FIELD STRENGTH OF FUNDAMENTAL – UNITY CS – PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

The fundamental carrier of the EUT was maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A calibrated active loop antenna was used for this test in order to provide sufficient measurement sensitivity. The reference point of the loop antenna was maintained at 1m above the ground plane during the testing.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

As outlined in 15.209(e) and 15.31(f)(2), measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	EMCO	6502	AZB	2023-09-06	2025-09-06
Cable	Northwest EMC	3kHz - 1GHz RE Cables	OCB	2023-05-26	2024-05-26
Receiver	Rohde & Schwarz	ESCI	ARG	2023-08-31	2024-08-31

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.8 dB	-1.8 dB

FREQUENCY RANGE INVESTIGATED

12.56 MHz TO 14.56 MHz

POWER INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

ALCO0426-2

MODES INVESTIGATED

Transmitting RFID 13.56 MHz. Pneumatic RFID Module, 1x port populated with probe and transmitting.

FIELD STRENGTH OF FUNDAMENTAL – UNITY CS – PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

EUT:	Unity CS	Work Order:	ALCO0426
Serial Number:	2301010901X	Date:	2023-11-09
Customer:	Alcon Research LLC	Temperature:	23.3°C
Attendees:	Hakan Gokdogan	Relative Humidity:	29.8%
Customer Project:	None	Bar. Pressure (PMSL):	1015 mb
Tested By:	Nolan De Ramos	Job Site:	OC08
Power:	120VAC/60Hz	Configuration:	ALCO0426-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	14	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

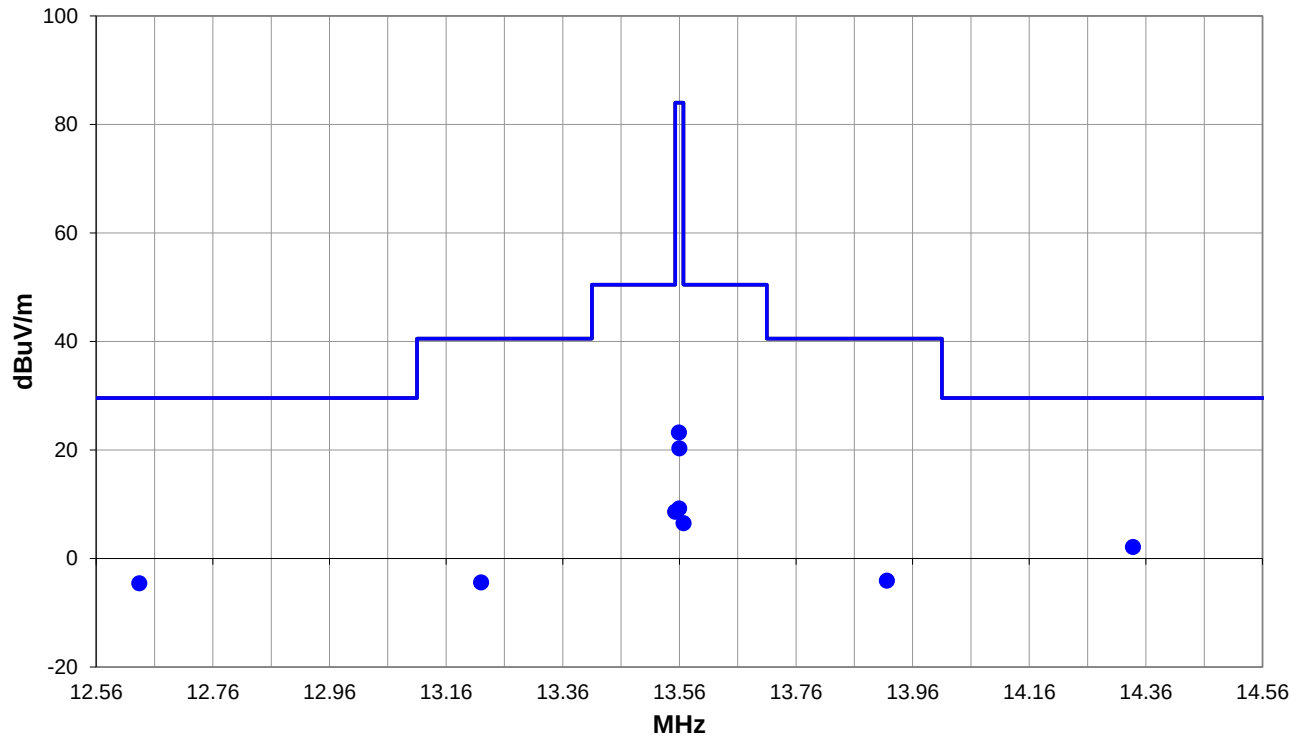
Unity CS only has 1x available port on the Pneumatic RFID Module

EUT OPERATING MODES

Transmitting RFID 13.56 MHz. Pneumatic RFID Module, 1x port populated with probe and transmitting.

DEVIATIONS FROM TEST STANDARD

None



Run #: 14 ■ PK ◆ AV ● QP

FIELD STRENGTH OF FUNDAMENTAL – UNITY CS – PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #14

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
14.338	9.6	11.6	1.0	101.0	10.0	0.0	Par to GND	QP	-19.1	2.1	29.5	-27.4
12.634	2.9	11.6	1.0	129.0	10.0	0.0	Par to GND	QP	-19.1	-4.6	29.5	-34.1
13.553	16.1	11.6	1.0	79.0	10.0	0.0	Par to GND	QP	-19.1	8.6	50.5	-41.9
13.567	14.0	11.6	1.0	112.0	10.0	0.0	Par to GND	QP	-19.1	6.5	50.5	-44.0
13.916	3.4	11.6	1.0	72.0	10.0	0.0	Par to GND	QP	-19.1	-4.1	40.5	-44.6
13.220	3.1	11.6	1.0	23.0	10.0	0.0	Par to GND	QP	-19.1	-4.4	40.5	-44.9
13.559	30.7	11.6	1.0	76.0	10.0	0.0	Par to GND	QP	-19.1	23.2	84.0	-60.8
13.560	27.8	11.6	1.0	65.0	10.0	0.0	Perp to EUT	QP	-19.1	20.3	84.0	-63.7
13.560	16.7	11.6	1.0	24.0	10.0	0.0	Par to EUT	QP	-19.1	9.2	84.0	-74.8

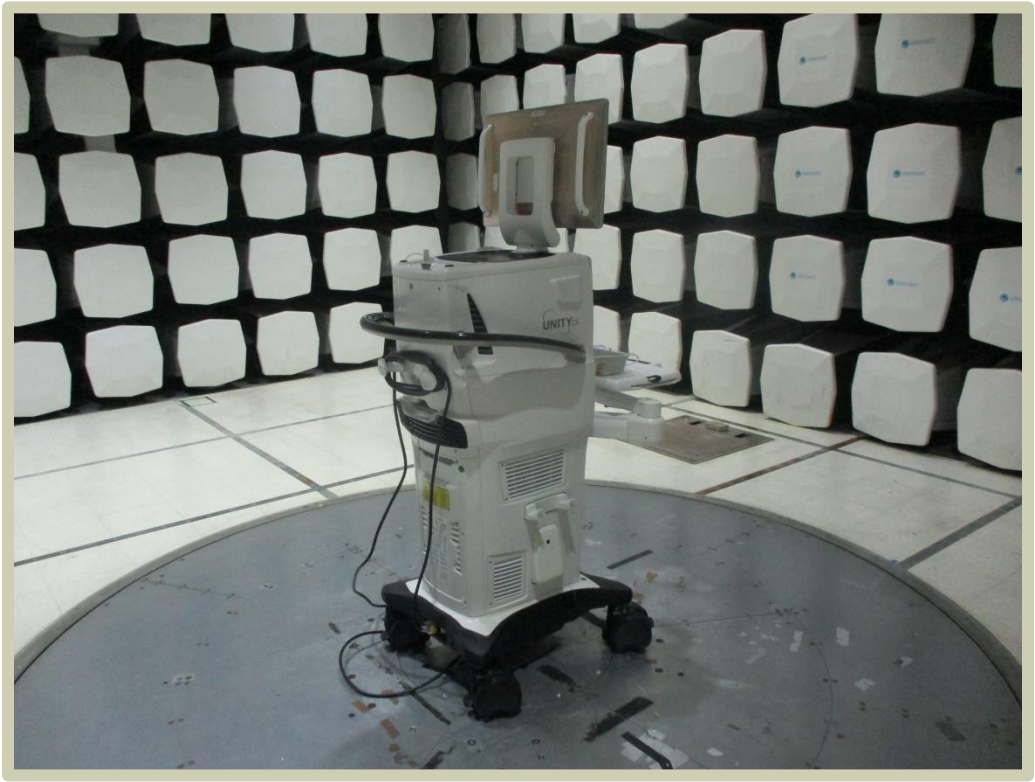
CONCLUSION

Pass

Tested By

FIELD STRENGTH OF FUNDAMENTAL – UNITY CS – PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0



FIELD STRENGTH OF FUNDAMENTAL – UNITY CS – PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - ILLUMINATOR RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity. Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

As outlined in 15.209(e) and 15.31(f)(2), measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	EMCO	6502	AZB	2023-09-06	2025-09-06
Cable	Northwest EMC	3kHz - 1GHz RE Cables	OCB	2023-05-26	2024-05-26
Receiver	Rohde & Schwarz	ESCI	ARG	2023-08-31	2024-08-31

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.8 dB	-1.8 dB

FREQUENCY RANGE INVESTIGATED

490 MHz TO 30 MHz

POWER INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

ALCO0426-1

MODES INVESTIGATED

Transmitting RFID 13.56 MHz. Illuminator RFID Module, all 2x ports populated with probes and transmitting

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - ILLUMINATOR RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

EUT:	Unity VCS	Work Order:	ALCO0426
Serial Number:	2301157201X	Date:	2023-11-08
Customer:	Alcon Research LLC	Temperature:	22.7°C
Attendees:	Hakan Gokdogan	Relative Humidity:	39.6%
Customer Project:	None	Bar. Pressure (PMSL):	1015 mb
Tested By:	Nolan De Ramos	Job Site:	OC08
Power:	120VAC/60Hz	Configuration:	ALCO0426-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	12	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

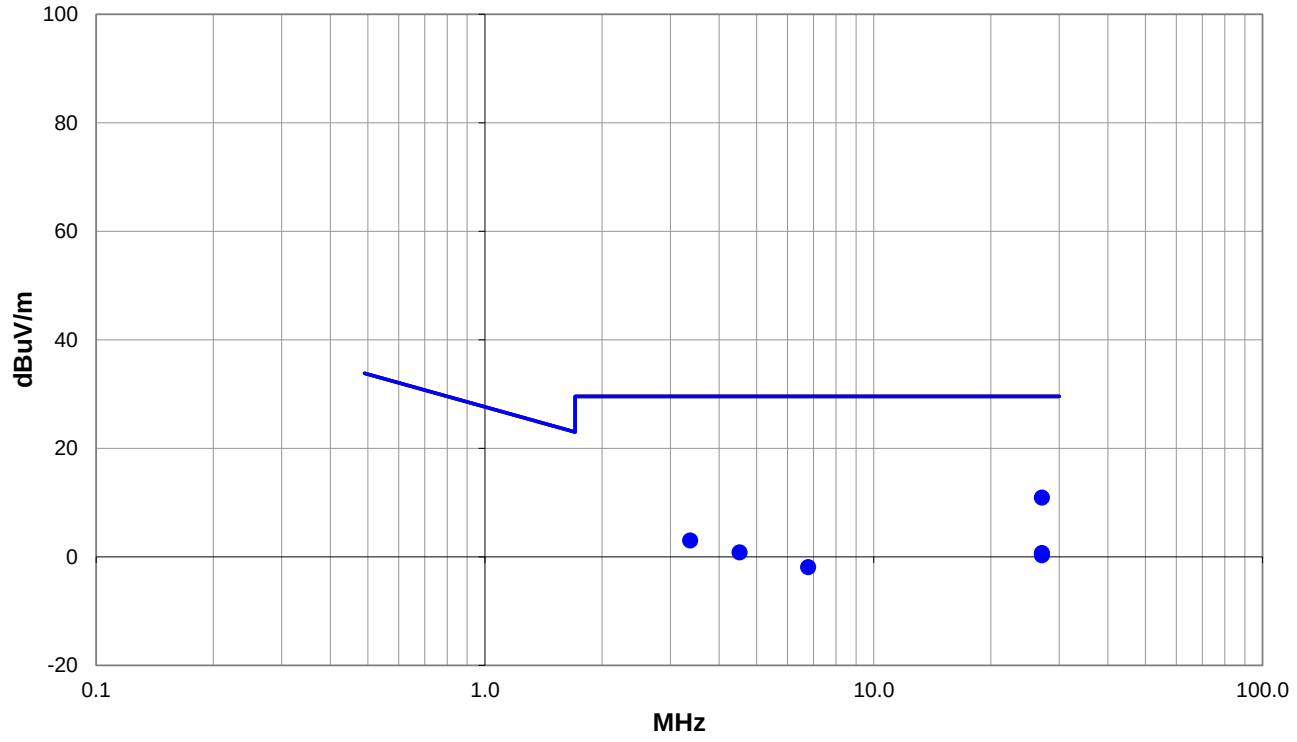
None

EUT OPERATING MODES

Transmitting RFID 13.56 MHz. Illuminator RFID Module, all 2x ports populated with probes and transmitting

DEVIATIONS FROM TEST STANDARD

None



Run #: 12 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - ILLUMINATOR RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #12

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
27.078	20.2	9.8	1.0	10.0	10.0	0.0	Perp to EUT	QP	-19.1	10.9	29.5	-18.6
3.370	11.5	10.6	1.0	97.0	10.0	0.0	Perp to EUT	QP	-19.1	3.0	29.5	-26.5
4.516	9.1	10.8	1.0	230.0	10.0	0.0	Perp to EUT	QP	-19.1	0.8	29.5	-28.7
27.074	10.0	9.8	1.0	360.0	10.0	0.0	Par to GND	QP	-19.1	0.7	29.5	-28.8
27.078	9.6	9.8	1.0	302.0	10.0	0.0	Par to EUT	QP	-19.1	0.3	29.5	-29.2
6.777	6.2	11.0	1.0	57.0	10.0	0.0	Perp to EUT	QP	-19.1	-1.9	29.5	-31.4

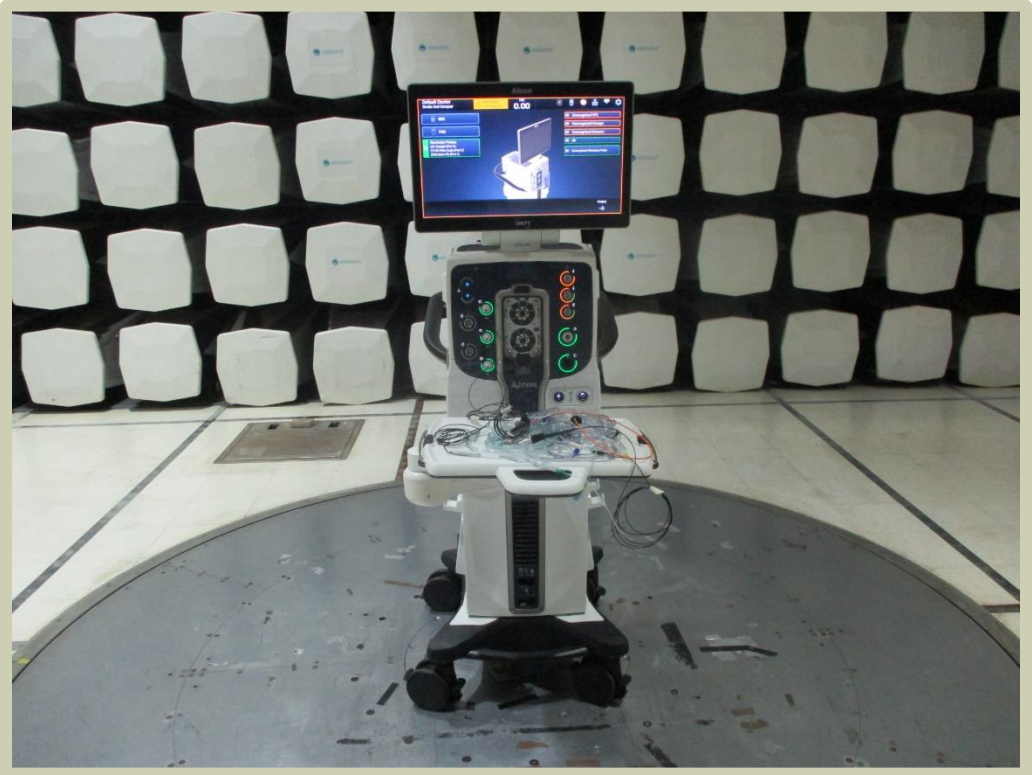
CONCLUSION

Pass

Tested By

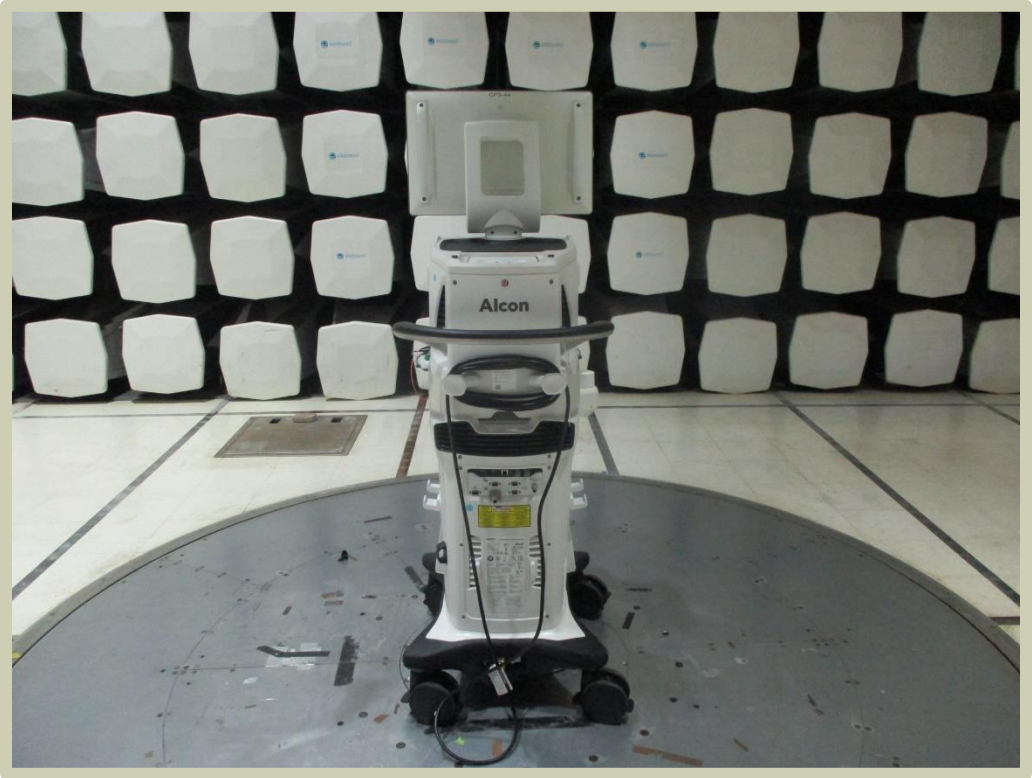
FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - ILLUMINATOR RFID MODULE

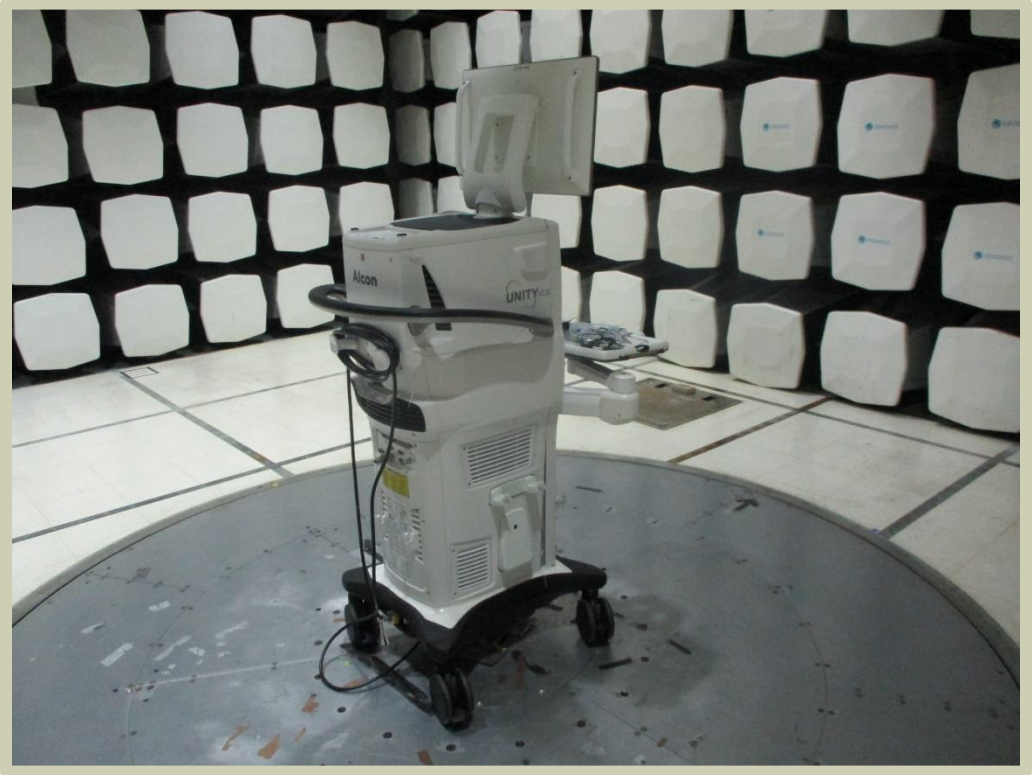
element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0



FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - ILLUMINATOR RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0





FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - LASER RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity. Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

As outlined in 15.209(e) and 15.31(f)(2), measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	EMCO	6502	AZB	2023-09-06	2025-09-06
Cable	Northwest EMC	3kHz - 1GHz RE Cables	OCB	2023-05-26	2024-05-26
Receiver	Rohde & Schwarz	ESCI	ARG	2023-08-31	2024-08-31

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.8 dB	-1.8 dB

FREQUENCY RANGE INVESTIGATED

490 kHz TO 30 MHz

POWER INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

ALCO0426-1

MODES INVESTIGATED

Transmitting RFID 13.56 MHz. Laser RFID Module, all 2x ports populated with probes and transmitting

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - LASER RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

EUT:	Unity VCS	Work Order:	ALCO0426
Serial Number:	2301157201X	Date:	2023-11-08
Customer:	Alcon Research LLC	Temperature:	21.3°C
Attendees:	Hakan Gokdogan	Relative Humidity:	44.5%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mb
Tested By:	Nolan De Ramos	Job Site:	OC08
Power:	120VAC/60Hz	Configuration:	ALCO0426-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	7	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

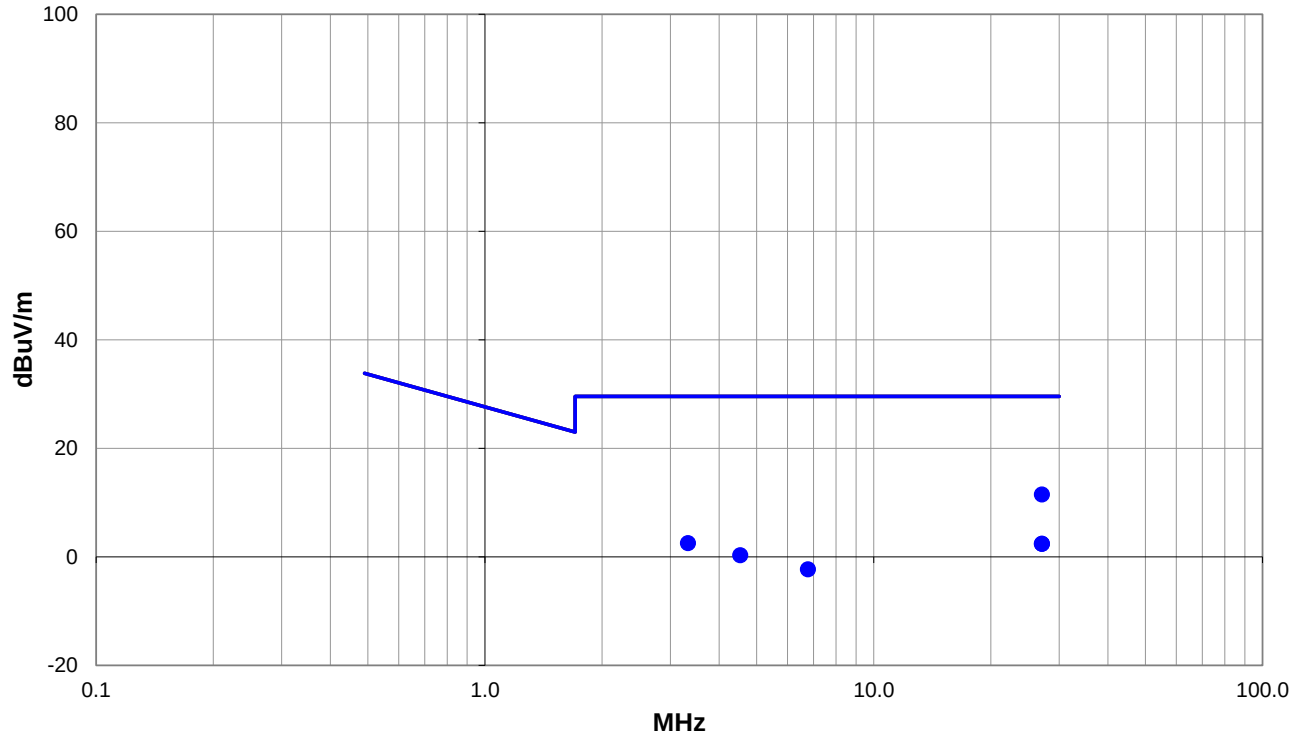
None

EUT OPERATING MODES

Transmitting RFID 13.56 MHz. Laser RFID Module, all 2x ports populated with probes and transmitting

DEVIATIONS FROM TEST STANDARD

None



Run #: 7 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - LASER RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #7

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
27.078	20.8	9.8	1.0	1.0	10.0	0.0	Perp to EUT	QP	-19.1	11.5	29.5	-18.0
3.326	11.0	10.6	1.0	260.0	10.0	0.0	Perp to EUT	QP	-19.1	2.5	29.5	-27.0
27.078	11.7	9.8	1.0	360.0	10.0	0.0	Par to GND	QP	-19.1	2.4	29.5	-27.1
27.076	11.7	9.8	1.0	334.0	10.0	0.0	Par to EUT	QP	-19.1	2.4	29.5	-27.1
4.534	8.6	10.8	1.0	80.0	10.0	0.0	Perp to EUT	QP	-19.1	0.3	29.5	-29.2
6.767	5.8	11.0	1.0	164.0	10.0	0.0	Perp to EUT	QP	-19.1	-2.3	29.5	-31.8

CONCLUSION

Pass

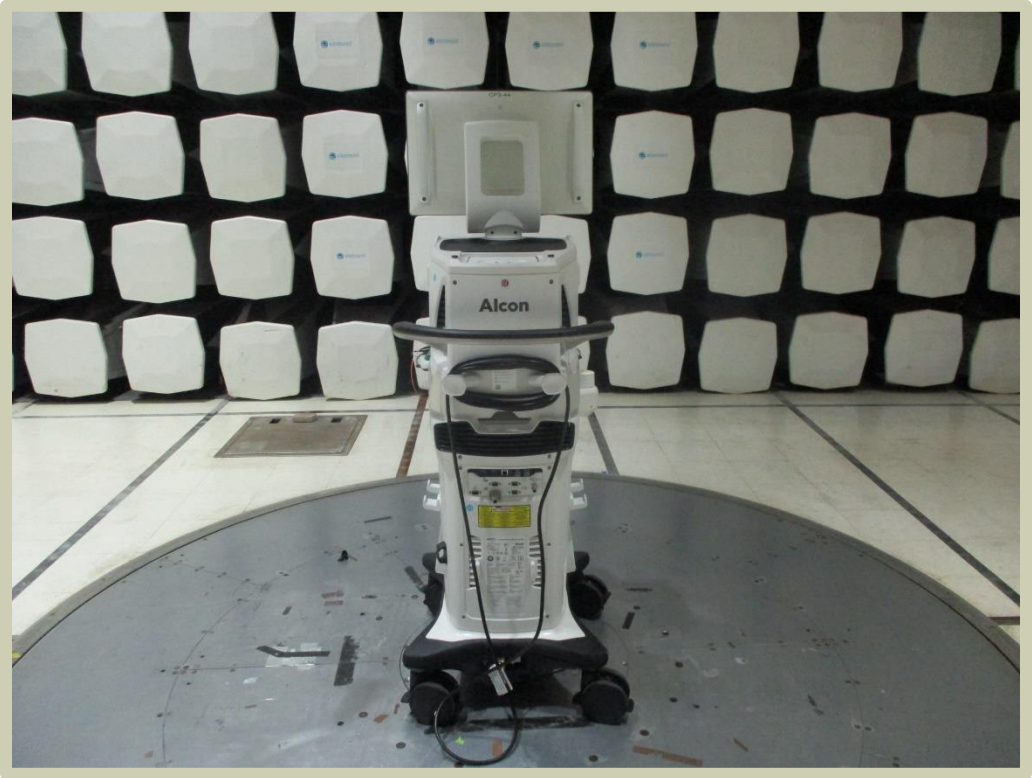
Tested By

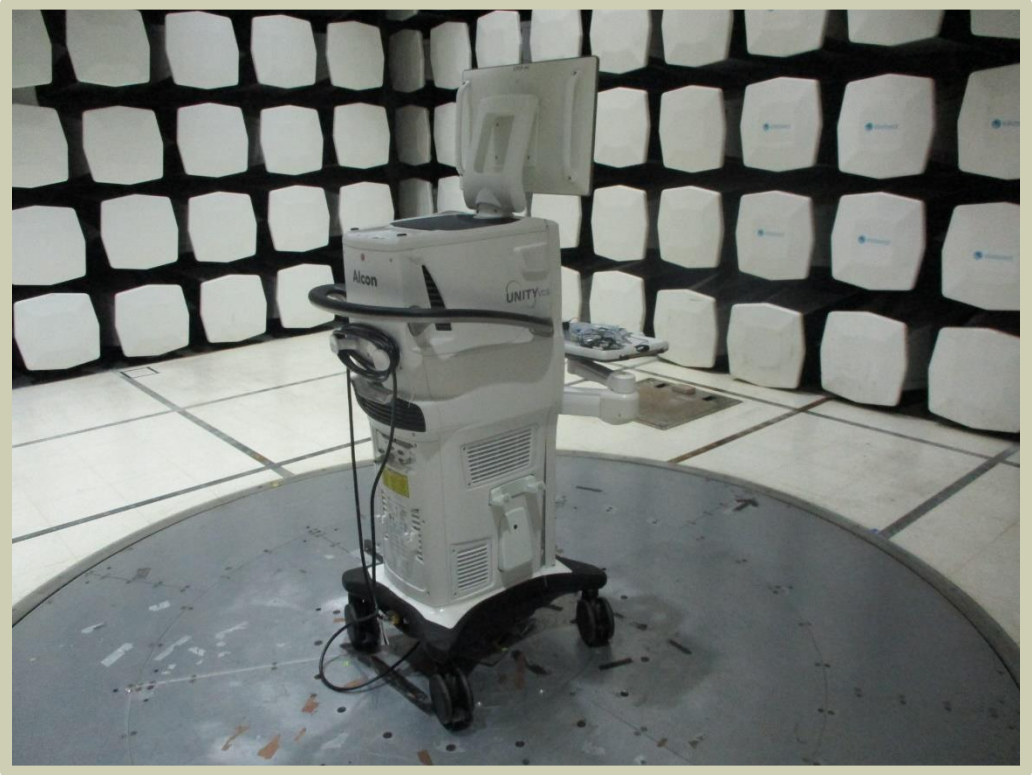
FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - LASER RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - LASER RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0





FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity. Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

As outlined in 15.209(e) and 15.31(f)(2), measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	EMCO	6502	AZB	2023-09-06	2025-09-06
Cable	Northwest EMC	3kHz - 1GHz RE Cables	OCB	2023-05-26	2024-05-26
Receiver	Rohde & Schwarz	ESCI	ARG	2023-08-31	2024-08-31

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.8 dB	-1.8 dB

FREQUENCY RANGE INVESTIGATED

490 kHz TO 30 MHz

POWER INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

ALCO0426-1

MODES INVESTIGATED

Transmitting RFID 13.56 MHz. Pneumatic RFID Board, all 5x ports populated with probes and transmitting

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

EUT:	Unity VCS	Work Order:	ALCO0426
Serial Number:	2301157201X	Date:	2023-11-08
Customer:	Alcon Research LLC	Temperature:	20.1°C
Attendees:	Hakan Gokdogan	Relative Humidity:	50.7%
Customer Project:	None	Bar. Pressure (PMSL):	1019 mb
Tested By:	Nolan De Ramos	Job Site:	OC08
Power:	120VAC/60Hz	Configuration:	ALCO0426-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	5	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

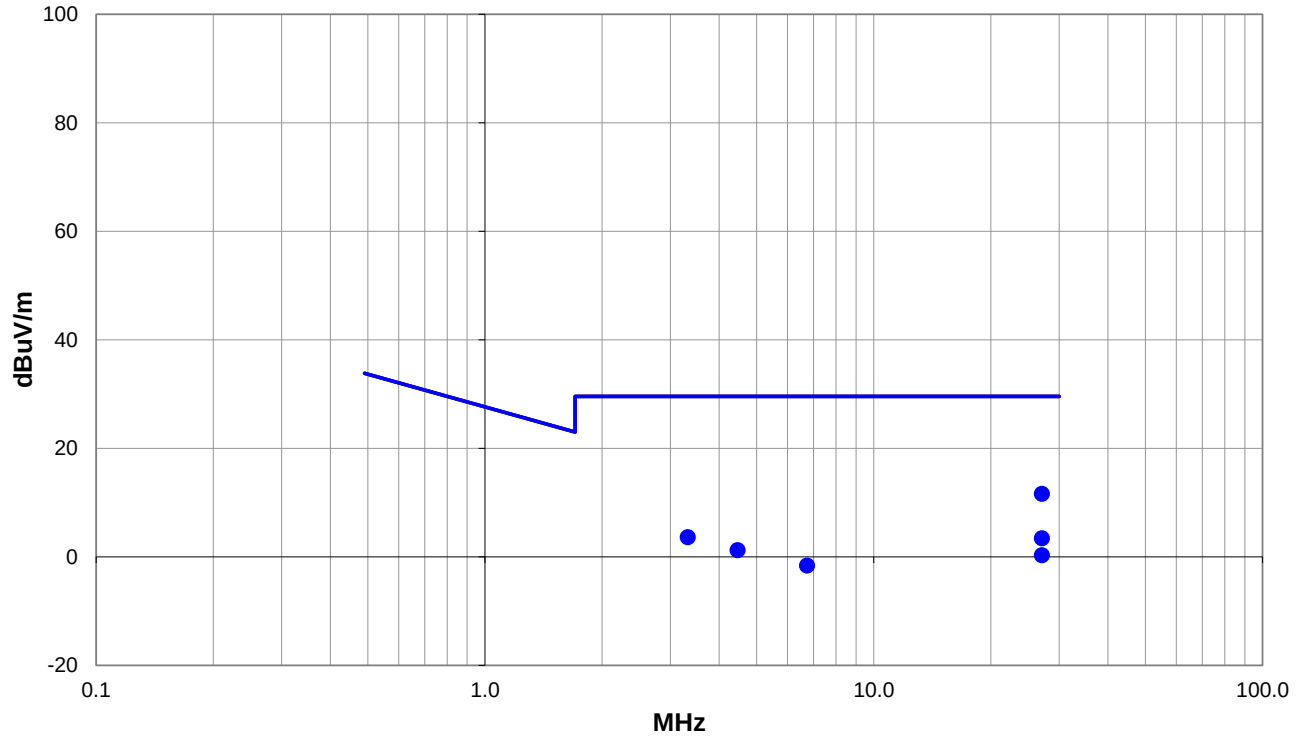
None

EUT OPERATING MODES

Transmitting RFID 13.56 MHz. Pneumatic RFID Board, all 5x ports populated with probes and transmitting

DEVIATIONS FROM TEST STANDARD

None



Run #: 5 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #5

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
27.079	20.9	9.8	1.0	360.0	10.0	0.0	Perp to EUT	QP	-19.1	11.6	29.5	-17.9
3.323	12.1	10.6	1.0	229.0	10.0	0.0	Perp to EUT	QP	-19.1	3.6	29.5	-25.9
27.077	12.7	9.8	1.0	308.0	10.0	0.0	Par to GND	QP	-19.1	3.4	29.5	-26.1
4.463	9.5	10.8	1.0	354.0	10.0	0.0	Perp to EUT	QP	-19.1	1.2	29.5	-28.3
27.075	9.6	9.8	1.0	307.0	10.0	0.0	Par to EUT	QP	-19.1	0.3	29.5	-29.2
6.733	6.5	11.0	1.0	167.0	10.0	0.0	Perp to EUT	QP	-19.1	-1.6	29.5	-31.1

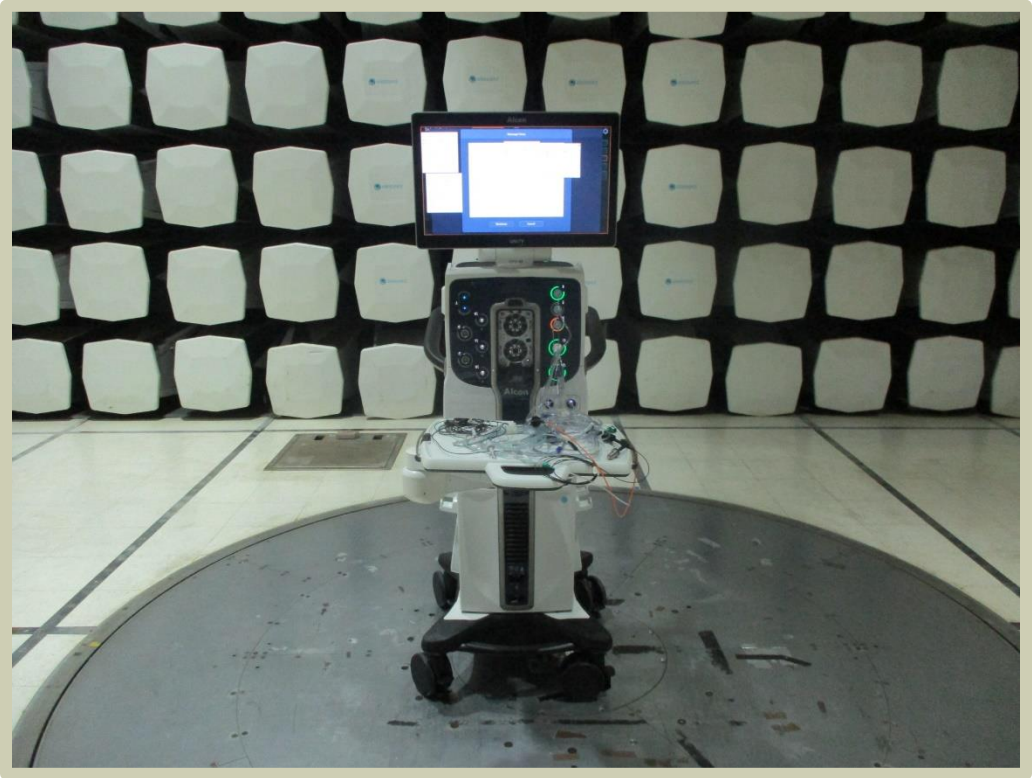
CONCLUSION

Pass

Tested By

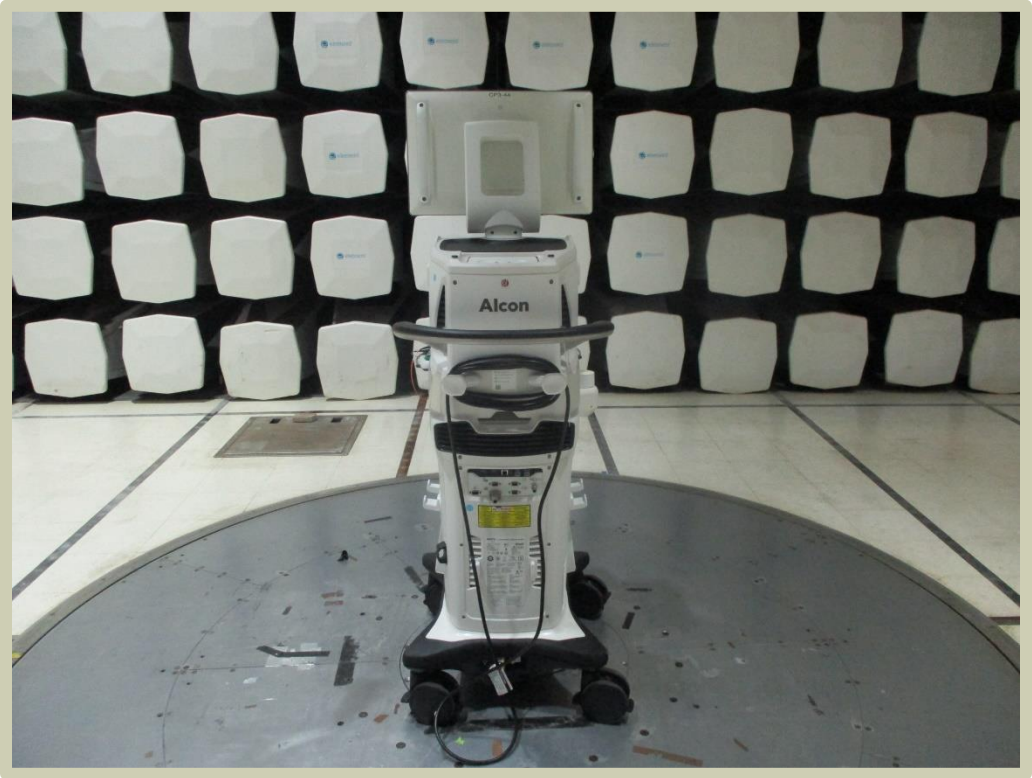
FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - PNEUMATIC RFID MODULE

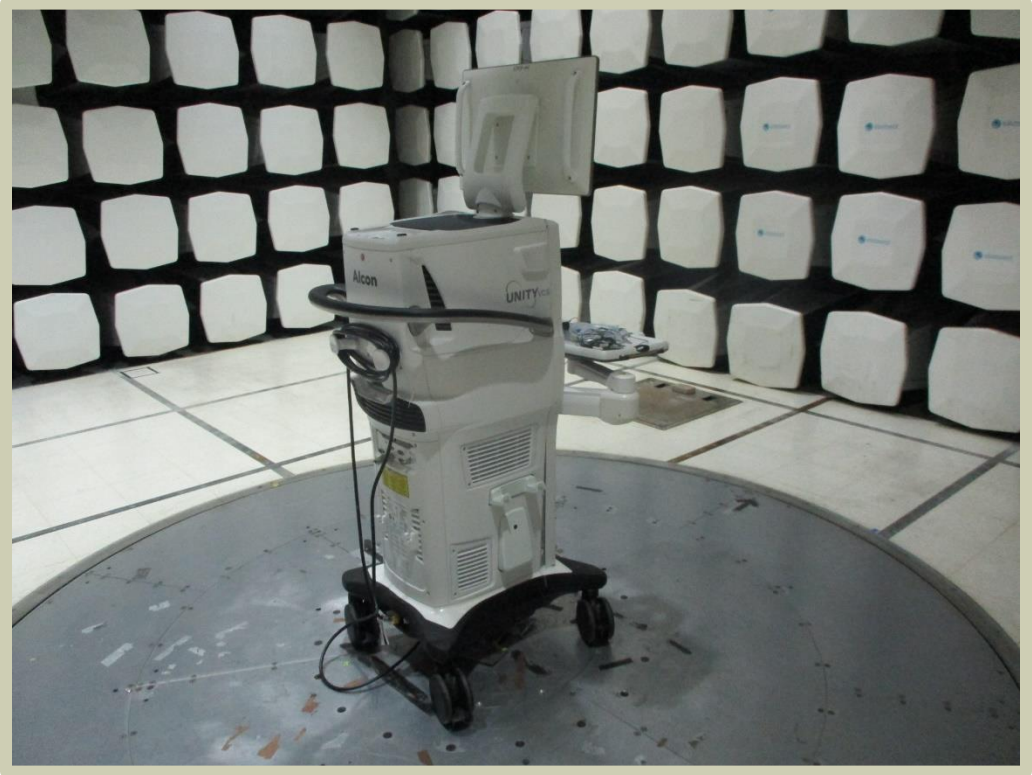
element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0



FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0





FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - UNITY CS - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was continuously transmitting while set to the channel specified.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). An active loop antenna was used for this test in order to provide sufficient measurement sensitivity. Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

As outlined in 15.209(e) and 15.31(f)(2), measurements may be performed at a distance closer than what is specified with the limit. The limit at the specified distance is shown on the data sheet. Measurements are made at a closer distance and the data is adjusted using a distance correction factor of 40dB/decade for comparison to the limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Loop	EMCO	6502	AZB	2023-09-06	2025-09-06
Cable	Northwest EMC	3kHz - 1GHz RE Cables	OCB	2023-05-26	2024-05-26
Receiver	Rohde & Schwarz	ESCI	ARG	2023-08-31	2024-08-31

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	1.8 dB	-1.8 dB

FREQUENCY RANGE INVESTIGATED

490 kHz TO 30 MHz

POWER INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

ALCO0426-2

MODES INVESTIGATED

Transmitting RFID 13.56 MHz. Pneumatic RFID Module, 1x port populated with probe and transmitting.

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - UNITY CS - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

EUT:	Unity CS	Work Order:	ALCO0426
Serial Number:	TBD	Date:	2023-11-09
Customer:	Alcon Research LLC	Temperature:	23.4°C
Attendees:	Hakan Gokdogan	Relative Humidity:	29.5%
Customer Project:	None	Bar. Pressure (PMSL):	1015 mb
Tested By:	Nolan De Ramos	Job Site:	OC08
Power:	120VAC/60Hz	Configuration:	ALCO0426-2

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	16	Test Distance (m):	10	Ant. Height(s) (m):	1(m)

COMMENTS

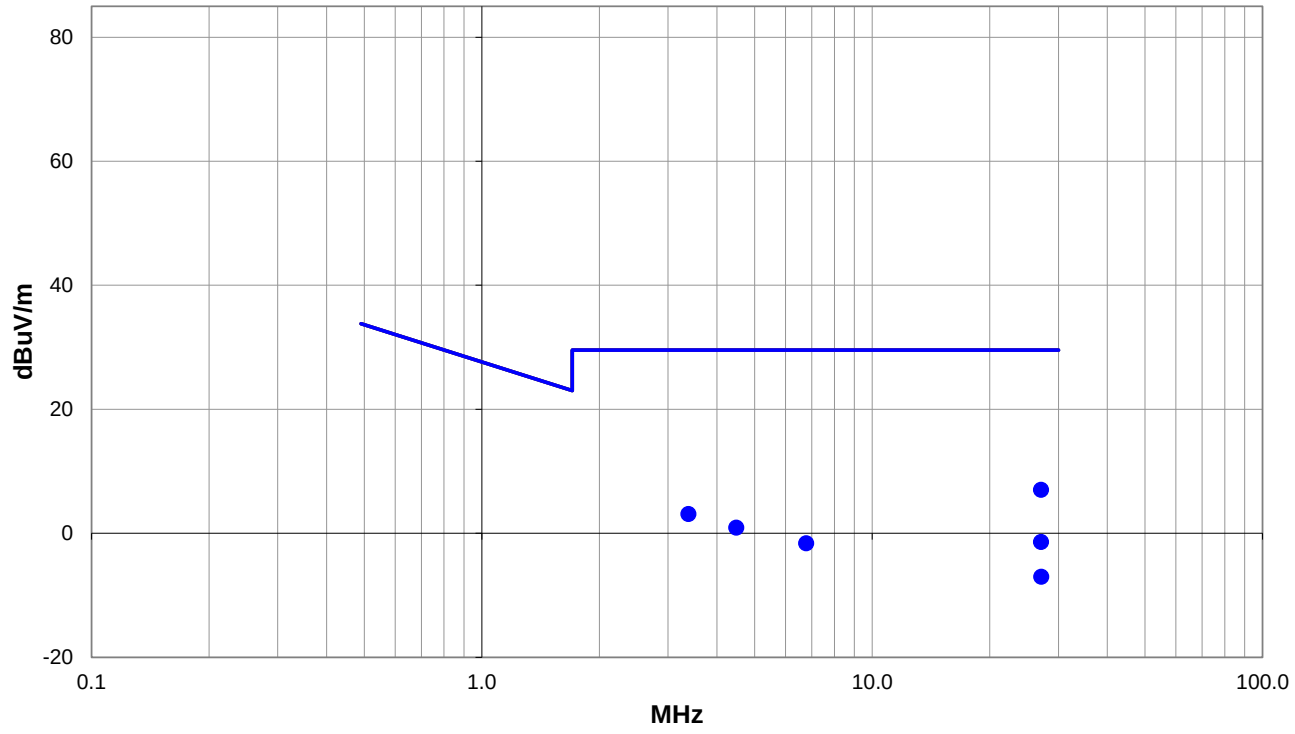
Unity CS only has 1x available port on the Pneumatic RFID Module

EUT OPERATING MODES

Transmitting RFID 13.56 MHz. Pneumatic RFID Module, 1x port populated with probe and transmitting.

DEVIATIONS FROM TEST STANDARD

None



Run #: 16 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - UNITY CS - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #16

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
27.078	16.3	9.8	1.0	189.0	10.0	0.0	Perp to EUT	QP	-19.1	7.0	29.5	-22.5
3.381	11.6	10.6	1.0	168.0	10.0	0.0	Perp to EUT	QP	-19.1	3.1	29.5	-26.4
4.483	9.2	10.8	1.0	288.0	10.0	0.0	Perp to EUT	QP	-19.1	0.9	29.5	-28.6
27.078	7.9	9.8	1.0	196.0	10.0	0.0	Par to GND	QP	-19.1	-1.4	29.5	-30.9
6.769	6.5	11.0	1.0	11.0	10.0	0.0	Perp to EUT	QP	-19.1	-1.6	29.5	-31.1
27.088	2.3	9.8	1.0	268.0	10.0	0.0	Par to EUT	QP	-19.1	-7.0	29.5	-36.5

CONCLUSION

Pass

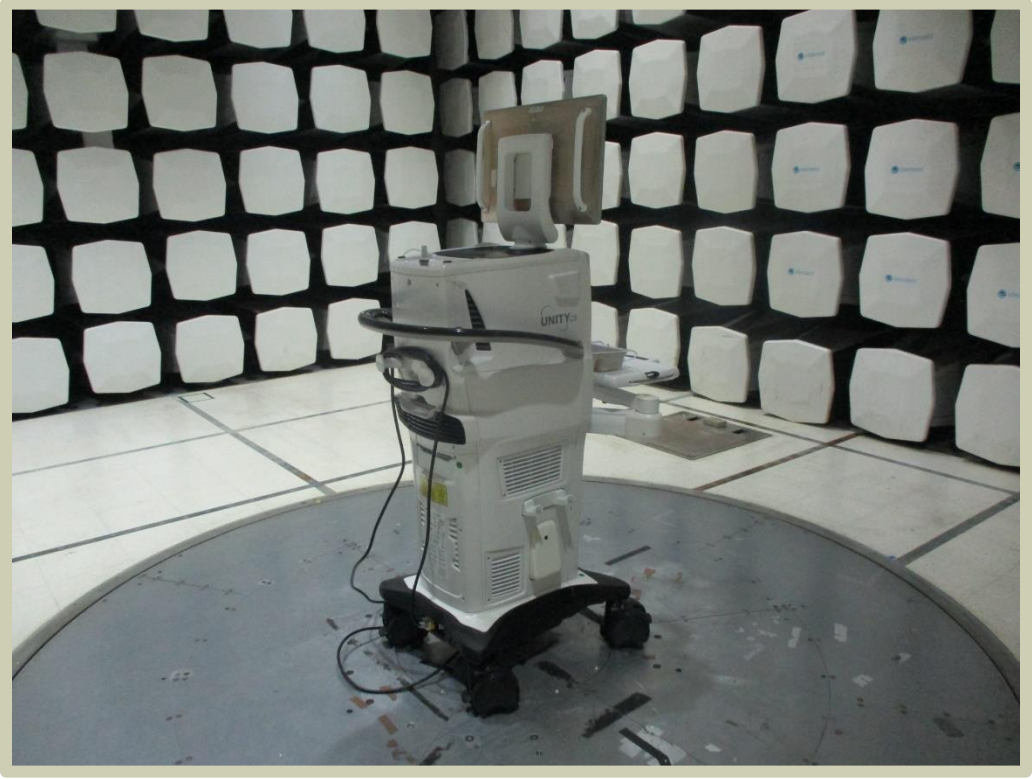
Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - UNITY CS - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

FIELD STRENGTH OF SPURIOUS EMISSIONS (LESS THAN 30 MHZ) - UNITY CS - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0



FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - ILLUMINATOR RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting while set at the operating channel.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Biconilog	EMCO	3142	AXB	2022-05-04	2024-05-04
Cable	ESM Cable Corp.	30-1GHz Cables	OCW	2023-01-23	2024-01-23
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAD	2023-01-23	2024-01-23
Filter - Low Pass	Micro-Tronics	LPM50004	HGK	2023-01-09	2024-01-09
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAY	2022-12-06	2023-12-06

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	4.7 dB	-4.7 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 1000 MHz

POWER INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

ALCO0426-1

MODES INVESTIGATED

Transmitting RFID 13.56 MHz. Illuminator RFID Module, all 3x ports populated with probes and transmitting

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - ILLUMINATOR RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

EUT:	Unity VCS	Work Order:	ALCO0426
Serial Number:	2301157201X	Date:	2023-11-09
Customer:	Alcon Research LLC	Temperature:	21.2°C
Attendees:	Hakan Gokdogan	Relative Humidity:	29%
Customer Project:	None	Bar. Pressure (PMSL):	1018 mb
Tested By:	Nolan De Ramos	Job Site:	OC07
Power:	120VAC/60Hz	Configuration:	ALCO0426-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	15	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

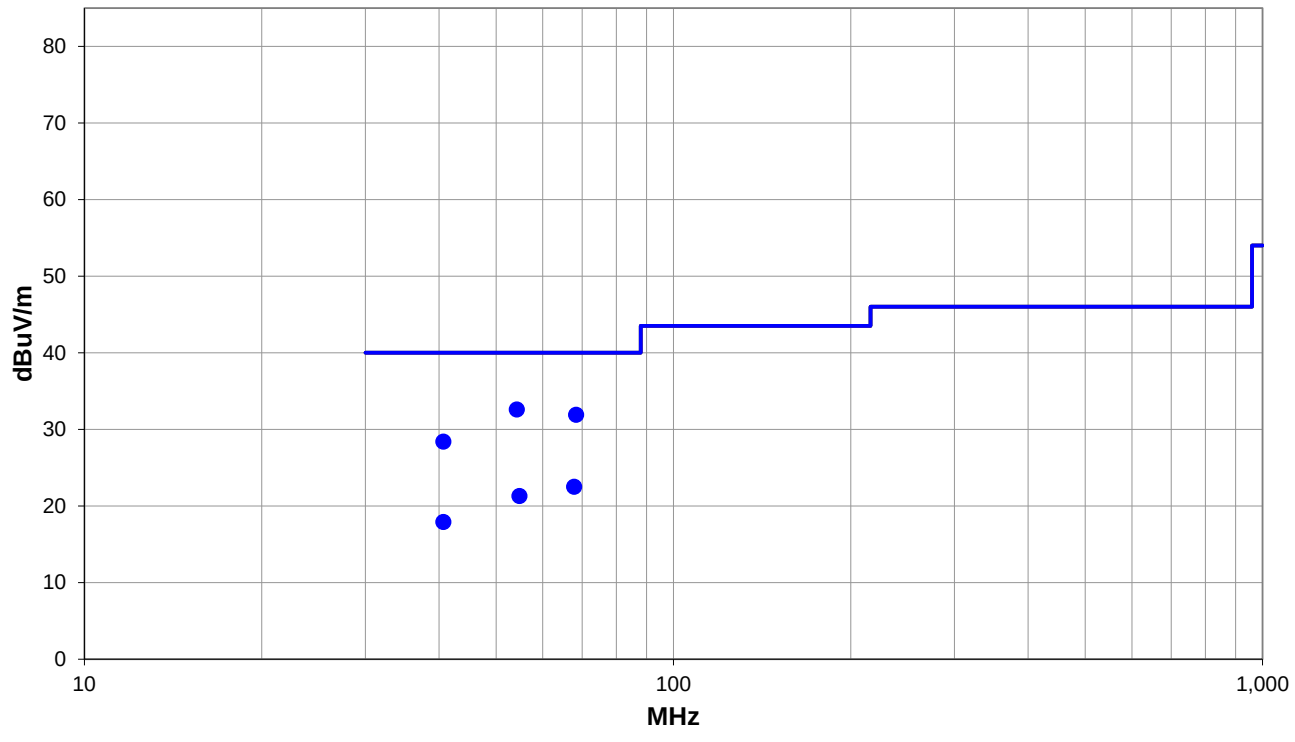
None

EUT OPERATING MODES

Transmitting RFID 13.56 MHz. Illuminator RFID Module, all 3x ports populated with probes and transmitting

DEVIATIONS FROM TEST STANDARD

None



Run #: 15

PK AV QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - ILLUMINATOR RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #15

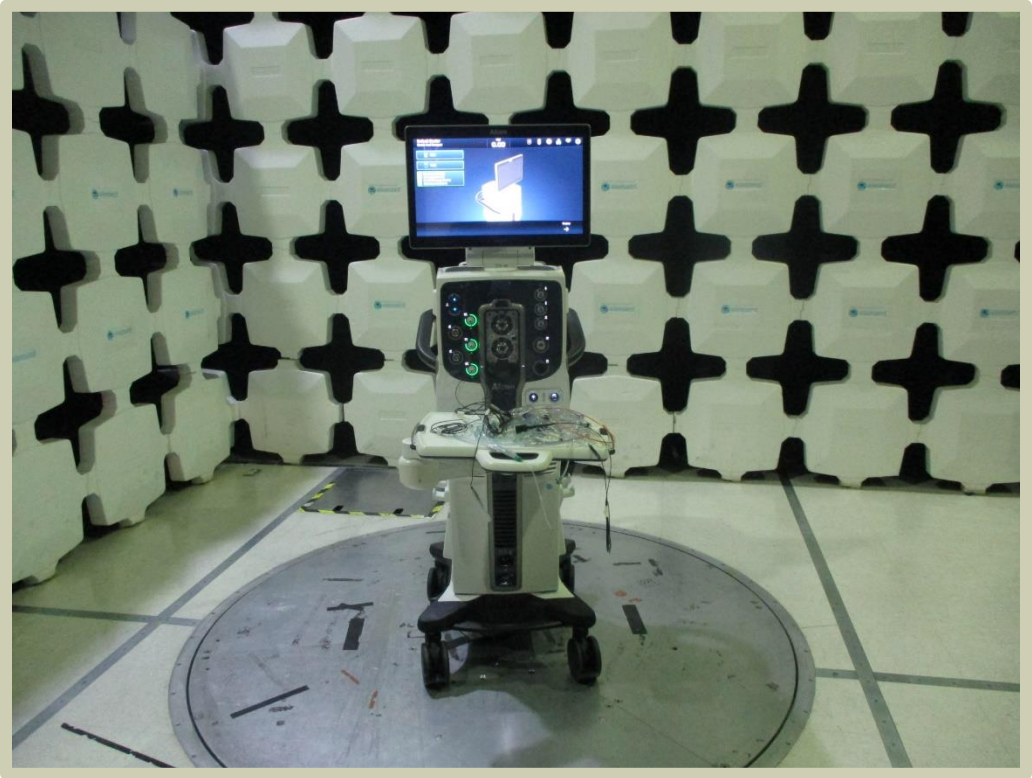
Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
54.185	42.0	-9.4	1.07	171.0	3.0	0.0	Vert	QP	0.0	32.6	40.0	-7.4
68.340	42.6	-10.7	1.02	161.0	3.0	0.0	Vert	QP	0.0	31.9	40.0	-8.1
40.678	33.3	-4.9	1.0	333.0	3.0	0.0	Vert	QP	0.0	28.4	40.0	-11.6
67.801	33.2	-10.7	3.56	68.0	3.0	0.0	Horz	QP	0.0	22.5	40.0	-17.5
54.754	30.8	-9.5	3.98	270.0	3.0	0.0	Horz	QP	0.0	21.3	40.0	-18.7
40.678	22.8	-4.9	2.68	293.0	3.0	0.0	Horz	QP	0.0	17.9	40.0	-22.1

CONCLUSION

Pass

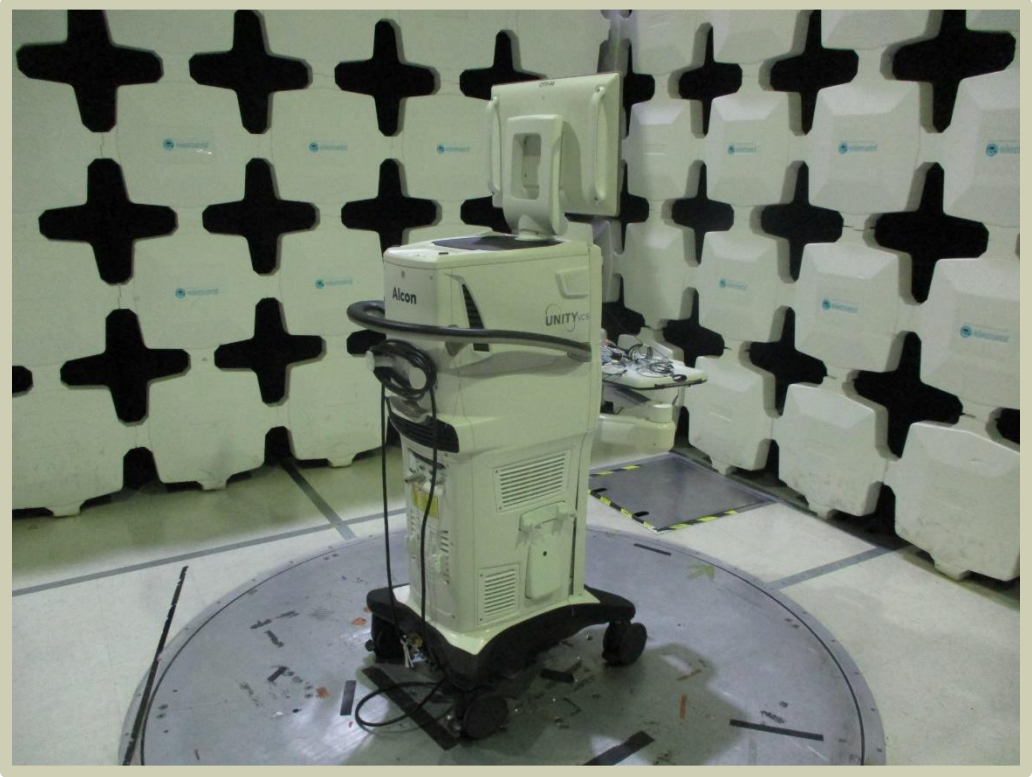
Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - ILLUMINATOR RFID MODULE



FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - ILLUMINATOR RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0



FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - LASER RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting while set at the operating channel.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Biconilog	EMCO	3142	AXB	2022-05-04	2024-05-04
Cable	ESM Cable Corp.	30-1GHz Cables	OCW	2023-01-23	2024-01-23
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAD	2023-01-23	2024-01-23
Filter - Low Pass	Micro-Tronics	LPM50004	HGK	2023-01-09	2024-01-09
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAY	2022-12-06	2023-12-06

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	4.7 dB	-4.7 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 1000 MHz

POWER INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

ALCO0426-1

MODES INVESTIGATED

Transmitting RFID 13.56 MHz. Laser RFID Module, all 2x ports populated with probes and transmitting

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - LASER RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

EUT:	Unity VCS	Work Order:	ALCO0426
Serial Number:	2301157201X	Date:	2023-11-09
Customer:	Alcon Research LLC	Temperature:	21.7°C
Attendees:	Hakan Gokdogan	Relative Humidity:	29.4%
Customer Project:	None	Bar. Pressure (PMSL):	1018 mb
Tested By:	Nolan De Ramos	Job Site:	OC07
Power:	120VAC/60Hz	Configuration:	ALCO0426-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	17	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

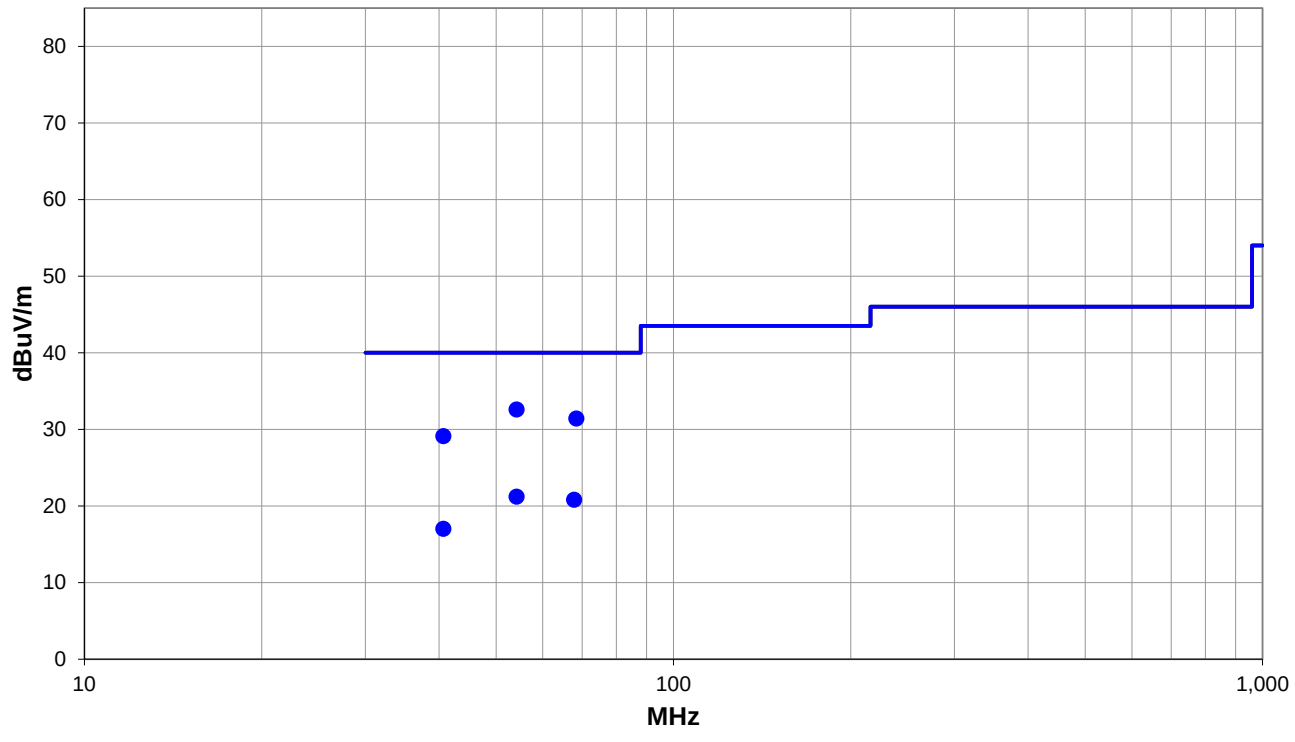
None

EUT OPERATING MODES

Transmitting RFID 13.56 MHz. Laser RFID Module, all 2x ports populated with probes and transmitting

DEVIATIONS FROM TEST STANDARD

None



Run #: 17

PK AV QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - LASER RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #17

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
54.167	42.0	-9.4	1.0	170.0	3.0	0.0	Vert	QP	0.0	32.6	40.0	-7.4
68.380	42.1	-10.7	1.0	179.0	3.0	0.0	Vert	QP	0.0	31.4	40.0	-8.6
40.680	34.0	-4.9	1.01	323.0	3.0	0.0	Vert	QP	0.0	29.1	40.0	-10.9
54.174	30.6	-9.4	3.85	259.0	3.0	0.0	Horz	QP	0.0	21.2	40.0	-18.8
67.789	31.5	-10.7	3.28	88.0	3.0	0.0	Horz	QP	0.0	20.8	40.0	-19.2
40.682	21.9	-4.9	1.11	324.0	3.0	0.0	Horz	QP	0.0	17.0	40.0	-23.0

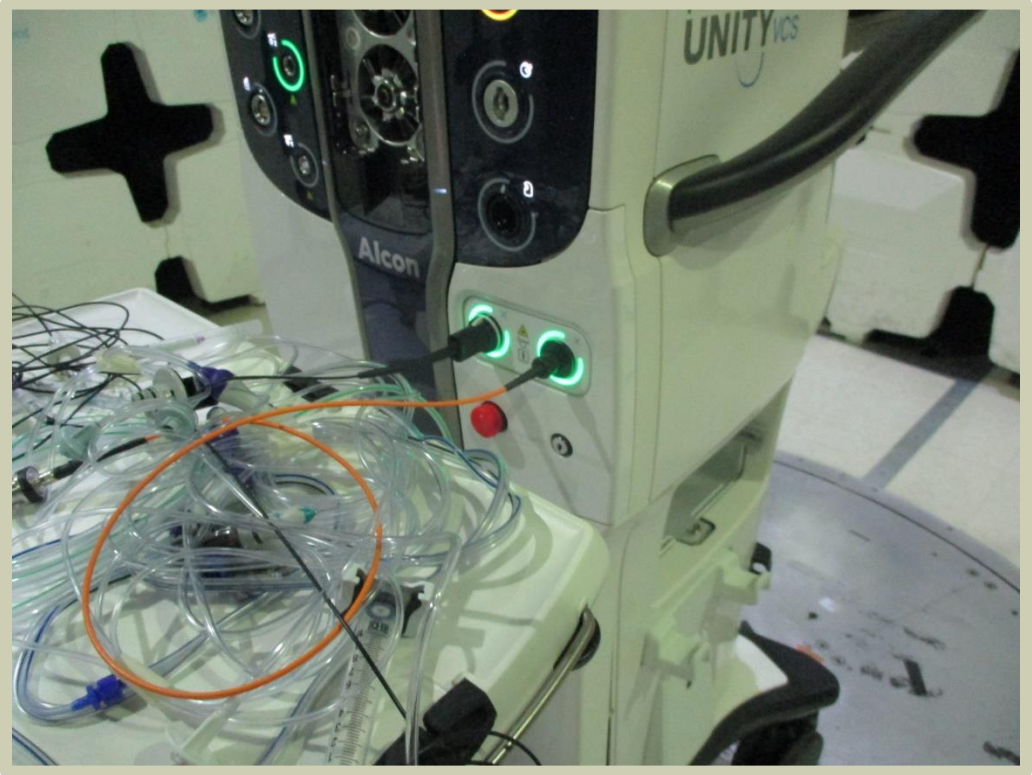
CONCLUSION

Pass

Tested By

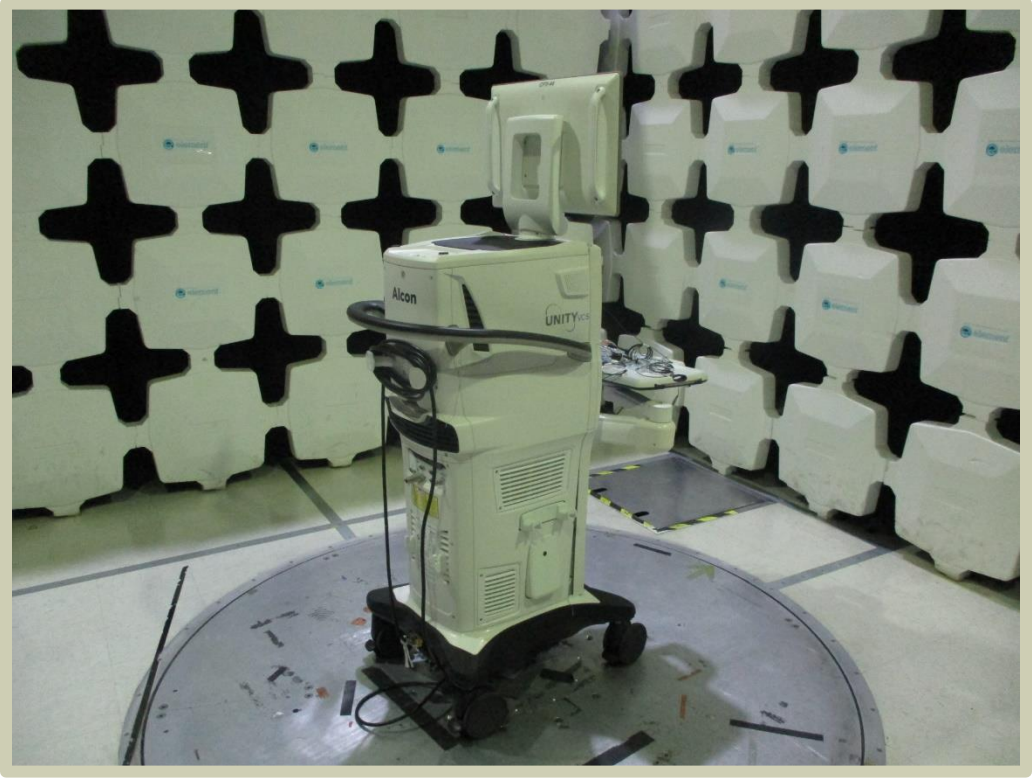
FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - LASER RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0



FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - LASER RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0



FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

TEST DESCRIPTION

The antennas to be used with the EUT were tested. The EUT was transmitting while set at the operating channel.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Antenna - Biconilog	EMCO	3142	AXB	2022-05-04	2024-05-04
Cable	ESM Cable Corp.	30-1GHz Cables	OCW	2023-01-23	2024-01-23
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	PAD	2023-01-23	2024-01-23
Filter - Low Pass	Micro-Tronics	LPM50004	HGK	2023-01-09	2024-01-09
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAY	2022-12-06	2023-12-06

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	4.7 dB	-4.7 dB

FREQUENCY RANGE INVESTIGATED

30 MHz TO 1000 MHz

POWER INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

ALCO0426-1

MODES INVESTIGATED

Transmitting RFID 13.56 MHz. Pneumatic RFID Module, All 5x ports populated with probes and transmitting

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

EUT:	Unity VCS	Work Order:	ALCO0426
Serial Number:	2301157201X	Date:	2023-11-09
Customer:	Alcon Research LLC	Temperature:	21.5°C
Attendees:	Hakan Gokdogan	Relative Humidity:	29.5%
Customer Project:	None	Bar. Pressure (PMSL):	1018 mb
Tested By:	Nolan De Ramos	Job Site:	OC07
Power:	120VAC/60Hz	Configuration:	ALCO0426-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.225:2023	ANSI C63.10:2013

TEST PARAMETERS

Run #:	16	Test Distance (m):	3	Ant. Height(s) (m):	1 to 4(m)

COMMENTS

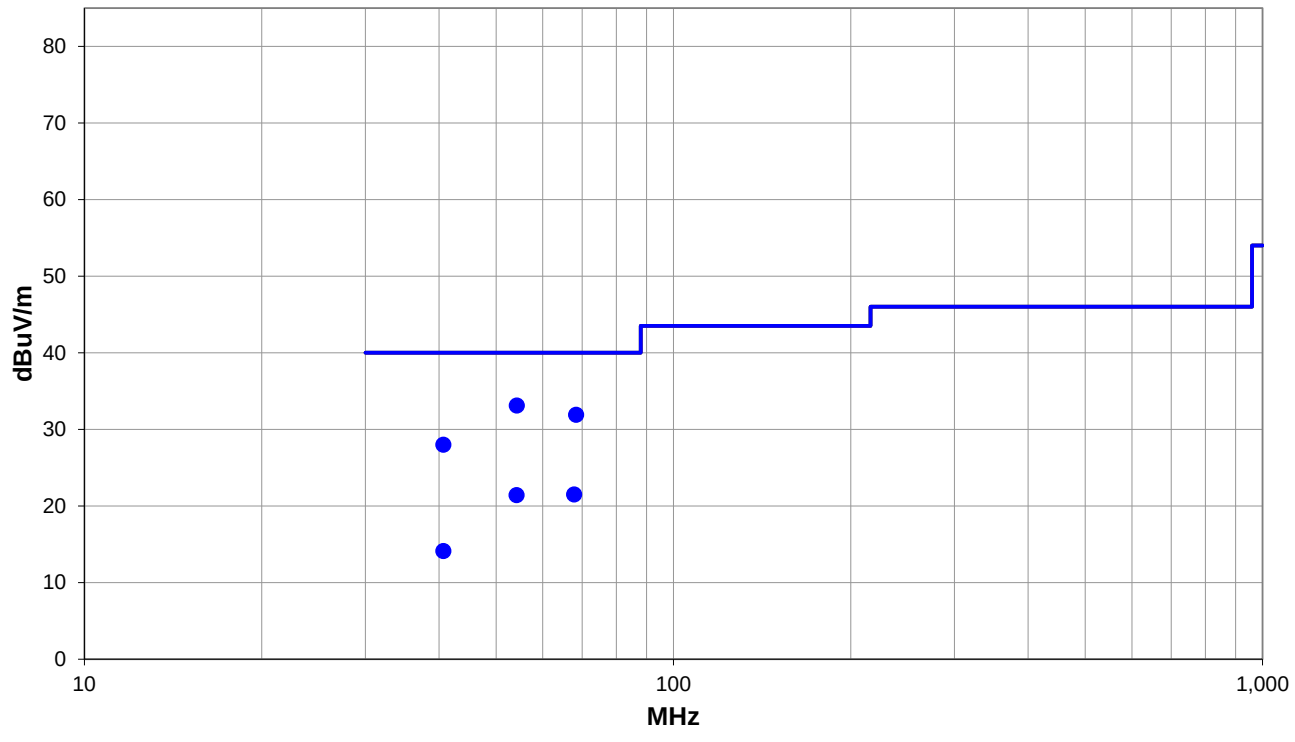
None

EUT OPERATING MODES

Transmitting RFID 13.56 MHz. Pneumatic RFID Module, All 5x ports populated with probes and transmitting

DEVIATIONS FROM TEST STANDARD

None



Run #: 16 ■ PK ◆ AV ● QP

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0

RESULTS - Run #16

Freq (MHz)	Amplitude (dBuV)	Factor (dB/m)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
54.178	42.5	-9.4	1.0	151.0	3.0	0.0	Vert	QP	0.0	33.1	40.0	-6.9
68.334	42.6	-10.7	1.54	177.0	3.0	0.0	Vert	QP	0.0	31.9	40.0	-8.1
40.675	32.9	-4.9	1.0	28.0	3.0	0.0	Vert	QP	0.0	28.0	40.0	-12.0
67.812	32.2	-10.7	3.26	68.0	3.0	0.0	Horz	QP	0.0	21.5	40.0	-18.5
54.170	30.8	-9.4	3.69	243.0	3.0	0.0	Horz	QP	0.0	21.4	40.0	-18.6
40.680	19.0	-4.9	1.0	16.0	3.0	0.0	Horz	QP	0.0	14.1	40.0	-25.9

CONCLUSION

Pass

Tested By

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - PNEUMATIC RFID MODULE

FIELD STRENGTH OF SPURIOUS EMISSIONS (GREATER THAN 30 MHZ) - PNEUMATIC RFID MODULE

element
WTD.2023.10.23.0
EmiR5 2022.07.06.0
PSA-ESCI 2023.04.25.0