER IS DEPENDENT FROM THE FIELD STRENGTH

Frequency	AF	Corr.
GHz	dB (1/m)	dB
26.5	43.4	-11.2
27.0	43.4	-11.2
28.0	43.4	-11.1
29.0	43.5	-11.0
30.0	43.5	-10.9
31.0	43.5	-10.8
32.0	43.5	-10.7
33.0	43.6	-10.7
34.0	43.6	-10.6
35.0	43.6	-10.5
36.0	43.6	-10.4
37.0	43.7	-10.3
38.0	43.7	-10.2
39.0	43.7	-10.2
40.0	43.8	-10.1

cable loss 1 (inside chamber)	cable loss 2 (outside chamber)	cable loss 3 (switch unit)	cable loss 4 (to receiver)	distance corr. (-20 dB/decade)	d <sub>Limit</sub> (meas. distance (limit))	d <sub>used</sub> (meas. distance (used))
dB	dB	dB	dB	dB	m	m
4.4				-9.6	3	1.0
4.4				-9.6	3	1.0
4.5				-9.6	3	1.0
4.6				-9.6	3	1.0
4.7				-9.6	3	1.0
4.7				-9.6	3	1.0
4.8				-9.6	3	1.0
4.9				-9.6	3	1.0
5.0				-9.6	3	1.0
5.1				-9.6	3	1.0
5.1				-9.6	3	1.0
5.2				-9.6	3	1.0
5.3				-9.6	3	1.0
5.4				-9.6	3	1.0
5.5				-9.6	3	1.0

Sample calculation

$E \text{ (dB } \mu\text{V/m)} = U \text{ (dB } \mu\text{V)} + AF \text{ (dB 1/m)} + Corr. \text{ (dB)}$

U = Receiver reading

AF = Antenna factor

Corr. = sum of single correction factors of used cables, switch unit, distance correction, amplifier (if applicable)

Linear interpolation will be used for frequencies in between the values in the table.

distance correction =  $-20 * LOG (d_{Limit} / d_{used})$

Linear interpolation will be used for frequencies in between the values in the table.

Table shows an extract of values.

The test results relate only to the tested item. The sample has been provided by the client. Without the written consent of Bureau Veritas Consumer Products Services Germany GmbH excerpts of this report shall not be reproduced.



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## 7 MEASUREMENT UNCERTAINTIES

<b>KDB 935210 D05</b>	<b>ECL</b>
Power measurement	0,68 dB
Measuring AGC threshold level	0,90 dB
Out of band rejection	0,90 dB
Input-versus-output signal comparison	0,91 dB
Mean power output	0,90 dB
Measuring out-of-band/out-of-block (including intermodulation) emissions and spurious emissions	0,90 dB
Out-of-band/out-of-block emissions conducted measurements	0,90 dB
Spurious emissions conducted	2,18 dB
Spurious emissions radiated measurements	5,38 dB
Total frequency uncertainty	$2 \times 10^{-7}$

Reference :

ECL-MU5.4.6.3-EMC-14-001-V03.00 MU Wireless.xls



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## 8 PHOTO REPORT

Please see separate photo report.

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## Annex A: Accreditation certificate (for information)

The accreditation relates to competences stated on the accreditation certificate. The current certificate is available on the homepage of the DAkkS and can be downloaded under accredited bodies with the processing number:

<https://www.dakks.de/en>



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## Annex B: Additional information provided by client

None.

\*\*\*\*\* End of test report \*\*\*\*\*

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