





Prüfbericht-Nr.: Test Report No.:	18052801.r02	Auftrags-Nr.: Order No.:	89213872	Seite 1 von 25 Page 1 of 25
Kunden-Referenz-Nr.: Client Reference No.:	205334	Auftragsdatum: Order date:	17.07.2018	
Auftraggeber: Client:	PPA-Electronics b.v.b.a FAID'HERBESTRAAT 3A 2800 MECHELEN BELGIUM			
Prüfgegenstand: <i>Test item</i> :	Receiver for Dockmate System			
Bezeichnung / Typ-Nr.: Identification / Type No.:	DOCKMATE (receiver)			
Auftrags-Inhalt: Order content:	Compliance with regulatory requirements			
Prüfgrundlage: Test specification:	47 CFR Part 15 (10-1-17 edition), Subpart C			
	-			

Wareneingangsdatum: Date of receipt:	14.08.2018	
Prüfmuster-Nr.: Test sample No.:	Rx.1 (unindentified sample)	
Prüfzeitraum: Testing period:	12.09.2018 - 13.09.2018	
Ort der Prüfung: Place of testing.	Leek	e e e e e e e e e e e e e e e e e e e
Prüflaboratorium: Testing laboratory:	TÜV Rheinland Nederland B.V. Leek Laboratory	
Prüfergebnis*: Test result*:	Pass	dockmate

	von/tested by: Kv					_
27.09.20	18 R.van der Me	er/Test Eng.		27.09.2018	E. van der Wal/Senio	r Eng.
Datum Date	Name / Stellun Name / Position		erschrift nature	Datum Date	Name / Stellung Name / Position	Unterschrift Signature
Sonstige	es / Other: -					
	des Prüfgegenstar		ung:		ollständig und unbeschä nplete and undamaged	digt
Condition	n of the test item at d	envery.		Test hem con	ipiele and undamaged	
		2 = gut	3 = bef riedigend F(ail) = entspricht n		4 = ausreichend age(n)N/A = nicht anwendbar	5 = mangelhaft N/T/ = nicht getested



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Liste der verwendenten Prüfmittel List of used test equipment

Conformance of the used measurement and test equipment with the requirements of ISO/IEC 17025:2005 has been confirmed before testing. NA= Not Applicable

Prüfmittel Kind of Equipment	Hersteller / Manufacturer	Bezeichnung / Model Name	Prüfmittel- Nr. / ID-Nr. Equipment No. / ID-No.	Kalibrierung Calibration (mm/yyyy)	Nächste Kalibrierung Next calibration (mm/yyyy)
For Radiated Emission	S				
Measurement Receiver	Rohde & Schwarz	ESCI	A00314	03/2018	03/2019
RF Cable S-AR	Gigalink	APG0500	A00447	01/2018	01/2019
Controller	Maturo	SCU/088/ 8090811	A00450	N/A	N/A
Controller	EMCS	DOC202	A00257	N/A	N/A
Test facility	Comtest	FCC listed: 786213 IC: 2932G-2	A00235	10/2017	10/2020
Spectrum Analyzer	Rohde & Schwarz	FSV	A00337	07/2018	07/2019
Antenna mast	EMCS	AP-4702C	A00258	N/A	N/A
Temperature- Humiditymeter	Extech	SD500	A00445	06/2018	06/2019
Horn antenna 1-18 GHz	EMCO	3115	A00008	12/2017	12/2020
Filterbox	EMCS	RFS06S	A00255	03/2018	03/2019
RF cables >1G setup	H&S	Sucoflex	A00339 / A00343	07/2018	07/2019
Biconilog Testantenna	Teseq	CBL 6111D	A00466	10/2017	10/2018

Accreditation

The reported tests were performed under ISO17025 accreditation, unless otherwise specified as 'not under Accreditation'

An overview of all TÜV Rheinland Nederland B.V. accreditations, notifications and designations, please visit our website <u>www.tuv.com/nl</u>. You can find the relevant declarations under the download link.





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Produktbeschreibung Product description

1	Produktdetails Product details	Receiver (Rx/Tx) for a wireless system for a boat.
2	Maße / Gewicht Dimensions / Weight	See product documentation
3	Bedienelemente Operating elements	See product documentation
4	Ausstattung / Zubehör Equipment / Accessories	
5	Verwendete Materialien Used materials	
6	Sonstiges Other	
	A REAL ARCAN	

Absatz Clause	Anforderungen – Prüfungen / Requirem	ents - Tests		
1	15.207(a)	AC Power Line Conducted Emissions Note: Not applicable, does not connect to the public network	P F N/A N/T	
2	15.209, 15.231(b) 15.215(c) 15.231(b)	Radiated unwanted emissions Bandwidth of the emission RF on/off time	P F N/A N/T	

Testmethods: ANSI C63.10-2013.

Revisions Revisions					
Revision Revision	Datum Date	Anmerkung Remark	Verfasser Author		
-	27.09.2018	First release	R. van der Meer		
Note: Latest	revision report will rep	ace all previous reports			



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1 General information.

1.1 **Product description**.

EUT is part of a remote control system for moto yachts, to allow easy docking. It controls Engines, Thrusters, Anchor winch and the Horn of the boat. System comprises of Transmitter (Hand held) and receiver (built into the dash board of a boat). System operates on 433MHz band. Receiver is supplied from on board 12/24V installation. Receiver has simple non-powered relay outputs - so for example relay is connected in parallel with horn switch on the dash board, to allow user to operate it remotely. Cable length of all the connections doesn't exceed 3m. Radio communication is 2-way. This report concerns the Receiver part of the system.

Details:

Voltage input rating	:	12 / 24Vdc
Antenna	:	External
Operating frequency	:	433.1 – 433.6 MHz
Modulation	:	FSK
Power setting	:	3 (max is 12)
Firmware version		2.11c
Remarks		2 way communication system.

1.2 Test methodology.

The test methodology used is based on the requirements of 47 CFR Part 15 (10-1-17), sections 15.31, 15.35, 15.205, 15.209, 15.231. The test methods, which have been used, are based on ANSI C63.10-2013.

Radiated emission tests were performed at a measurement distance of 3 meters.

The receivers are switching automatically to the right bandwidth in accordance with CISPR 16. This is implemented in the receiver. The antenna factors are programmed in the test receiver. The receiver automatically calculates the appropriate correction factor for the utilized antenna and also the appropriate antenna factor for the cable loss. The total correction is automatically added to the measured value.

1.3 Test facility.

The Federal Communications Commission and Industry Canada has reviewed the technical characteristics of the test facilities at TÜV Rheinland, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948.

The description of the test facilities has been filed at the Office of the Federal Communications Commission under registration number 786213. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

1.4 Test conditions.

Normal test conditions:

Temperature (*)	: +15°C to +35°C
Relative humidity(*)	: 20 % to 75 %
Supply voltage	: 12 / 24 Vdc

*When it was impracticable to carry out the tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests are stated separately.



	PPA-Electronics DOCKMATE
FCC ID:	2AQQARXDOCKMATE
IC:	-

2 System test configuration.

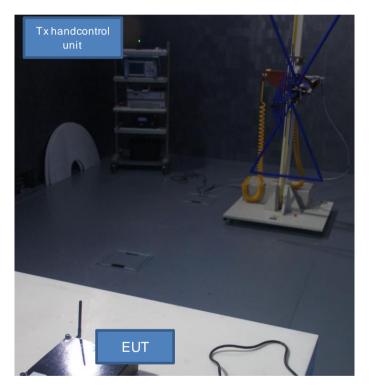
2.1 Justification.

This report covers the EUT as a stand-alone transmitter.

The justification and manipulation of cables and equipment in order to simulate a worst-case behavior of the test setup has been carried out as prescribed in ANSI C63.10-2013.

2.2 EUT mode of operation.

An EUT was supplied which enabled a constant transmit mode for testing purposes. The EUT was tested while continuously communicating with the transmitter handcontrol unit. The transmitter handcontrol unit was placed on the other side of the Semi-anechoic Room far as possible away from the measurement antenna so not to influence the measurement results. It was pre-programmed for 433.2 MHz and although that is not in the middle of the frequency band it operates on (as required per ANSI C63.10-2013 section 5.6 Table 4), for practical reasons it was used for the testing. Tested on power level : 3.



2.3 Special accessories.

No special accessories are used and/or needed to achieve compliance.

2.4 Equipment modifications.

No modifications are used and/or needed to achieve compliance.



3 Radiated emission data.

RESULT: PASS

Date of testing:

2018-09-12

Frequency range:

30MHz - 4500MHz

Requirements:

For the EUT the general radiated emissions limits are applicable according FCC 'Code of Federal Regulations Title 47' Part 15, Subpart C, Section 15.209 and limits for the transmitter per FCC 15.231(b).

The field strength of radiated emissions shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (μV/meter)	Field strength (dBµV/m)	Measurement distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0 (Av), 74 (Pk)	3

Table of applicable general radiated emissions limits per 15.209

Funda- mental fre- quency (MHz)	Field strength of funda- mental (microvolts/ meter)	Field strength of spurious emissions (microvolts/meter)
40.66-	2,250	225
70–130	1,250	125
130–174	¹ 1,250 to 3,750	¹ 125 to 375
174–260	3,750	375
260-470	¹ 3,750 to 12,500	¹ 375 to 1,250
Above 470	12,500	1,250

¹ Linear interpolations.

Table of applicable radiated emissions limits per 15.231(b), specified at a distance of 3 meters.

For the fundamental frequency the EUT operates on this would mean the Field strength level as mentioned in table below.

F	Frequency (MHz)	Field strength (μV/meter)	Field strength (dBµV/m)	Measurement distance (meters)
43	33.1 – 433.6	4385.0 - 4401.5*	80.8 (Av) – 100.8 (Pk)	3
	Table	of applicable radiated emission	ns limits per 15.231(b) for the	EUT

* linear interpolation



PPA-Electronics DOCKMATE
2AQQARXDOCKMATE -

In addition, emissions appearing in the Restricted bands of Operation listed in paragraph 15.205(a) shall not exceed the general requirements shown in paragraph 15.209.

Test procedure:

The EUT was placed on a nonconductive turntable 0.8m (<1 GHz) or 1.5m (>1GHz) above the ground plane. Before final measurements of radiated emissions were performed, the EUT was scanned to determine its emission spectrum profile.

The spectrum was examined from 30MHz to 4.5 GHz (up to the 10th harmonic of the fundamental frequency the EUT operates on). Final radiated emission measurements were made at 3m distance.

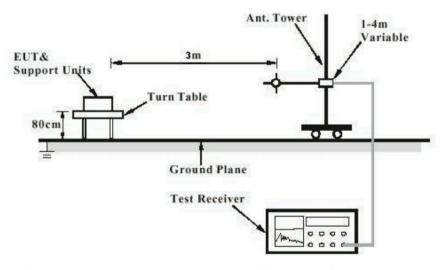
At each frequency where a spurious emission was found, the EUT was rotated 360° and the antenna was raised and lowered from 1 to 4m in order to determine the emission's maximum level. Measurements were taken using both horizontal and vertical antenna polarizations. The EUT was tested in horizontal and vertical orientation.

The six highest emission amplitudes relative to the appropriate limit were recorded in this report. Field strength values of radiated emissions at frequencies not listed in the tables are more than 20 dB below the applicable limit. Where Peak (Pk) values where at least 6 dB under the Average (Av) limits, Av value was not tested. Were Average values were tested, Average values were measured using a reduced Video Bandwidth.

Measuring instrument and setting

Radiated emissions test settings						
Frequency range	30 MHz – 4500 MHz					
Test distance	3 m					
Receive antenna scan height	1 m - 4 m					
Receive antenna polarization	Vertical / Horizontal					
Test instrument detector and bandwidth <1GHz	Quasi-peak (Qp) 120 kHz *unlessotherwise noted					
Test instrument detector and bandwidth >1GHz	Peak (Pk) RBW=1MHz VBW=3MHz and					
and 15.231(b)	Average (Avg) RBW=1MHz VBW=<3MHz >10 kHz					

Test setup diagram



Note: Measurements above 1 GHz are done with a table height of 1.5m



3.1 Radiated field strength measurements (30 MHz – 1 GHz, E-field)

Frequency [MHz]	EUT Orientation	Antenna Orientation	Level Qp [dBµV/m]	Limit QP [dBµV/m]	Margin [dB]	Result Pass/Fail
31.45 noise	Horizontal	Vertical	28.0	40.0	12.0	Pass
120.00	Side	Horizontal	38.9	43.5	4.6	Pass
180.00	Horizontal	Horizontal	34.4	46.0	11.6	Pass
240.00	Horizontal	Vertical	43.9	46.0	2.1	Pass
300.00	Horizontal	Horizontal	45.1	46.0	0.9	Pass
433.2 fundamental	Vertical	Vertical	96.7 Pk 69.7 Av	100.8 Pk 80.8 Av	4.1 Pk 11.1 Av	Pass
866.4* ^H	Vertical	Horizontal	45.7	46.0	0.3	Pass
894 noise	Horizontal	Horizontal	26.0	46.0	20.0	Pass

Table 2 Radiated emissions of the EUT

The results of the radiated emission tests, carried out in accordance with 47 CFR Part 15 section 15.205, 15.209, 15.231(b) are depicted in Table 2.

Notes:

- 1. Field strength values of radiated emissions at frequencies not listed in the table above are more than 20 dB below the applicable limit. The reported value is the worst case found at the reported frequency.
- 2. Measurement uncertainty is 5.1 dB.
- 3. Detector: Quasi Peak, bandwidth: 120 kHz unless otherwise stated.
- 4. *^R refers to a frequency in a restricted band, *^H refers to a harmonic of the fundamental frequency of the EUT.
- 5. a selection of plots is provided on the next pages.

3.1.1 Test equipment used (for reference see test equipment listing).

A00257	A00258	A00314	A00450	A00447	A00235	A00466	A00444	



3.1.2 Radiated field strength measurements (1 GHz – 4.5 GHz, E-field)

Frequency [GHz]	EUT Orientation	EUT's Antenna orientation	Antenna Orientation	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result
1.08* ^R	Vertical	Vertical	Vertical	42.3 Pk	54 (Av) 74 (Pk)	10.7	Pass
1.44* ^R	Horizontal	Vertical	Horizontal	44.4 Pk	54 (Av) 74 (Pk)	9.6	Pass
2.28* ^{H R}	Vertical	Horizontal	Horizontal	42.9 Pk	54 (Av) 74 (Pk)	11.1	Pass
3.47* ^H	Horizontal	Horizontal	Vertical	47.5 Pk	54 (Av) 74 (Pk)	6.5	Pass
4.33* ^{H R}	Horizontal	Vertical	Vertical	57.3 Pk 53.2 Av	54 (Av) 74 (Pk)	0.7	Pass

Table 3 Radiated emissions of the EUT in the frequency range 1 – 4.5 GHz

Notes:

- *R refers to a frequency in a restricted band,

- *H refers to a frequency which is a harmonic of the fundamental.

- Field strength values of radiated emissions not listed in the tables above are more than 20 dB below the applicable limit.

- Where Peak (Pk) values were within a 6 dB margin of Average (Av) limits, Av not tested.

- Measurement uncertainty is +/- 5.1 dB.

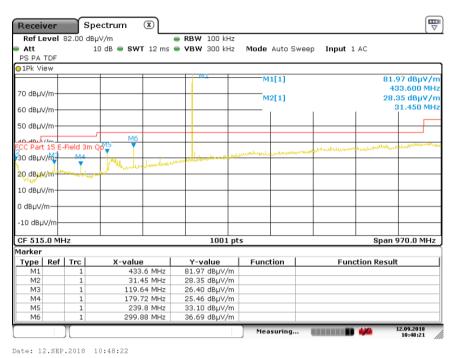
- a selection of plots is provided on the next pages.

Used test equipment and ancillaries:

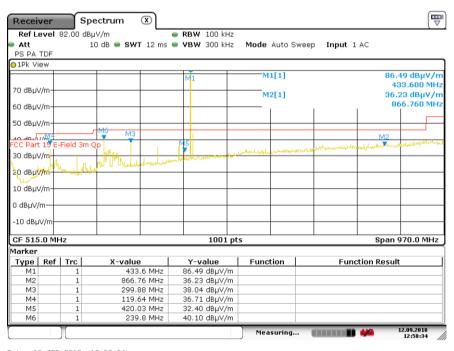
A00450	A00257	A00235	A00337	A00258	A00444	A00008	A00247	A00255



3.1.3 Plot of the emissions below 1 GHz



Plot 1: the emissions, EUT Horizontal, Antenna Vertical polarization, Peak values shown



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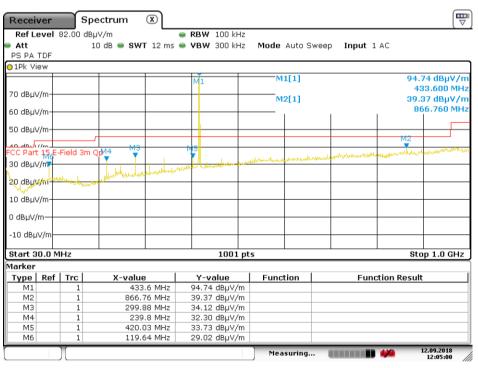
Plot 2: of the emissions, EUT Side-Antenna Horizontal, Antenna Horizontal polarization, Peak values shown



Receiver	S	pectrum 🙁					
Ref Level	82.00 dE	Bµ∀/m	👄 RBW 100 kHz				
Att		10 dB 👄 SWT 12	ms 👄 VBW 300 kHz	Mode Auto SV	weep Input	1 AC	
PS PA TDF							
)1Pk View							
			M1	M1[1]			10 dBµV/m
70 dBuV/m							3.600 MHz
/о аврулп-Т				M2[1]			39 dBµV/m
60 dBµV/m+						. 86	6.760 MHz
50 dBµV/m+		M3				1412	
40 doub Um		T M6	M5			Y	
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10 dBµV/m-	**************************************						
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10 dBµV/m 0 dBµV/m -10 dBµV/m -10 dBµV/m- Start 30.0 f 4arker	MHz	X-value	1001 pt	ts	Fu	Sta	•
10 dBµV/m 0 dBµV/m -10 dBµV/m -10 dBµV/m- Start 30.0 f 4arker		X-value 433.6 M	Y-value		Fu		•
10 dBµV/m- 0 dBµV/m- -10 dBµV/m- Start 30.0 f 1arker Туре Ref	Trc		<u>Y-value</u> Hz 92.10 dBµV/m Hz 43.39 dBµV/m		Fu		
10 dBµV/m 0 dBµV/m -10 dBµV/m Start 30.0 f Marker Type Ref M1 M2 M3	Trc	433.6 M 866.76 M 299.88 M	Y-value Hz 92.10 dBµV/m Hz 43.39 dBµV/m Hz 41.67 dBµV/m		Fu		
10 dBµV/m -10 dBµ	Trc 1 1 1 1 1 1 1 1	433.6 M 866.76 M 299.88 M 239.8 M	Y-value Hz 92.10 dBμV/m Hz 43.39 dBμV/m Hz 41.67 dBμV/m Hz 39.81 dBμV/m		Fu		
10 dBµV/m 0 dBµV/m -10 dBµV/m Start 30.0 f Marker Type Ref M1 M2 M3	1 1 1 1	433.6 M 866.76 M 299.88 M	Y-value Hz 92.10 dBµV/m Hz 43.39 dBµV/m Hz 41.67 dBµV/m Hz 39.81 dBµV/m Hz 35.56 dBµV/m		Fu		

Date: 12.SEP.2018 12:01:45

Plot 3: the emissions, EUT Side, Antenna Horizontal polarization, Peak values shown

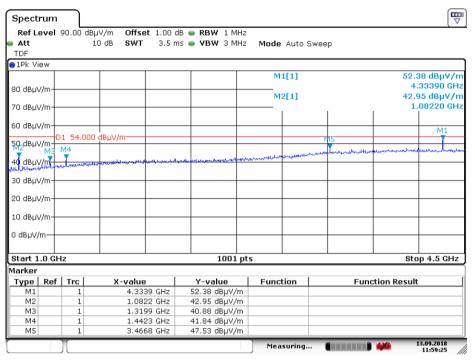


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Plot 4: the emissions, EUT Side, Antenna Vertical, Peak values shown

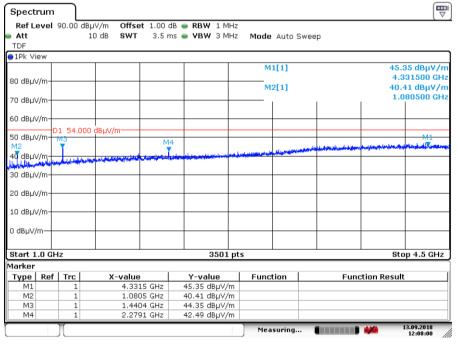


3.1.4 Plots of the emissions above 1 GHz



Date: 13.SEP.2018 11:59:24

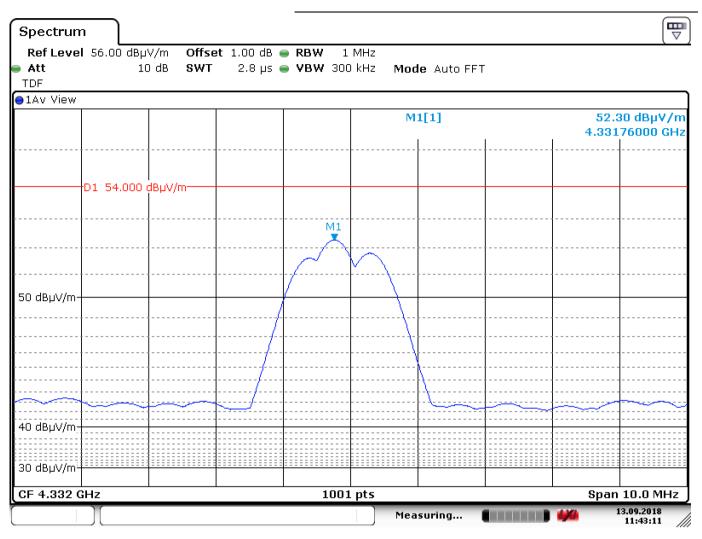
Plot 5: radiated emissions of the EUT, in the range 1 – 4.5 GHz (peak values shown), EUT horizontal, Antenna vertical



Date: 13.SEP.2018 12:08:00

Plot 6: radiated emissions of the EUT, in the range 1 – 4.5 GHz (peak values shown), EUT Horizontal, Antenna vertical





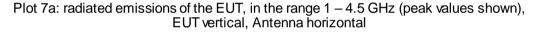
Date: 13.SEP.2018 11:43:10

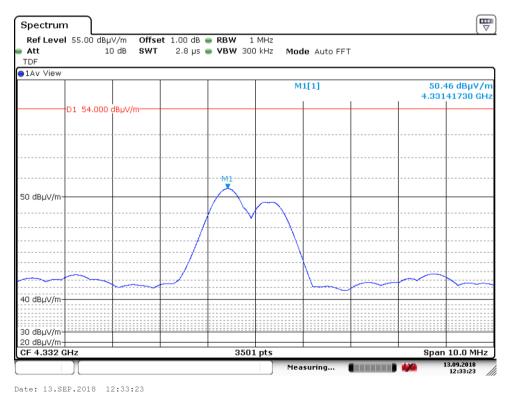
Plot 6b: radiated emissions of the EUT, in the range 1 – 4.5 GHz (average value shown), EUT Horizontal, Antenna vertical



Att TDF		B2.00 (dB e RBW 1 MHz ms e VBW 3 MHz		o Sweep	
1Pk Vi	ew T				M1[1]		51.26 dBµV/n
70 dBµ\	/m-						4.332300 GH
	·				M2[1]		44.87 dBµV∕n
O dBµ∖						I.	1.440400 GH
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tart 1	.0 GH	z		3501 pt	ts		Stop 4.5 GHz
arker							
ype	Ref	Trc	X-value	Y-value	Function	Fun	ction Result
M1		1	4.3323 GHz	51.26 dBµV/m			
M2		1	1.4404 GHz	44.87 dBµV/m			
M3		1	1.3204 GHz	41.79 dBµV/m			
M4 M5		1	1.0805 GHz 1.1405 GHz	40.11 dBµV/m			
M6		1	2.2811 GHz	38.52 dBµV/m 42.86 dBµV/m			

Date: 13.SEP.2018 12:27:25



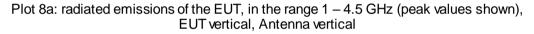


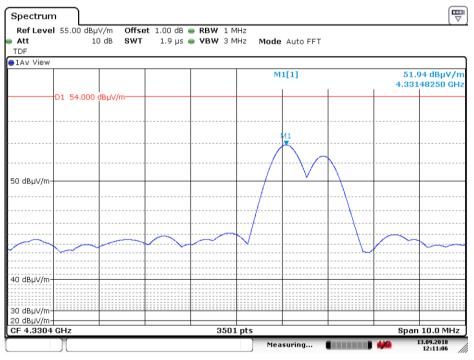




Ref Level Att TDF		1 1	dB 👄 RBW 1 MHz ms 👄 VBW 3 MHz		weep	
1Pk View						
				M1[1]		52.43 dBµV/m
80 dBµV/m				M2[1]		4.331500 GHz 41.73 dBµV/m
				MZ[1]		1.080500 GHz
70 dBµV/m+-						1.000000 012
60 dBµV/m						
						M1
50 dBµV/m+-	1 54.00	0 dBµV/m				
M2 M3					ina participating from the balance of the formation in the formation in the second second second second second	ورسادها والمستهنان والمقرسان
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A State of the second se	and from the second					
30 dBµV/m—						
20 dBuV/m						
10 dBµV/m						
0 dBµV/m						
Start 1.0 GH	z		3501 pt	s		Stop 4.5 GHz
1arker						
Type Ref		X-value	Y-value	Function	Function Re	esult
M1	1	4.3315 GHz	52.43 dBµV/m			
M2	1	1.0805 GHz	41.73 dBµV/m			

Date: 13.SEP.2018 12:04:49

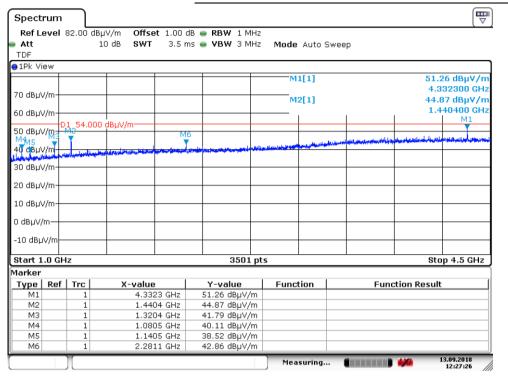




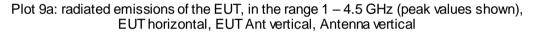
Date: 13.SEP.2018 12:11:06

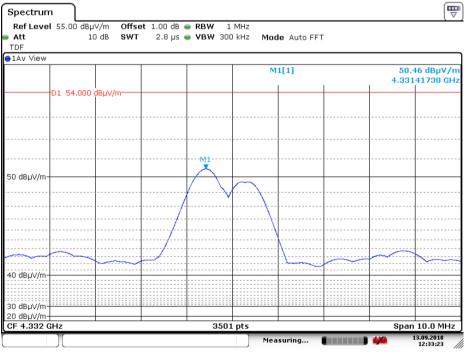
Plot 8b: radiated emissions of the EUT, in the range 1 – 4.5 GHz (4.33 GHz average value shown), EUT vertical, Antenna vertical



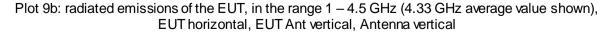


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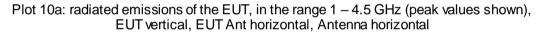
Date: 13.SEP.2018 12:33:23

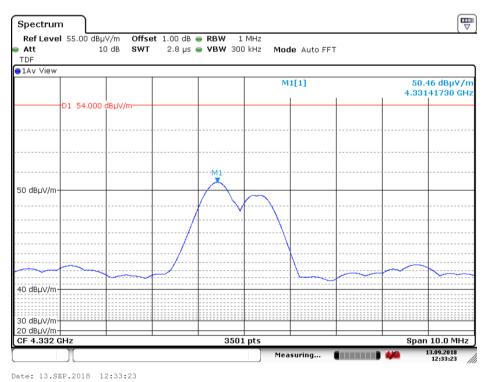




•	rum evel (B2.00 dB		dB 👄 RBW 1 MHz ms 👄 VBW 3 MHz	Mode Auto Sv	veep	
1Pk Vi	ew						
					M1[1]		51.26 dBµV/m
							4.332300 GHz
70 dBµ∖	^{ym} †				M2[1]		44.87 dBµV/m
50 dBµ\	/m+						1.440400 GHz
		1_54.000	I dBuV/m				M1
50 dBµ∖	//m=++	42		16			and a strategic attention
M4M5		Ĭ			معليمتند والمعادية	الاحطابة بلائنة بعاج ببزار عادرا الجد	
40 d8µ∖	-	البعالان والبيران		Children Services and a service of			
30 dBµ\	//m+-						
20 dBµ\	/m+						
LO dBµ\	/m+						
) dBµV/	m+-						
10 dBu	Um						
то ивр	v/III						
Start 1	.0 GH	z		3501 pts	5	I	Stop 4.5 GHz
larker							
Type	Ref	Trc	X-value	Y-value	Function	Functio	n Result
M1		1	4.3323 GHz	51.26 dBµV/m			
M2		1	1.4404 GHz	44.87 dBµV/m			
MЗ		1	1.3204 GHz	41.79 dBµV/m			
M4		1	1.0805 GHz	40.11 dBµV/m			
M5		1	1.1405 GHz	38.52 dBµV/m			
M6		1	2.2811 GHz	42.86 dBµV/m			

Date: 13.SEP.2018 12:27:25



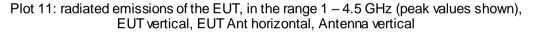


Plot 10b: radiated emissions of the EUT, in the range 1 – 4.5 GHz (4.33 GHz average value shown), EUT vertical, EUT Ant horizontal, Antenna horizontal



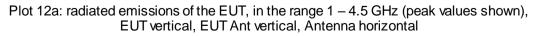
Spect	rum											
Ref L	evel	82.00 d	BµV/m C)ffset 1.00	dB 👄 RBW	1 MHz						<u> </u>
🕨 Att			10 dB 🛛 S	WT 3.5 r	ms 👄 VBW	3 MHz	Mode	Auto 9	Gweep			
TDF												
∋1Pk Vi	e₩											
							M	1[1]			49.15 dBj	w/m
70 dBu\	Um										4.332300	
70 UDD1	Π						M:	2[1]			41.69 dBj	
60 dBµ\	//m+-		_								1.440400) GHz
	D	1 54.00	10 dBµV/m-								M	11
50,dBµ\	//m+ M3	M2		M	6						ويجادب السيسية	. and the s
- <mark></mark>	NT.	T	Salar State State State			النامير وجارره	الاعاديد والمادين	and the second second	and the states of the states o	See Street and a street of the	and the second	and in second
40 08µ\	facility of the second	the second start	Contraction and Contraction of									
30 dBµ\	//m+-		_									
00 dp.4	11-											
20 dBµ\	//m											
10 dBµ\	//m+		_									
	·											
0 dBµV/	′m+					_						
-10 dBµ	wm											
-10 000	· · · ·											
Start 1	.0 GH	lz			3:	501 pt:	s				Stop 4.5	GHz
/larker												
Type	Ref	Trc	X-v	alue	Y-valu	e	Func	tion		-unction F	Result	
M1		1	4	4.3323 GHz	49.15 dB	µV/m						
M2		1	1	1.4404 GHz	41.69 dB	µV/m						
MЗ		1		.3204 GHz	40.09 dB							
M4		1		1.0805 GHz	42.19 dB							
M5		1		.1405 GHz	38.98 dB							
M6		1	2	2.2811 GHz	42.02 dB	µV/m ∣						
							Mea	suring			13.09.201 12:30:0	
)	_			12:30:0	08 //

Date: 13.SEP.2018 12:30:08

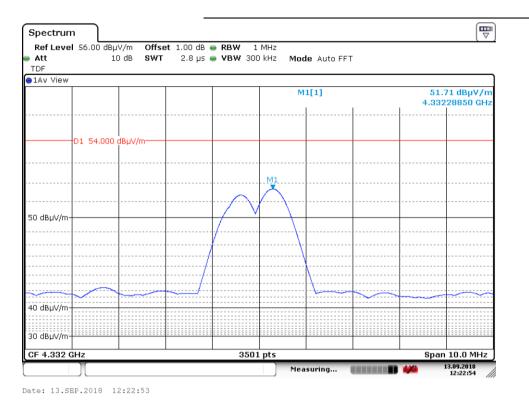


Att	evel :	80.00 dB		dB 👄 RBW 1 MHz ms 👄 VBW 3 MHz		Sweep	
TDF 1Pk Vi	2147						
70 dBuV					M1[1]		51.92 dBµV/ 4.332500 GF
50 dBµV	/m-				M2[1]		40.00 dBµV/ 1.080500 GF M1
50 dBµ∿ M <u>3</u> 43	/m+1	1 54.000) dBµV/m				Y
40 dBµ∖	M4 Vn	مدود الدر الدور الد	فالمفتسوسين فأل عمسا ووياعت الإرامين المحله	al and a state of the	an lan inderstaden in piliting in her in	and a second	and a second
30 dBµ\							
20 dBµ\	/m+						
LO dBµ∖	/m+						
) dBµV/	m+						
10 dBµ	v/m						
Start 1	.0 GH	z		3501 pt	ts		Stop 4.5 GH
1arker							
Туре	Ref		X-value	Y-value	Function	Fund	tion Result
M1		1	4.3325 GHz	51.92 dBµV/m			
M2		1	1.0805 GHz	40.00 dBµV/m			
M3		1	1.1405 GHz	38.40 dBµV/m			
M4 M5		1	1.3204 GHz 1.4404 GHz	39.19 dBµV/m 43.50 dBµV/m			

Date: 13.SEP.2018 12:20:24







Plot 12b: radiated emissions of the EUT, in the range 1 – 4.5 GHz (4.33 GHz average value shown), EUT vertical, EUT Ant vertical, Antenna horizontal

Ref Leve	1 80.00) dBu	//m	Offse	et 1.00	dB 🧉	RBW :	l MHz							
Att			i dB	SWT	3.5	ms 🧉	VBW 3	3 MHz	Mode	Auto S	Sweep)			
TDF															
1Pk View															
									M	1[1]				47.	72 dBµV∕r
70 dBµV/m								_							32500 GH
									M	2[1]					34 dBµV∕r
50 dBµV/m								_						1.0	180500 GH
	D1 54	.000 c	iBµV/r	n						<u> </u>			_		M1
50.dBµV/m	M5														and the second
40 cBµV/m					with when the		and sector burning the		خاديدي ومطاونته		ALC: NOT	lesson and some			
مقطبته بطابق البناديا	-	N. Hardenson													
30 dBµV/m	-							-					_		
20 dBµV/m															
10 dBuV/m								_					_		
. ,															
0 dBµV/m–								_					_		
-10 dBµV/n															
-το αθην/η	1														
Start 1.0	CHZ						35	01 pt	-					Sto) p 4.5 GHz
1arker								or pe	,					011	7p 110 0112
	ef Tro	1	X-	value	,	1	Y-value	.	Func	tion		Fu	nction	Result	t
M1		L			- 25 GHz		47.72 dB								
M2		L		1.08	05 GHz		42.34 dBµ	JV/m							
MЗ		L			05 GHz		40.33 dB								
M4		L			04 GHz		40.48 dBµ								
M5		L		1.44	04 GHz		42.35 dBµ	JV/m ∣							

Date: 13.SEP.2018 12:17:42

Plot 13: radiated emissions of the EUT, in the range 1 – 4.5 GHz (peak values shown), EUT vertical, EUT Ant vertical, Antenna vertical



	PPA-Electronics DOCKMATE
FCC ID:	2AQQARXDOCKMATE
IC:	-

4 Plot of the carrier bandwidth

4.1 Bandwidth of the emission

RESULT: PASS

Date of testing:

2018-09-12

Requirements:

The bandwidth of emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier. For this EUT operating at operating frequency of 433.2 MHz the allowable bandwidth of emissions would be: 0.25% * 433.2 MHz = 1083 kHz.

Testprocedure: ANSI C63.10-2013

Testresults:

Measurement uncertainty is +/- 26kHz.

The measured bandwidth of the emissions as measured with a spectrum analyzer was: 218.3 kHz (see Plot 14). The test was performed on a modified EUT, where constant transmission was enabled. See next page for the plot.

Used test equipment and ancillaries:

 osed test equipment and anemanes.										
A00266	A01744	A00444	A01634							

The complete list of used equipment can be found in section 1 of this testreport.



Receiver	Spectrum	×				
Ref Level 110	.00 dBµV/m		😑 RBW 30 kHz			
🕨 Att	40 dB 👄	SWT 12 ms	👄 VBW 100 kHz	Mode Auto	FFT Input 1 AC	
PS PA TDF						
∋1Pk View						
				M1[1]		96.51 dBµV/m
100 dBµV/m						433.228970 MHz -20.08 dB
			\rightarrow			-161.840 kHz
90 dBµV/m						
80 dBµV/m						
	02				03	
70 dBuV/m						
60 dBµV/m						
50 dBµV/m						
40 dBµV/m						
30 dBµV/m						
20 dBµV/m						
CF 433.2 MHz	I	I	1001 pt	s	I	Span 500.0 kHz
/larker						
Type Ref T	rc X-va	lue	Y-value	Function	Functi	on Result
M1		2897 MHz	96.51 dBµV/m			
D2 M1		51.84 kHz	-20.08 dB			
D3 M1	1	56.44 kHz	-20.13 dB			
				Measuring.		12.09.2018 12:49:33

Date: 12.SEP.2018 12:49:33

Plot 14: plot of the emission.

Note: the measurement was taken at an output power level of 12, hence the high level at M1.



	PPA-Electronics DOCKMATE
	2AQQARXDOCKMATE
IC:	•

4.2 RF On time

RESULT: PASS

Date of testing:

2018-09-12

Requirement:

15.231(a)(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Testresult:

Plot below shows the EUT's RF On Time in a 100ms period. The RF On time in 100 ms is the sum of the two pulse widths: (1.36 - 0) ms + (11.0-9.6) ms = 2.76 ms.

Recei	ver		Spectrum (x						
	evel	102.00) dBµV/m		🔵 RBW 100 kH					
e Att			_	Г 100 r	ms ⊜ VBW 300 k⊢	Iz	Input	t 1 AC		
TRG: VI		PA TD	F							
<mark>⊙</mark> 1Pk Vi	ew									
						M	1[1]			.25 dBµV/m
90 dBµ\										0.0000000 s
90 GDD1	////					Da	2[1]			0.01 dB 1.3600 ms
80 dBµ\	//m									1.3000 ms
1	- A	F								
🙀 dΒµ\	//m									
	11									
€O dBµ\	/////									
50 dBuy	//m=T	RG_52	.000 dBµV/m	1	where the will be when the start				1	4.1
Machellythe	oque e	uruni	www.adaalaalayaalaalaalaa	and the second of the second	www.marutaliter.	ruphun panang	and land	and and a straight the	www.www.ww	man and the second
40 dBµ\	//m+-									
00 40.4	11									
30 dBµ\	/////									
20 dBµ\	//m-									
	,									
10 dBµ\	//m+-									
CF 433	8.2 MF	lz			1001 pt	s				10.0 ms/
Marker								4]
Туре	Ref	Trc	X-value		Y-value	Func	tion	Fi Fi	unction Resu	lt
M1		1		0.0 s	69.25 dBµV/m					
D2 D3	M1 	1		36 ms .6 ms	0.01 dB 5.97 dB					
D3	 M1	1		.oms .oms	5.97 dB					
		1			3.65 48	1				12.09.2018
		Л				Mea	suring.			10:38:58

Date: 12.SEP.2018 10:38:59

Plot 15a : RF On Time of the transmitter as measured on a spectrum analyzer.



			·						
Receiver		pectrum 🕱							(₩)
Ref Level	102.00		👄 RBW 10						
🖷 Att		30 dB 🔵 SWT 1	2 ms 👄 VBW 30	DO kHz		Input	1 AC		
TRG: VID PS	PA TDF								
⊖1Pk View									
					M:	1[1]			68.42 dBµV/m 0.0000000 s
90 dBµV/m						0[1]			-2.17 dB
					D2[1]				1.4560 ms
80 dBµV/m+								DB	D4
								4	4
႞ႝၴႍႄႜၛႜ႘ၯ႓ၟၖၮႃႜ	iki2								
60 dBµV/m+	—								
50 dBµV/m-	ling 52.0	00 dBµV/m 	and the second		the stands	a ada da	h lini atahtanta mi	ر ایر س	Unthrother
40 dBµV/m-	hilasaanas	nukina dala na ditikan dar sati	hall for all and the second second	with the first state of the second state of th	way nurvay	ገብሥት ጥር	իշտեսքինութումին	(InitAllinon	O D MAD IN POLICI
to appyrin									
30 dBµV/m-									
20 dBµV/m+									
10 dBµV/m-									
CF 433.2 M	Hz		10)01 pts	5		1		1.2 ms/
Marker				•					
Type Ref	Trc	X-value	Y-value	e	Funct	ion		Function	Result
M1	1	0.0)s 68.42 dBj	JV/m					
D2 M:		1.456 r		.7 dB					
D3 M:		9.576 1		21 dB					
D4 M:	1 1	10.988 r	ns 5.7	'7 dB	<u></u>				
	Л				Mea	suring.			12.09.2018 10:40:45

Date: 12.SEP.2018 10:40:46

Plot 15b: RF On Time, zoomed in for more accurate measurement, as measured on a spectrum analyzer.

<< End of report >>