



Version: 02

902MHz-928MHz Template: Release November 03rd, 2020

# **TEST REPORT**

N°: 171174 -761649 A(FILE# 1797354)

Subject

Radio spectrum matters tests according to standards: 47 CFR Part 15.247 & RSS-247 Issue 2 & RSS-Gen Issue 5

Issued to KUKA Deutschland GmbH

Zugspitzstraße 140 86165 Augsburg Germany

Apparatus under test

♦ Product Central Radio Transmitter

♣ Trade mark
KUKA

Manufacturer KUKA Deutschland GmbH

♦ Model under test
FNA

♥ Serial number 0000114

♥ FCC ID R7TAMB9826

**♦ IC** 5136A-AMB9826

**Conclusion** See Test Program chapter

**Test date** February 15, 2021 to February 16, 2021

Test location Moirans

**Test Site** 6500A-1 & 6500A-3

Sample receipt date February 12, 2021

Fcc test site 197516
Composition of document 29 pages

**Document issued on** February 16, 2021

Written by : Mounir BOUAMARA Tests operator Approved by LDES
CHAMPS

Approved by LDES
CHAMPS

Approved by LDES
CHAMPS

Approved by LDES
CHAMPS

Tel. 04 76 07 36 36
Fax 04 76 55 90 88

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I CIE

Laboratoire Central des Industries Electriques Une société de Bureau Veritas ZI Centr'alp 170 rue de Chatagnon 38430 Moirans FRANCE Tél: +33 4 76 07 36 36 contact@lcie.fr www.lcie.fr



# **PUBLICATION HISTORY**

Version	Date	Author	Modification
01	February 16, 2021	Mounir BOUAMARA	Creation of the document
02	September 27, 2021	Mounir BOUAMARA	Adding the following information Fcc test site :197516

Each new edition of this test report replaces and cancels the previous edition. The control of the old editions of report is under responsibility of client.



# **SUMMARY**

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#### 1. TEST PROGRAM

#### References

- > 47 CFR Part 15.247
- RSS 247 Issue 2
- > RSS Gen Issue 5
- > KDB 558074 D01 DTS Meas Guidance v05r02
- > ANSI C63.10-2013

Radio requirement:

Clause (47CFR Part 15.247 & RSS-247 Issue 2 & RSS-Gen Issue 5)  Test Description	Test result - Comments			
Occupied Bandwidth	□ PASS	□ FAIL	□ NA	☑ NP(1)
6dB Bandwidth	□ PASS	□ FAIL	□ <b>NA</b> ()	☑ NP(1)
Duty Cycle	□ PASS	□ FAIL	☑ NA	□ NP(1)
Maximum Output Power	☑ PASS	□ FAIL	□ NA	□ NP(1)
Power Spectral Density	□ PASS	□ FAIL	□ NA	☑ NP(1)
Conducted Spurious Emission at the Band Edge	□ PASS	□ FAIL	□ <b>NA</b> ()	☑ NP(1)
Unwanted Emissions into Non-Restricted Frequency Bands	□ PASS	□ FAIL	□ <b>NA</b> ()	☑ NP(1)
AC Power Line Conducted Emission	□ PASS	□ FAIL	□ NA(2)	☑ NP(1)
Unwanted Emissions into Restricted Frequency Bands	☑ PASS	□ FAIL	□ NA	□ NP(1)
Receiver Radiated emissions	□ PASS	□ FAIL	☑ NA	□ NP(1)
This table is a summary of test report, see conclusion of ea	ach clause of this tes	t report for detail.		

(1): Limited program

(2): EUT not directly or indirectly connected to the AC Power Public Network

PASS: EUT complies with standard's requirement FAIL: EUT does not comply with standard's requirement

NA: Not Applicable NP: Test Not Performed



## 2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)

### 2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

#### **Equipment under test (EUT):**

KUKA FNA Serial Number: 0000114



**Equipment Under Test** 

#### Power supply:

During all the tests, EUT is supplied by V<sub>nom</sub>: 24VDC

For measurement with different voltage, it will be presented in test method.

Name	Туре	Rating	Reference / Sn	Comments
Supply1	□ AC ☑ DC □ Battery	24		
Voltage tal	ble used (for Power Line Cor	nducted Emissions):		
	T		Management manfauss als	

Туре	Measurement performed:				
☐ AC	☐ 120VAC/60Hz	☐ 240VAC/50Hz			
☑ DC	□ <b>+</b> 12 <b>VDC</b>	☑ 24VDC			
☐ Battery	□ <b>+</b> 3.6 <b>VDC</b>	□ <b>VDC</b>			
☐ USB (Laptop auxiliary)	☐ 120VAC/60Hz (Laptop auxiliary)	☐ 240VAC/50Hz(Laptop auxiliary)			

# Inputs/outputs - Cable: FNA: Assignment of X2

Access	Туре	Function	Length used (m)	Declared <3m	Shielded	Under test	Comment
1	NC	Not connected				$\checkmark$	-
2	NC	Not connected				$\checkmark$	-
3	SO_A	Testing Safe Input A				$\checkmark$	Self-supply: Connected with SI_A
4	SI_A	Safe Input A				$\checkmark$	Connected with SO_A
5	SO_B	Testing Safe Input B				$\checkmark$	Self-supply: Connected with SI_A
6	SI_B	Safe Input B				<b>V</b>	Connected with SO_B



FNA: Assignment of X3

Access	Туре	Function	Length used (m)	Declared <3m	Shielded	Under test	Comment
1	+24Vin	24V Supply				$\checkmark$	Master: Output Repeater: Input
2	GND	Ground				$\checkmark$	Master: Output Repeater: Input
3	RX_A	RS485 – Input A				$\checkmark$	
4	RX_B	RS485 – Input B				$\checkmark$	
5	TX_Y	RS485 – Output Y				$\checkmark$	
6	TX_Z	RS485 – Output Z				$\checkmark$	

Equipment information:							
Frequency band:			[902 – 9	28] MHz			
Number of Channel:	4						
Spacing channel:			2 N	lHz			
Channel bandwidth:			MI	Ηz			
Antenna Type:	□ Integral		☑ Ext	ernal		☐ Dedicated	
Antenna connector:				No	<b> T</b>	emporary for test	
Transmit chains:	V	₫ 1		□ 2		2	
Receiver chains			□ 2				
Type of equipment:		е	☐ Plug-in		□ Combined		
Ad-Hoc mode:		Yes				□ No	
Duty cycle:	☐ Continuous d	luty	✓ Intermi	ttent duty	t duty □ 100% duty		
Equipment type:		ction mo	odel	☐ Pre-product		ction model	
	Tmin:		□ -20°C	□ 0°C	;	☑ 5°C	
Operating temperature range:	Tnom:	Tnom:		20°C			
	Tmax:		□ 35°C	<b>☑</b> 55°0	2	□ X°C	
Type of power source:	☐ AC power sup	ply	☑ DC power supply			☐ Battery	
Operating voltage range:	Vnom:		□ 120V/60Hz		☑ 24 Vdc		
Operating voltage range.	VIIOIII.		☐ 240\//E0∐-z		□ V \/do		

Antenna Characteristic						
Antenna assembly Gain (dBi) Frequency Band (MHz) Impedance(Ω) Reference of the antenna						
1	6	902 - 928 MHz	50	PN6-915 Patch		

CHANNEL PLAN					
Channel	Frequency (MHz)				
Cmin	902.5 MHz				
Cmid	904.5 MHz				
Cmax	908.5 MHz				

Hardware information		
Software (if applicable):	<b>V</b> . :	Not communicated



#### 2.2. RUNNING MODE

Test mode	Description of test mode
Test mode 1	Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
Test mode 2	Permanent reception

Test	Running mode					
Occupied Bandwidth	☐ Test mode 1 (1)	☐ Alternative test mode()				
6dB Bandwidth	☐ Test mode 1 (1)	☐ Alternative test mode()				
Duty Cycle	☐ Test mode 1 (1)	☐ Alternative test mode()				
Maximum Output Power	☐ Test mode 1 (1)	☑ Alternative test mode()				
Power Spectral Density	☐ Test mode 1 (1)	☐ Alternative test mode()				
Conducted Spurious Emission at the Band Edge	☐ Test mode 1 (1)	☐ Alternative test mode()				
Unwanted Emissions into Non-Restricted Frequency Bands	☐ Test mode 1 (1)	☐ Alternative test mode()				
AC Power Line Conducted Emission	☐ Test mode 1 (1)	☐ Alternative test mode()				
Unwanted Emissions into Restricted Frequency Bands	☑ Test mode 1 (1)	☐ Alternative test mode()				
Receiver Radiated emissions	☐ Test mode 2 (1)	☐ Alternative test mode()				

- (1) Following commands with the specific test software "X" are used to set the product:
  - a. See document "X" (provided by customer) for the command used during test.

## 2.3. EQUIPMENT LABELLING



2.4.	<b>EQUIP</b> I	MENT MODIFICATION		
☑ None	e	☐ Modification:		



#### 3. **MAXIMUM OUTPUT POWER**

#### 3.1. **TEST CONDITIONS**

Test performed by : Mounir BOUAMARA

Date of test : February 15, 2021 to February 16, 2021

Ambient temperature : 23 °C Relative humidity : 26 %

#### 3.2. **TEST SETUP**

-	i ne Equipment	Under	i est is	installed:

☑ OATS

☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

□ Conducted Method

☑ Radiated Method

- Test Procedure:

☑ ANSI C63.10 § 11.9.1.1

☐ ANSI C63.10 § 11.9.1.2

□ ANSI C63.10 § 11.9.2.2.2 (Method AVGSA-1) □ ANSI C63.10 § 11.9.2.2.4 (Method AVGSA-2)









Photo Setup: anechoic chamber (XY axis)





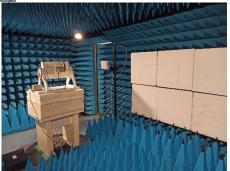


Photo Setup: anechoic chamber (Z axis)

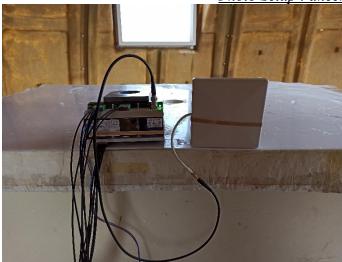




Photo Setup – OATS

Photograph for Maximum Conducted Output Power



#### 3.3. LIMIT

Frequency range	Maximum Conducted Output Power
2400MHz to 2483.5MHz	≤30dBm*

<sup>\*</sup>Remark: Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

### 3.4. TEST EQUIPMENT LIST

	TEST EQUIPME	NT USED			
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Antenna Bi-log	CHASE	CBL6111A	C2040051	06/19	06/21
Antenna Dipole precision	SCHWARZBECK	UHAP	C2040075	08/20	08/22
Antenna Dipole precision	SCHWARZBECK	VHAP	C2040076	08/20	08/22
Antenna Mat (OATS)	ETS Lingren	2071-2	F2000392		
Cable (OATS)	_	1GHz	A5329623	05/20	05/21
Cable substitution (OATS)	_	1GHz	A5329059	05/20	05/22
Cable substitution (OATS)	_	1GHz	A5329057	05/20	05/22
Emission Cable	SUCOFLEX	6GHz	A5329061	06/20	06/21
Frequency generator 0.1-2060MHz	HEWLETT PACKARD	8657B	A5442025	05/20	05/21
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
OATS	_	_	F2000409	04/20	04/21
RADIO ERP_EIRP	LCIE SUD EST	v4	L2000034		
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	11/20	11/22
Rehausse Table C1/OATS	LCIE	_	F2000512		
Table C1/OATS	LCIE	_	F2000445		
Turntable (OATS)	ETS Lingren	Model 2187	F2000403		
Turntable / Mast controller (OATS)	ETS Lingren	Model 2066	F2000372		
Antenna Loop	ELECTRO-METRICS	EM-6879	C2040052	06/19	06/22
Radiated emission comb generator	BARDET	_	A3169050		

Note: In our quality system, the test equipment calibration due is more & less 2 months



#### 3.5. RESULTS

Channel	Cmin	Cmax							
Voltage		Vnom							
Temperature	Tnom	Tnom	Tnom						
EIRP (dBm)	10.76	10.06	10.38						

#### 3.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **KUKA FNA**, SN: **0000114**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247 & RSS 247 ISSUE 2** limits.



#### 4. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS

#### 4.1. TEST CONDITIONS

Test performed by : Mounir BOUAMARA

Date of test : February 15, 2021 to February 16, 2021

Ambient temperature : 23 °C Relative humidity : 26 %

#### 4.2. TEST SETUP

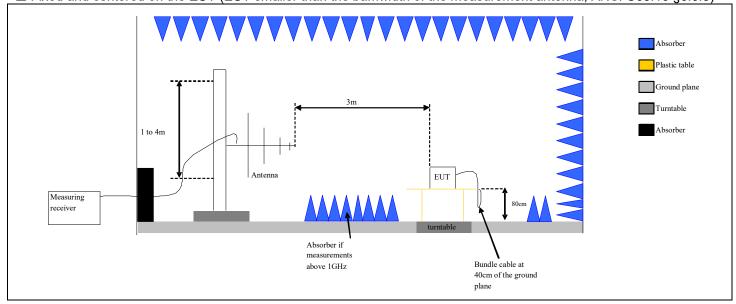
The product has been tested according to ANSI C63.10 (2013) and FCC part 15 subpart C.

Test is performed in parallel, perpendicular and ground parallel axis with a loop antenna below 30MHz. Measurement bandwidth was 200Hz below 150kHz and 9kHz between 150kHz & 30MHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. Antenna height was 1m. The EUT is placed **on an open area test site**. Distance between measuring antenna and the EUT is **10m**.

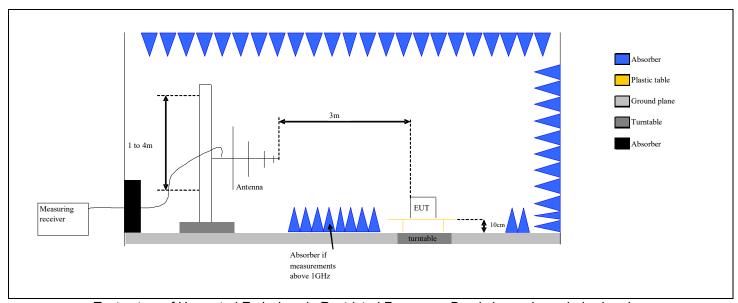
Test is performed in horizontal (H) and vertical (V) polarization with **bilog** between 30MHz & 1GHz and with a horn antenna above 1GHz. Measurement bandwidth was 120kHz below 1GHz and 1MHz above 1GHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. The EUT is place at 1.5m high above 1GHz and at 0.8m high under 1GHz. The EUT is placed **in a full anechoic chamber** above 1GHz and **on an open area test site** from 30MHz to 1GHz. Distance between measuring antenna and the EUT is **10m**. The height antenna is varied from 1m to 4m from 30MHz to 1GHz and above 1GHz is:

☑ On mast, varied from 1m to 4m

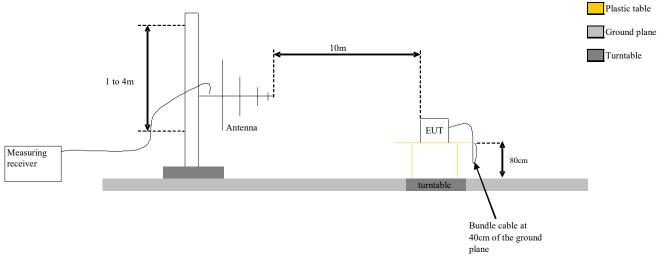
☐ Fixed and centered on the EUT (EUT smaller than the bamwidth of the measurement antenna, ANSI C63.10 §6.6.5)

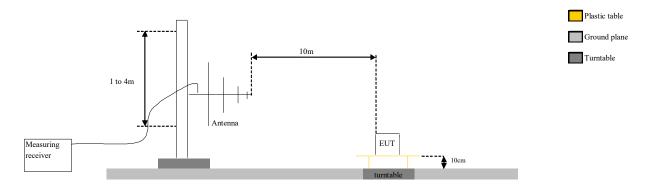






Test set up of Unwanted Emissions in Restricted Frequency Bands in semi anechoic chamber





Test Set up for radiated measurement in open area test site









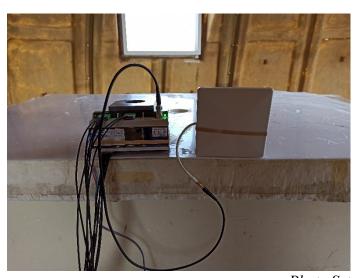
Photo Setup: anechoic chamber (XY axis)







Photo Setup: anechoic chamber (Z axis)



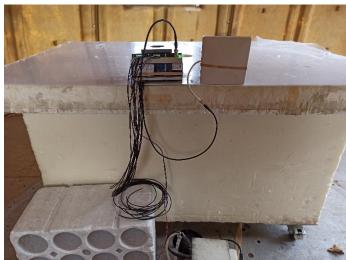


Photo Setup – OATS

Photograph for Unwanted Emission in restricted frequency bands



### 4.3. LIMIT

	Measure at 300m	
requency range	Level	Detector
9kHz-490kHz	67.6dBμV/m /F(kHz)	QPeak
	Measure at 30m	
requency range	Level	Detector
490kHz-1.705MHz	87.6dBµV/m /F(kHz)	QPeak
1.705MHz-30MHz	29.5dBµV/m	QPeak
requency range 30MHz to 88MHz	Level 29.5dBµV/m	<b>Detector</b> QPeak
88MHz to 216MHz	29.5dBµV/m	QPeak QPeak
16MHz to 960MHz	35.5ВµV/m	QPeak
60MHz to 1000MHz	43.5dBμV/m	QPeak
OOM IZ TO TOOOM IZ	63.5dBµV/m	Peak
Above 1000MHz	43.5dBµV/m	Average
roquency renge	Measure at 3m	Detector
requency range		
30MHz to 88MHz	40dBμV/m	QPeak
88MHz to 216MHz	43.5dBμV/m	QPeak
216MHz to 960MHz	46BµV/m	QPeak
60MHz to 1000MHz	54dBµV/m	QPeak
Above 1000MHz	74dBµV/m	Peak
	54dBµV/m	Average



#### 4.4. TEST EQUIPMENT LIST

	TEST EQUIPME	NT USED			
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Antenna Bi-log	CHASE	CBL6111A	C2040051	06/19	06/21
Antenna Biconic	EMCO	3104C	C2040175	03/20	03/22
Antenna Mat (OATS)	ETS Lingren	2071-2	F2000392		
BAT EMC	NEXIO	v3.19.1.23	L1000115		
Cable (OATS)	_	1GHz	A5329623	05/20	05/21
Emission Cable	SUCOFLEX	6GHz	A5329061	06/20	06/21
OATS	_	_	F2000409	04/20	04/21
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	11/20	11/22
Table C1/OATS	LCIE	_	F2000445		
Turntable (OATS)	ETS Lingren	Model 2187	F2000403		
Turntable / Mast controller (OATS)	ETS Lingren	Model 2066	F2000372		
Amplifier 9kHz - 40GHz	LCIE SUD EST	_	A7102082	06/20	06/21
Antenna Bi-Log	CHASE	UPA6192	C2040221	01/18	01/23
Antenna horn 18GHz	EMCO	3115	C2042029	09/17	02/21
BAT EMC	NEXIO	v3.19.1.23	L1000115		
Cable 1m	HUBER & SUHNER	18GHz	A5329705	02/19	01/21
Comb EMR HF	YORK	CGE01	A3169114		
Emission Cable	_	6GHz	A5329069	02/20	02/21
Emission Cable (SMA 1m)	TELEDYNE	26GHz	A5329874	10/20	10/21
Emission Cable (SMA 3.3m)	TELEDYNE	26GHz	A5329875	10/20	10/21
Emission Cable <1GHz (Ampl <-> Cage)	-	18GHz	A5329907	08/20	08/21
Filter Matrice	LCIE SUD EST	Combined filters	A7484078	09/20	09/21
Multimeter - CEM	FLUKE	87	A1240251	11/18	02/21
Power supply DC	METRIX	AX503	A7042308		
Radiated emission comb generator	BARDET	_	A3169050		
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	11/20	11/22
Rehausse Table C3	LCIE	_	F2000507		
Semi-Anechoic chamber #3 (BF)	SIEPEL	_	D3044017 _BF	12/19	12/22
Semi-Anechoic chamber #3 (VSWR)	SIEPEL	_	D3044017 _VSWR	12/19	12/22
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/19	09/21
Table C3	LCIE	_	F2000461		
Thermo-hygrometer (C3)	OREGON	BAR206	B4204078	10/18	02/21
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371		
Turntable controller (Cage#3)	ETS Lingren	Model 2090	F2000444		

Note: In our quality system, the test equipment calibration due is more & less 2 months



### 4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

✓ None
□ Divergence:

### 4.6. RESULTS

Results in the frequency band [30-1000] MHz:

						F	RADIATEI	D EMISSIC	DNS								
Graph na	me:		E	mr#1				Tes	t co	nfigurat	tion:						
Limit:			F	CC C	FR47	Par	t15C	(H+	V) -	Worst c	ase pres	sented -	TX mc	de -	Axis	ΥX	
Class:								Ċm			·						
					Fr	equ	ency rang	je: [30MH	z - 1	GHz]							
Antenna	polarizat	ion:						RB	<b>W</b> :	100k	Hz						
Azimuth:			0°	° - 36	0°			VB	<b>W</b> :	300k	Hz						
										FC FC Niv Niv Me	C/FCC CF C/FCC CF eau (Susp eau (Susp	R47 Part1: R47 Part1: R47 Part1: ect Manue ect Manue prizontale)	5C - Clas 5C - Clas I) (Horizo	sse: - C sse: - C ontale)	QCrête.	/3.0m	
100 dBµV/m																•	_
																	_
													FCC/I	F©C CFR47 P€	art15C - Class	e: - QCrête	3.0
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0			The state of the s	dradiscopera	relativitation private	ing lay MINTER I											_
	30MHz	,			·			Fréquenc	е							1GI	Ηz
							Spurious	s emissio	ns								

Frequency (MHz)	Peak Level (dBµV/m)	Polarization	Correction (dB)
902.758*	95.5	Horizontal	-8.4
902.272*	95.8	Vertical	-8.4

<sup>\*</sup>Carrier frequency

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						R	ADIATED	EMI	SSION	NS								
Graph na	me:		Er	nr#2					Test	conf	gurat	ion:						
Limit:			FC	CC CF	R47 Pa	art1	15C		(H+V	) - W	orst ca	se pres	ented -	· TX mc	ode -	Axis	Z	
Class:									Ċmin	l								
					Freq	ue	ncy rang	e: [3	0MHz	- 1GI	lz]							
Antenna	polarizat	ion:							RBW	7:	100kl	Ηz						
Azimuth:	th: 0° - 360° <b>VBW</b> : 300kHz																	
										<ul><li></li><li></li></ul>	FCC Nive Nive	C/FCC CF C/FCC CF C/FCC CF eau (Susp eau (Susp s.Peak (Ho s.Peak (Ve	R47 Part1 R47 Part1 ect Manue ect Manue prizontale)	15C - Clas 15C - Clas el) (Horizo el) (Vertic	sse: - ( sse: - ( ontale)	QCrête Crête/3	/3.0	m/
120 dBμV/m															FCC OFR47 P		se: - QCr	te/3.0m
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	30MHz							Fréd	quence								10	SHz
							Spurious	s emis	ssions	S								

Frequency (MHz)	Peak Level (dBµV/m)	Polarization	Correction (dB)
902.321*	100.4	Horizontal	-8.4
902.758*	86.7	Vertical	-8.4

<sup>\*</sup>Carrier frequency



						F	RAD	IATE	D EN	/IISS	ION	S									
Graph na	me:		Er	nr#3						Te	est c	conf	igura	tion:							
Limit:			FC	CC CF	FR47	Par	t150	)		(H	+V)	- W	orst c	ase p	rese	nted -	TX m	ode -	Axis	XY	
Class:										Cr	nid										
					Fre	que	enc	y ran	ge:	[30M	Hz -	- 1G	Hz]								
Antenna	polarizat	ion:									3W		100k								
Azimuth:			0°	- 360	)°					VE	3W	:	300k	Hz							
												0	FC FC Niv	C/FC0 C/FC0 /eau (S /eau (S	C CFR4 C CFR4 Suspec	47 Part1 47 Part1 et Manue et Manue zontale)	5C - Cla 5C - Cla 5C - Cla el) (Horiz el) (Verti	asse: - ( asse: - ( contale)	QCrête/:	e/3.0i	m/
100 dBµV/m																,					<b>S</b>
																	FCI	D/FCC CFR47 F	Part15C - Cla	sse: - QCn	te/3.0
	ed hadrodisco proposed descriptions	ment from the first for most of the section and the section an	Makingapa Haran Kaba	eesh dareksessa	disagraphica, status	n project hands	kyptillet to the A	of natural space	oktopen fliste	and the second	we transact	de la	popular proportion de	in juris his more lift	skazienie berekt	Marine finish order idd	s phine of the sphere	n distribution de service de serv	Agraphical section of	argery society	N. September
0.	30MHz									réquer											
							Sp	uriou	ıs en	nissio	ons										

Frequency (MHz)	Peak Level (dBµV/m)	Polarization	Correction (dB)
904.310*	98.0	Horizontal	-8.4
904.698*	91.1	Vertical	-8.4

<sup>\*</sup>Carrier frequency



				RA	DIATED EM	ISSIOI	NS							
Graph nan	ne:	Emr#	<u>4</u>			Test	conf	figurati	on:					
Limit:		FCC	CFR47 F	art1	5C	(H+V	′) - W	orst ca	se prese	nted - 7	ΓX mo	de - A	\xis Z	<u> </u>
Class:						Cmic	ĺ		-					
			Fred	quen	cy range: [3	30MHz	- 1G	Hz]						
Antenna p	olarization:					RBW		100k⊦	z					
Azimuth:		0° - 3	60°			VBW	<i>!</i> :	300kH	z					
								FCC	/FCC CFR4	17 Part15	C - Clas	se: - M	oyenn	e/3.0r
								FCC	FCC CFR4	17 Part15	C - Clas	se: - Q	Crête/	3.0m/
								FCC	/FCC CFR4	17 Part15	C - Clas	se: - Cı	rête/3.	0m/
								Mes	Peak (Hori:	zontale)				
								Mes	Peak (Vert	cale)				
							$\Diamond$	Peak	(Peak/Lim	Q-Peak)	(Horizor	itale)		
120										1				
dBµV/m														
														<b></b>
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											FCC/F	CC CFR47 Part	15C - Classe	- QCrete/3.
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3	0MHz				F									1GH
					Fre	equence								
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Frequency (MHz)	Peak (dBµV/m)	LimQP (dBµV/m)	Peak-LimQP (dB)	Polarization	Correction (dB)
904.600*	95.5	46.0	49.5	Horizontal	-8.4

<sup>\*</sup>Carrier frequency



							RA	DIATED EN	/IISSIO	NS								
Graph na	me:		Е	mr#5	5				Test	con	figurat	ion:						
Limit:			F	CC (	CFR4	7 Pai	rt15	5C	(H+\	/) - W	orst ca	ase pres	ented -	TX mo	ode -	Axis	XΥ	
Class:									Cma									
					F	requ	ien	cy range:	30MHz	: - 1G	Hz]							
Antenna	polarizat	ion:							RBV		100kl	Ηz						
Azimuth:			0	° - 36	60°				VBW	<b>/</b> :	300kl	Hz						
												C/FCC CFF				-		
												C/FCC CFF						
												C/FCC CFF				Crëte/3	.0m	1
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Frequency (MHz)	Peak Level (dBµV/m)	Polarization	Correction (dB)
908.723*	99.5	Horizontal	-8.2
908.286*	97.3	Vertical	-8.2

<sup>\*</sup>Carrier frequency



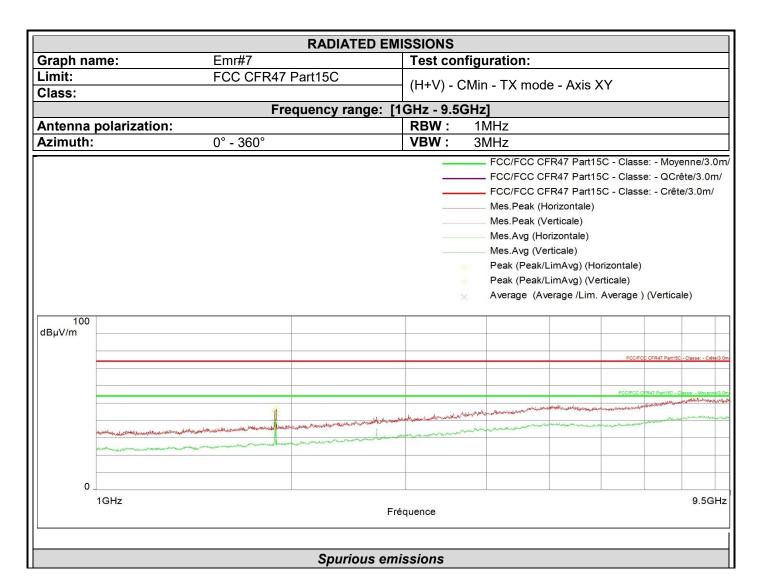
						RADIA	ATED E	MISSIC	NS							
Graph na	me:		Em	r#6				Tes	t con	figurat	ion:					
Limit:			FC	C CFR4	7 Pai	rt15C		(H+	√) - V	Vorst ca	se pres	ented -	TX mo	ode -	Axis ?	Z
Class:								Čma								
				F	requ	ency	range:	[30MH:	z - 10	GHz]						
Antenna <sub>I</sub>	polarizatio	on:						RB\	<b>V</b> :	100kl	Ηz					
Azimuth:			0° -	360°				VBV	۷:	300kl	Ηz					
										FC(	C/FCC CFF	R47 Part1	5C - Cla	sse: - l	Moyenn	ne/3.0
										FC0	C/FCC CFF	R47 Part1	5C - Cla	sse: - (	QCrête/	/3.0n
									_	FC0	C/FCC CFF	R47 Part1	5C - Cla	sse: - (	Crête/3	.0m/
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	30MHz							Fréquence								1GI
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						Snu	rious a	missior	98							

Frequency (MHz)	Peak Level (dBµV/m)	Polarization	Correction (dB)
908.286*	102.7	Horizontal	-8.2
908.772*	101.8	Vertical	-8.2

<sup>\*</sup>Carrier frequency



#### Results in the frequency band [1-9.5] GHz:



Frequency (MHz)	Average (dBµV/m)	Lim.Average (dBµV/m)	Average- Lim.Average (dB)	Commentaire	Polarization	Correction (dB)
1882.867	39.2	54.0	-14.8	Vertical	Vertical	-31.2
1895.333	44.0	54.0	-10.0	Vertical	Vertical	-31.1



RADIATED EMISSIONS											
Graph name:	Emr#8	Test configuration:									
Limit:	FCC CFR47 Part15C	(HTV) CMin TV made Avia 7									
Class:		(H+V) - CMin - TX mode - Axis Z									
	Frequency rai	ge: [1GHz - 9.5GHz]									
Antenna polarization		RBW: 1MHz									
Azimuth:	0° - 360°	VBW: 3MHz									
		FCC/FCC CFR47 Part15C - Classe: - Mo	oyenne/3.0m								
		——— FCC/FCC CFR47 Part15C - Classe: - Q	Crête/3.0m/								
		FCC/FCC CFR47 Part15C - Classe: - Cr	ête/3.0m/								
		——— Mes.Peak (Horizontale)									
		Mes.Peak (Verticale)									
		Mes.Avg (Horizontale)									
		Mes.Avg (Verticale) Peak (Peak/LimAvg) (Horizontale)									
		D 1 (D 14): A \ A ( ): 1 \									
		→ Peak (Peak/LimAvg) (Verticale)   ✓ Peak (Peak /Lim. Peak ) (Verticale)									
		× Average (Average /Lim. Average ) (Horiz	zontale)								
		× Average (Average /Lim. Average ) (Verti	,								
dB <sub>µ</sub> V/m											
ασμν/ιιι											
		FCC/FCC CFR47 Pa	rt15C - Classe: - Crête/3.0n								
		ECC/SCC CSB47 Dart15	C - Classe - Moveme/3 Or								
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1GHz		Fréquence	9.5GHz								
	Spurio	us emissions									

Frequency (MHz)	Average (dBµV/m)	Lim.Average (dBµV/m)	Average- Lim.Average (dB)	Commentaire	Polarization	Correction (dB)
1882.867	38.3	54.0	-15.7	Horizontal	Horizontal	-31.2
1978.633	43.6	54.0	-10.4	Vertical	Vertical	-30.8
8120.733	47.2	54.0	-6.8	Vertical	Vertical	-13.8

Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Peak- Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
8120.733	55.8	74.0	-18.2	Vertical	Vertical	-13.8



RADIATED EMISSIONS						
Graph name:	Emr#9	Test configuration:				
Limit:	FCC CFR47 Part15C					
Class:		(H+V) - CMid - TX mode - Axis XY				
	Frequency r	ange: [1GHz - 9.5GHz]				
Antenna polarization	:	RBW: 1MHz				
Azimuth:	0° - 360°	VBW: 3MHz				
		FCC/FCC CFR47 Part15C - Classe: - Moyenne/3.0  FCC/FCC CFR47 Part15C - Classe: - QCrête/3.0m/  FCC/FCC CFR47 Part15C - Classe: - Crête/3.0m/  Niveau (Suspect Manuel) (Horizontale)  Mes.Peak (Horizontale)  Mes.Peak (Verticale)				
		Mes.Avg (Horizontale)  Mes.Avg (Verticale)  Peak (Peak /Lim. Peak ) (Verticale)  Average (Average /Lim. Average ) (Horizontale)  Average (Average /Lim. Average ) (Verticale)				
100 dBμV/m		FCCFCC CFR47 PartISC - Classe: - Celte FCCFCC CFR47 PartISC - Classe: - Mayerine				
	the said and a second s					
01GHz		9.5GI Fréquence				

Frequency (MHz)	Average (dBµV/m)	Lim.Average (dBµV/m)	Average- Lim.Average (dB)	Commentaire	Polarization	Correction (dB)
1813.167	36.7	54.0	-17.3	Horizontal	Horizontal	-31.2
1884.567	38.1	54.0	-15.9	Horizontal	Horizontal	-31.2
1812.600	48.1	54.0	-5.9	Vertical	Vertical	-31.2
1885.133	34.7	54.0	-19.3	Vertical	Vertical	-31.2
1886.833	33.6	54.0	-20.4	Vertical	Vertical	-31.2
1890.800	33.4	54.0	-20.6	Vertical	Vertical	-31.2
1978.067	48.9	54.0	-5.1	Vertical	Vertical	-30.8
8612.033	42.5	54.0	-11.5	Vertical	Vertical	-13.3
1812.033	51.6	74.0	-22.4	Vertical	Vertical	-31.2
1978.067	54.1	74.0	-19.9	Vertical	Vertical	-30.8
8342.867	52.5	74.0	-21.5	Vertical	Vertical	-13.5



	RADIA	ED EMISSIONS				
Graph name:	Emr#10	Test configuration:				
Limit:	FCC CFR47 Part15C					
Class:		(H+V) - Civila - 1X mode - Axis Z	(H+V) - CMid - TX mode - Axis Z			
	Frequency ra	nge: [1GHz - 9.5GHz]				
Antenna polarization	:	RBW: 1MHz				
Azimuth:	0° - 360°	VBW: 3MHz				
		FCC/FCC CFR47 Part15C - Classe: - Moyenne	/3.0n			
		FCC/FCC CFR47 Part15C - Classe: - QCrête/3	.0m/			
		FCC/FCC CFR47 Part15C - Classe: - Crête/3.0	m/			
		Mes.Peak (Horizontale)				
		Mes.Peak (Verticale)				
		Mes.Avg (Horizontale)				
		Mes.Avg (Verticale)				
		Peak (Peak/LimAvg) (Horizontale)				
		Peak (Peak/LimAvg) (Verticale)				
		<ul> <li>Peak (Peak /Lim. Peak ) (Verticale)</li> <li>Average (Average /Lim. Average ) (Horizontale)</li> </ul>	`			
		× Average (Average /Lim. Average ) (Horizontale) × Average (Average /Lim. Average ) (Verticale)	)			
		/ / / / / / / / / / / / / / / / / / /				
100						
dBμV/m						
		FCCIFCC CFR47 Part15C - Classe:	- Crête/3.0			
		FCCFCC CFR47 PartISC - Classe: - Mi	ovenne/3.0			
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IGHZ		Fréquence	JUHZ			

Frequency (MHz)	Average (dBµV/m)	Lim.Average (dBµV/m)	Average- Lim.Average (dB)	Commentaire	Polarization	Correction (dB)
1976.933	37.4	54.0	-16.6	Horizontal	Horizontal	-30.8
1972.400	46.9	54.0	-7.1	Vertical	Vertical	-30.8
6344.233	46.0	54.0	-8.0	Vertical	Vertical	-18.7

Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Peak- Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
1972.400	52.2	74.0	-21.8	Vertical	Vertical	-30.8
6344.233	54.8	74.0	-19.2	Vertical	Vertical	-18.7



	RADIA	ATED EMISSIONS
Graph na		Test configuration:
Limit:	FCC CFR47 Part15C	(H+V) - CMax - TX mode - Axis XY
Class:		(H+V) - Civiax - 1 × Hioue - Axis × f
	Frequency r	range: [1GHz - 9.5GHz]
Antenna	polarization:	RBW: 1MHz
Azimuth:	0° - 360°	VBW: 3MHz
		FCC/FCC CFR47 Part15C - Classe: - Moyenne/3.0
		FCC/FCC CFR47 Part15C - Classe: - QCrête/3.0m
		FCC/FCC CFR47 Part15C - Classe: - Crête/3.0m/
		Niveau (Suspect Manuel) (Verticale)
		Mes.Peak (Horizontale)
		Mes.Peak (Verticale)
		Mes.Avg (Horizontale)
		Mes.Avg (Verticale)
		× Average (Average /Lim. Average ) (Verticale)
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dBµV/m		
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		FCCFCC CFR47 PartisC - Classe - Movement
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-	1GHz	9.5Gł
		Fréquence
	Spui	rious emissions

Frequency (MHz)	Average (dBµV/m)	Lim.Average (dBµV/m)	Average- Lim.Average (dB)	Commentaire	Polarization	Correction (dB)
1882.867	37.9	54.0	-16.1	Vertical	Vertical	-31.2



RADIATED EMISSIONS						
Graph name:	Emr#12	Test configuration:				
Limit:	FCC CFR47 Part15C	(H+V) - CMax - TX mode - Axis Z				
Class:		(HTV) - Civiax - TX IIIOGE - AXIS Z				
	Frequency ra	nge: [1GHz - 9.5GHz]				
Antenna polarization	):	RBW: 1MHz				
Azimuth:	0° - 360°	VBW: 3MHz				
-		FCC/FCC CFR47 Part15C - Classe: - Moyenne/3.0r				
		FCC/FCC CFR47 Part15C - Classe: - QCrête/3.0m/				
		FCC/FCC CFR47 Part15C - Classe: - Crête/3.0m/				
		Mes.Peak (Horizontale)				
		Mes.Peak (Verticale)				
		Mes.Avg (Horizontale)				
		Mes.Avg (Verticale) Peak (Peak/LimAvg) (Horizontale)				
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		Реак (Реак/LimAvg) (Verticale)  × Peak (Peak /Lim. Peak ) (Verticale)				
		× Average (Average /Lim. Average) (Horizontale)				
		× Average (Average /Lim. Average ) (Verticale)				
100 dBµV/m						
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		FCC/FCC CFR47 PartISC - Classe: - Crété/3.				
		XFCC/FCC CFR47 Part15C - Classer - Movembi3.				
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1GHz		9.5GH Fréquence				
	Spurio	ous emissions				

Frequency (MHz)	Average (dBµV/m)	Lim.Average (dBµV/m)	Average- Lim.Average (dB)	Commentaire	Polarization	Correction (dB)
1882.867	41.1	54.0	-12.9	Horizontal	Horizontal	-31.2
1965.600	44.2	54.0	-9.8	Vertical	Vertical	-30.8
6357.833	48.8	54.0	-5.2	Vertical	Vertical	-18.7
8174.567	45.8	54.0	-8.2	Vertical	Vertical	-13.4

Frequency (MHz)	Peak (dBµV/m)	Lim.Peak (dBµV/m)	Peak- Lim.Peak (dB)	Commentaire	Polarization	Correction (dB)
6357.833	56.9	74.0	-17.1	Vertical	Vertical	-18.7
8174.567	54.6	74.0	-19.4	Vertical	Vertical	-13.4

#### 4.7. CONCLUSION

Unwanted Emission in restricted frequency bands measurement performed on the sample of the product **KUKA FNA**, SN: **0000114**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.247 & RSS 247 ISSUE 2 limits.



#### 5. UNCERTAINTIES CHART

47 CFR Part 15.209 & 15.207 Kind of test	Wide uncertainty laboratory (k=2) ±x(dB) / (Hz)/ ms	Uncertainty limit
Measurement of conducted disturbances in voltage on the AC power port (9 kHz – 150 kHz)	2,67	3.8
Measurement of conducted disturbances in voltage on the AC power port (150 kHz - 30 MHz)	2,67	3.4
Measurement of conducted disturbances in voltage on the telecommunication port. (AAN)	3,67	5.0
Measurement of conducted disturbances in current (current clamp)	2,73	2.9
Measurement of disturbance power	2,67	4.5
Measurement of radiated magnetic field from 10kHz to 30MHz in SAC V01	4,48	1
Measurement of radiated magnetic field from 10kHz to 30MHz in SAC C01	4,48	1
Measurement of radiated electric field from 30 to 1000MHz in horizontal position on the OATS (Ecuelles)	4,88	6.3
Measurement of radiated electric field from 1 to 18GHz on the Ecuelles site	5.16	1
Measurement of radiated electric field from 30 to 1000MHz in vertical position on the OATS (Ecuelles)	4,99	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC C01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC C01	5,16	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC V01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC V01	5,15	6.3
Measurement of radiated electric field from 1 to 6 GHz C01	5,1	5.2
Measurement of radiated electric field from 1 to 6 GHz V01	4,85	5.2
Measurement of radiated magnetic field from 10kHz to 30MHz on the OATS (Ecuelles)	4,48	/

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values. This table includes all uncertainties maximum feasible for testing in the laboratory, whether or not made in this report