

VCS 3020X Rel. 4.x
Information in respect to EMC re-testing to cover new hardware

Device Under Test: **VCS 3020X Rel. 4.x**

Voice Communication System - series VCS 3020X Rel. 4.x, voice switch and interface part.

Comment:

The Voice Communication System - series VCS 3020X Rel. 4.x voice switch and interface part was already EMC tested. Re-testing was performed to cover new and additional hardware to be used in this product.

Short description:

The FREQUENTIS VCS 3020 voice/data switch and the connected operator positions form a fully digital, non-blocking voice communication system based on PCM technology. The FREQUENTIS VCS 3020 provides the possibility to integrate various types of communication equipment by the use of different interface types.

The system is developed for operation in the fields of e.g. air traffic management, public safety, public transport, maritime etc.

Dimensions:

The system is designed in 19" technology for build in into 19" standard cabinets. The DUT was built into a 24 HE cabinet. The total cabinet weight depends on the amount of shelves and interfaces. The weight of the DUT is approx. 60kg.

System configuration:

Provided with a typical system configuration, the DUT VCS 3020X Rel.4.x, including components as described below, was installed in a 24 HE cabinet.

Tests were carried out with JIF's and CIF build in into BGT CIF. Five operator positions, a TMCS (Technical Monitoring and Control System) and interfaces for connection to telephone or radio equipment were used.

The following hardware components were used during testing:

- 1 x Rack BGT PS 01
- 2 x Rack BGT UIF
- 1 x Rack BGT PRI
- 1 x Rack BGT CIF02
- 1 x Rack EFORE Fan

with following boards:

- 6 x BG PSU AC
- 1 x BG GPIF 04.00
- 1 x BG GPIF 04.00 (PRI)
- 1 x BG GPIF 03.01
- 2 x BG JIF 05

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2 x BG CIF 05
2 x XCIF 01.00
7 x BG ERIF 04.00
1 x BG ERIF 03.00

The VCS 3020 operator positions (touch display, position electronic, handset, headset, footswitch etc.) and TMCS (Technical Monitoring and Control System) were connected by means of multi-wire shielded data cables. CAT 5 for TMCS and interfaces, CAT 6 for operator positions.

The VCS 3020 operator position consists of the following components:

1 x cPOS 02.00
1 x cPOS 02.10
1 x EPOSA 04.40
1 x EPOSA 04.50
1 x PP04.H.64
1 x MOD POS 3020X
2 x MOD PLSP 03.00
4 x MOD PLSP 02.00
1 x MOD POT 03.00
1 x MOD POT 03.00 (Rev. 03)
1 x MOD POT 03.10
2 x MOD PIPA 04.00
2 x MOD PIPS 05.01
1 x MOD PIPS 09.00
1 x MOD D-LAP XM
5 x Handset
2 x Headset
1 x Handmic

Selbst diagnostic:

The FREQUENTIS VCS 3020 system is supervised via a PC based Technical Monitoring and Control System (TMCS) developed by FREQUENTIS.

The TMCS has two main tasks to perform:

1. Providing the possibility to configure and control the VCS 3020.
2. Monitor the status (e.g. ok, not ok) of the VCS HW and SW modules.

For self-diagnostic purposes the VCS 3020 reports state changes (e.g. "ok -> not ok" or "not ok -> ok") to the TMCS which displays the actual state and documents the occurred events in log files.

Test Setup:

The proper function of the DUT during testing was monitored by VCS 3020 operator positions and the TMCS. In order to evaluate the performance of the system and the interface boards during testing, active connections were set up. Using the VCS 3020 operator positions and TMCS (TMCS outside the absorber room), active calls and data connections were monitored. These connections were not to be interrupted nor affected. For immunity testing the active voice path was additionally monitored with Rhode&Schwarz Radio Communication Analyser CMTA84. Therefore on the operator position (outside the absorber chamber) the voice level on the "ear-side" of the handset was measured. The level in "idle-state" was compared with the level in "disturbance-state".

2/12
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The following connections were set up:**1) Active TMCS connection**

The Technical Monitoring and Control System (outside the absorber room) was permanently connected via shielded CAT 5 cable with the VCS 3020X Rel.4.x digital switch (cabinet). (max. length > 30m). The TMCS shows the current system status. The system status was monitored before, during and after testing

2) Active Call: Operator Position to Operator Position

Operator Positions were connected to the VCS 3020 switch via shielded CAT 6 cables. Active call connections from operator positions inside absorber chamber to operator positions outside absorber chamber were set up. With the conference call feature the active calls of the operator positions were connected together for monitoring. The active connection was monitored during testing.

3) Active radio connection 1: ERIF 04.00 to ERIF 04.00

Both ERIF interfaces (4 wire analogue) were connected via shielded CAT5 loop back cable, inside the absorber room. (Rx-Tx, Tx-Rx). An active call was set up from outside the absorber room via operator positions (PTT, Squelch) and monitored during testing.

4) Active radio connection 2: ERIF 04.00 to Radio Simulator

The ERIF interface was connected via shielded CAT5 cable to the radio simulator box inside the absorber room. An active call (1kHz tone) was generated in the simulator box and routed from the interface through the switch to the operator position outside the absorber room. The call (tone) was monitored during testing.

5) Active digital connection: JIF05 01.00 - GPIF 04.00 – ERIF 04.00

The GPIF 04.00 interface was connected via shielded CAT 5 cable to the digital switch (JIF05 01.00) inside the absorber room. The ERIF 04.00 interface was connected to the GPIF 04.00 interface inside the rack (BGT UIF). An active radio connection was established and routed from the ERIF 04.00 interface to the connected operator positions (inside and outside absorber chamber). The status of the digital connection was monitored on the TMCS and the voice path as well as PTT and squelch were monitored on the operator position outside the absorber room.

Hardware setup used for emission and immunity testing:**Emission testing:****Setup No. 1:**

3 operator positions inside the absorber chamber, switch (cabinet) and TMCS outside.
The following hardware was used for setup 1. emission testing:

cPOS 02.00	30-0403801	PT
cPOS 02.10	30-0403802	1
EPOSA 04.40	30-0400202	PT
PLSP 02.00	30-0009000	438
PLSP 02.00	30-0009000	159
PIPS 05.01	30-0405000	1
PIPS 05.01	30-0405000	3
PIPA 04.00	30-0401000	69
POT 03.00	30-0401400	PT (Rev.03)
PLSP 03.00	30-0401200	8

Mean Well P66A		748108
Mean Well P66A		1638785
Mean Well P66A		1612941
Handset	TAS	xxx
Handset	TAS	xxx
Handset	HA11	xxx

Setup No. 2:

1 operator position inside the absorber chamber, switch (cabinet) and TMCS outside.
The following hardware was used for setup 2. emission testing:

EPOSA 04.50	30-0400203	PT
PIPA 04.00	30-0401000	69
POT 03.10	30-0401401	PT
PLSP 03.00	30-0401200	8
Mean Well P66A		1612941
Handset	TAS	xxx

Setup No. 3:

1 operator position inside the absorber chamber, switch (cabinet) and TMCS outside.
The following hardware was used for setup 3. emission testing:

PP 04.H.64	30-0501500	32
POS 3020X	30-0008903	608
PIPS 09.00	30-0502800	PT
D-LAP XM	30-0502200	PT
PLSP 02.00	30-0009000	159
PLSP 02.00	30-0009000	1298
Handmic 3 PTT Amor	25-0000181	xxx
Handstück 3 PTT + Headset Amor	25-0000180	xxx

Setup No. 4:

Digital switch and interface part (cabinet) inside the absorber chamber, operator positions and TMCS outside.
The following hardware was used for setup 4. emission testing:

24HE Cabinet	Rittal	xxx
BGT CIF2	30-0400100	PT
JIF5 01.00	30-0112400	436
CIF 5 01.00	30-0112300	PT
XCIF 01.00	40-0405700	xxx
JIF5 01.00	30-0112400	434
CIF 5 01.00	30-0112300	PT
XCIF 01.00	40-0405700	xxx
BGT PS01	30-9407700	34
PSUAC	SRA700	C9120633
PSUAC	SRA700	DE0470768
PSUAC	SRA700	DE0470767

4/12
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PSUAC	SRA700	H3442504
BGT PRI	30-0102501	6
PSUAC	SRA700	H3442503
PSUAC	SRA700	H3442505
GPIF 04.00	30-0503300	PT 07
BGT UIF 01	30-0203300	448
GPIF 04.00	30-0503300	PT 05
ERIF 03.00	30-9909700	7460
FAN Efore	FI95C240	E4340066
BGT UIF	30-0203300	25
GPIF 03.01	30-0006600	
ERIF 04.00	30-0503100	7
ERIF 04.00	30-0503100	3
ERIF 04.00	30-0503100	4
ERIF 04.00	30-0503100	6
ERIF 04.00	30-0503100	8
ERIF 04.00	30-0503100	2
Radio Simulator		xxx

Immunity testing:

Setup No. 5:

Digital switch and interface part (cabinet) inside the absorber chamber, operator positions and TMCS outside. The following hardware was used for setup 5. immunity testing:

24HE Cabinet	Rittal	xxx
BGT CIF2	30-0400100	PT
JIF5 01.00	30-0112400	436
CIF 5 01.00	30-0112300	PT
XCIF 01.00	40-0405700	xxx
JIF5 01.00	30-0112400	434
CIF 5 01.00	30-0112300	PT
XCIF 01.00	40-0405700	xxx
BGT PS01	30-9407700	34
PSUAC	SRA700	C9120633
PSUAC	SRA700	DE0470768
PSUAC	SRA700	DE0470767
PSUAC	SRA700	H3442504
BGT PRI	30-0102501	6
PSUAC	SRA700	H3442503
PSUAC	SRA700	H3442505
GPIF 04.00	30-0503300	PT 07
BGT UIF 01	30-0203300	448
GPIF 04.00	30-0503300	PT 05
ERIF 03.00	30-9909700	7460
FAN Efore	FI95C240	E4340066
BGT UIF	30-0203300	25
GPIF 03.01	30-0006600	
ERIF 04.00	30-0503100	7
ERIF 04.00	30-0503100	3
ERIF 04.00	30-0503100	4
ERIF 04.00	30-0503100	6

5/12
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ERIF 04.00	30-0503100	8
ERIF 04.00	30-0503100	2
Radio Simulator		xxx

Setup No. 6:

3 operator positions inside the absorber chamber, switch (cabinet) and TMCS outside.
The following hardware was used for setup 6. immunity testing:

PP 04.H.64	30-0501500	32
POS 3020X	30-0008903	608
PIPS 09.00	30-0502800	PT
D-LAP XM	30-0502200	PT
PLSP 02.00	30-0009000	159
PLSP 02.00	30-0009000	1298
Handmic 3 PTT Amor	25-0000181	xxx
Handstück 3 PTT + Headset Amor	25-0000180	xxx
EPOSA 04.50	30-0400203	PT
PIPA 04.00	30-0401000	69
POT 03.10	30-0401401	PT
PLSP 03.00	30-0401200	8
cPOS 02.00	30-0403801	PT
PLSP 02.00	30-0009000	438
PIPS 05.01	30-0405000	1
MV Adapterbox 02	30-0000200	92
MV Adapterbox 02	30-0000200	89
Mean Well P66A		748108
Mean Well P66A		1638785

Setup No. 7:

2 operator positions inside the absorber chamber, switch (cabinet) and TMCS outside.
The following hardware was used for setup 7. immunity testing:

cPOS 02.10	30-0403802	1
PLSP 02.00	30-0009000	438
PIPS 05.01	30-0405000	3
EPOSA 04.40	30-0400202	PT
PIPA 04.00	30-0401000	69
POT 03.00	30-0401400	PT (Rev.03)
PLSP 03.00	30-0401200	8
Mean Well P66A		1638785
Mean Well P66A		1612941
MV Adapterbox 02	30-0000200	92
MV Adapterbox 02	30-0000200	89

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6/12
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VCS 3020X Rel. 5.x
Information in respect to EMC testing

Device Under Test:**VCS 3020X Rel. 5.x**

Voice Communication System - series VCS 3020X Rel. 5.x, voice switch and interface part.

Comment:

The Voice Communication System - series VCS 3020X Rel. 4.x voice switch and interface part was already EMC tested. Re-testing was performed to cover new and additional hardware to be used in this product. The product including this new hardware is called VCS 3020X Rel. 5.x.

Short description:

The FREQUENTIS VCS 3020 voice/data switch and the connected operator positions form a fully digital, non-blocking voice communication system based on PCM technology. The FREQUENTIS VCS 3020 provides the possibility to integrate various types of communication equipment by the use of different interface types.

The system is developed for operation in the fields of e.g. air traffic management, public safety, public transport, maritime etc.

Dimensions:

The system is designed in 19" technology for build in into 19" standard cabinets. The DUT was built into a 24 HE cabinet. The total cabinet weight depends on the amount of shelves and interfaces. The weight of the DUT is approx. 60kg.

System configuration:

Provided with a typical system configuration the DUT VCS 3020X Rel.5.x, including components as described below, was installed in a 24 HE cabinet.

Tests were carried out with JIF's and CIF build in into BGT CIF. Five operator positions, a TMCS (Technical Monitoring and Control System) and interfaces for connection to telephone or radio equipment were used.

The following hardware components were used during testing:

- 1 x Rack BGT PS 01
- 2 x Rack BGT UIF
- 1 x Rack BGT PRI
- 1 x Rack BGT CIF02
- 1 x Rack EFORE Fan

with following boards:

- 6 x BG PSU AC
- 1 x BG GPIF 04.00
- 1 x BG GPIF 04.00 (PRI)
- 1 x BG GPIF 03.01
- 2 x BG JIF 05

7/12

2 x BG CIF 05
2 x XCIF 01.00
7 x BG ERIF 04.00
1 x BG ERIF 03.00

The VCS 3020 operator positions (touch display, position electronic, handset, headset, footswitch etc.) and TMCS (Technical Monitoring and Control System) were connected by means of multi-wire shielded data cables. CAT 5 for TMCS and interfaces, CAT 6 for operator positions.

The VCS 3020 operator position consists of the following components:

1 x cPOS 02.00
1 x cPOS 02.10
1 x EPOSA 04.40
1 x EPOSA 04.50
1 x PP04.H.64
1 x MOD POS 3020X
2 x MOD PLSP 03.00
4 x MOD PLSP 02.00
1 x MOD POT 03.00
1 x MOD POT 03.00 (Rev. 03)
1 x MOD POT 03.10
2 x MOD PIPA 04.00
2 x MOD PIPS 05.01
1 x MOD PIPS 09.00
1 x MOD D-LAP XM
5 x Handset
2 x Headset
1 x Handmic

Seld diagnostic:

The FREQUENTIS VCS 3020 system is supervised via a PC based Technical Monitoring and Control System (TMCS) developed by FREQUENTIS.

The TMCS has two main tasks to perform:

1. Providing the possibility to configure and control the VCS 3020.
2. Monitor the status (e.g. ok, not ok) of the VCS HW and SW modules.

For self-diagnostic purposes the VCS 3020 reports state changes (e.g. "ok -> not ok" or "not ok -> ok") to the TMCS which displays the actual state and documents the occurred events in log files.

Test Setup:

The proper function of the DUT during testing was monitored by VCS 3020 operator positions and the TMCS. In order to evaluate the performance of the system and the interface boards during testing, active connections were set up. Using the VCS 3020 operator positions and TMCS (TMCS outside the absorber room), active calls and data connections were monitored. These connections were not to be interrupted nor affected. For immunity testing the active voice path was additionally monitored with Rhode&Schwarz Radio Communication Analyser CMTA84. Therefore on the operator position (outside the absorber chamber) the voice level on the "ear-side" of the handset was measured. The level in "idle-state" was compared with the level in "disturbance-state".

8/12

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The following connections were set up:**1) Active TMCS connection**

The Technical Monitoring and Control System (outside the absorber room) was permanently connected via shielded CAT 5 cable with the VCS 3020X Rel.5.x digital switch (cabinet). (max. length > 30m). The TMCS shows the current system status. The system status was monitored before, during and after testing

2) Active Call: Operator Position to Operator Position

Operator Positions were connected to the VCS 3020 switch via shielded CAT 6 cables. Active call connections from operator positions inside absorber chamber to operator positions outside absorber chamber were set up. With the conference call feature the active calls of the operator positions were connected together for monitoring. The active connection was monitored during testing.

3) Active radio connection 1: ERIF 04.00 to ERIF 04.00

Both ERIF interfaces (4 wire analogue) were connected via shielded CAT5 loop back cable, inside the absorber room. (Rx-Tx, Tx-Rx). An active call was set up from outside the absorber room via operator positions (PTT, Squelch) and monitored during testing.

4) Active radio connection 2: ERIF 04.00 to Radio Simulator

The ERIF interface was connected via shielded CAT5 cable to the radio simulator box inside the absorber room. An active call (1kHz tone) was generated in the simulator box and routed from the interface through the switch to the operator position outside the absorber room. The call (tone) was monitored during testing.

5) Active digital connection: JIF05 01.00 - GPIF 04.00 – ERIF 04.00

The GPIF 04.00 interface was connected via shielded CAT 5 cable to the digital switch (JIF05 01.00) inside the absorber room. The ERIF 04.00 interface was connected to the GPIF 04.00 interface inside the rack (BGT UIF). An active radio connection was established and routed from the ERIF 04.00 interface to the connected operator positions (inside and outside absorber chamber). The status of the digital connection was monitored on the TMCS and the voice path as well as PTT and squelch were monitored on the operator position outside the absorber room.

Hardware setup used for emission and immunity testing:**Emission testing:****Setup No. 1:**

3 operator positions inside the absorber chamber, switch (cabinet) and TMCS outside.
The following hardware was used for setup 1. emission testing:

cPOS 02.00	30-0403801	PT
cPOS 02.10	30-0403802	1
EPOSA 04.40	30-0400202	PT
PLSP 02.00	30-0009000	438
PLSP 02.00	30-0009000	159
PIPS 05.01	30-0405000	1
PIPS 05.01	30-0405000	3
PIPA 04.00	30-0401000	69
POT 03.00	30-0401400	PT (Rev.03)
PLSP 03.00	30-0401200	8

9/12

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Mean Well P66A		748108
Mean Well P66A		1638785
Mean Well P66A		1612941
Handset	TAS	xxx
Handset	TAS	xxx
Handset	HA11	xxx

Setup No. 2:

1 operator position inside the absorber chamber, switch (cabinet) and TMCS outside.
The following hardware was used for setup 2. emission testing:

EPOSA 04.50	30-0400203	PT
PIPA 04.00	30-0401000	69
POT 03.10	30-0401401	PT
PLSP 03.00	30-0401200	8
Mean Well P66A		1612941
Handset	TAS	xxx

Setup No. 3:

1 operator position inside the absorber chamber, switch (cabinet) and TMCS outside.
The following hardware was used for setup 3. emission testing:

PP 04.H.64	30-0501500	32
POS 3020X	30-0008903	608
PIPS 09.00	30-0502800	PT
D-LAP XM	30-0502200	PT
PLSP 02.00	30-0009000	159
PLSP 02.00	30-0009000	1298
Handmic 3 PTT Amor	25-0000181	xxx
Handstück 3 PTT + Headset Amor	25-0000180	xxx

Setup No. 4:

Digital switch and interface part (cabinet) inside the absorber chamber, operator positions and TMCS outside.
The following hardware was used for setup 4. emission testing:

24HE Cabinet	Rittal	xxx
BGT CIF2	30-0400100	PT
JIF5 01.00	30-0112400	436
CIF 5 01.00	30-0112300	PT
XCIF 01.00	40-0405700	xxx
JIF5 01.00	30-0112400	434
CIF 5 01.00	30-0112300	PT
XCIF 01.00	40-0405700	xxx
BGT PS01	30-9407700	34
PSUAC	SRA700	C9120633
PSUAC	SRA700	DE0470768
PSUAC	SRA700	DE0470767

10/12
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PSUAC	SRA700	H3442504
BGT PRI	30-0102501	6
PSUAC	SRA700	H3442503
PSUAC	SRA700	H3442505
GPIF 04.00	30-0503300	PT 07
BGT UIF 01	30-0203300	448
GPIF 04.00	30-0503300	PT 05
ERIF 03.00	30-9909700	7460
FAN Efore	FI95C240	E4340066
BGT UIF	30-0203300	25
GPIF 03.01	30-0006600	
ERIF 04.00	30-0503100	7
ERIF 04.00	30-0503100	3
ERIF 04.00	30-0503100	4
ERIF 04.00	30-0503100	6
ERIF 04.00	30-0503100	8
ERIF 04.00	30-0503100	2
Radio Simulator		xxx

Immunity testing:

Setup No. 5:

Digital switch and interface part (cabinet) inside the absorber chamber, operator positions and TMCS outside. The following hardware was used for setup 5. immunity testing:

24HE Cabinet	Rittal	xxx
BGT CIF2	30-0400100	PT
JIF5 01.00	30-0112400	436
CIF 5 01.00	30-0112300	PT
XCIF 01.00	40-0405700	xxx
JIF5 01.00	30-0112400	434
CIF 5 01.00	30-0112300	PT
XCIF 01.00	40-0405700	xxx
BGT PS01	30-9407700	34
PSUAC	SRA700	C9120633
PSUAC	SRA700	DE0470768
PSUAC	SRA700	DE0470767
PSUAC	SRA700	H3442504
BGT PRI	30-0102501	6
PSUAC	SRA700	H3442503
PSUAC	SRA700	H3442505
GPIF 04.00	30-0503300	PT 07
BGT UIF 01	30-0203300	448
GPIF 04.00	30-0503300	PT 05
ERIF 03.00	30-9909700	7460
FAN Efore	FI95C240	E4340066
BGT UIF	30-0203300	25
GPIF 03.01	30-0006600	
ERIF 04.00	30-0503100	7
ERIF 04.00	30-0503100	3
ERIF 04.00	30-0503100	4
ERIF 04.00	30-0503100	6

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ERIF 04.00	30-0503100	8
ERIF 04.00	30-0503100	2
Radio Simulator		xxx

Setup No. 6:

3 operator positions inside the absorber chamber, switch (cabinet) and TMCS outside.
The following hardware was used for setup 6. immunity testing:

PP 04.H.64	30-0501500	32
POS 3020X	30-0008903	608
PIPS 09.00	30-0502800	PT
D-LAP XM	30-0502200	PT
PLSP 02.00	30-0009000	159
PLSP 02.00	30-0009000	1298
Handmic 3 PTT Amor	25-0000181	xxx
Handstück 3 PTT + Headset Amor	25-0000180	xxx
EPOSA 04.50	30-0400203	PT
PIPA 04.00	30-0401000	69
POT 03.10	30-0401401	PT
PLSP 03.00	30-0401200	8
cPOS 02.00	30-0403801	PT
PLSP 02.00	30-0009000	438
PIPS 05.01	30-0405000	1
MV Adapterbox 02	30-0000200	92
MV Adapterbox 02	30-0000200	89
Mean Well P66A		748108
Mean Well P66A		1638785

Setup No. 7:

2 operator positions inside the absorber chamber, switch (cabinet) and TMCS outside.
The following hardware was used for setup 7. immunity testing:

cPOS 02.10	30-0403802	1
PLSP 02.00	30-0009000	438
PIPS 05.01	30-0405000	3
EPOSA 04.40	30-0400202	PT
PIPA 04.00	30-0401000	69
POT 03.00	30-0401400	PT (Rev.03)
PLSP 03.00	30-0401200	8
Mean Well P66A		1638785
Mean Well P66A		1612941
MV Adapterbox 02	30-0000200	92
MV Adapterbox 02	30-0000200	89

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12/12
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