

Report No. 326237-3

Test Report

Product	Digital Wireless Transmitter					
Name and address of the applicant	RØDE Microphones 107 Carnarvon Street 2128 Silverwater, Australia					
Name and address of the manufacturer	RØDE Microphones 107 Carnarvon Street 2128 Silverwater, Australia					
Model	RØDELink TX-M2					
Rating	3.0V DC Primary Batteries (5.0V DC, 500mA USB Powered)					
Trademark	RØDELink					
Serial number	0001 and 0002					
Additional information	Digital Wireless Transmitter with Microphone or USB HID					
Tested according to	FCC Part 15.247 Frequency Hopping Transmitters / Digital Transmission Systems Industry Canada RSS-247, Issue 2 Low Power Licence-Exempt Radiocommunications Devices					
Order number	326237					
Tested in period	2017.04.03 to 2017.04.24					
Issue date	2017.06.28					
Name and address of the testing laboratory	Nemko FCC No: 994405 IC OATS: 2040D-1 Instituttveien 6 Kjeller, Norway TEL: +47 22 96 03 30 FAX: +47 22 96 05 50					
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1 INFORMATION

1.1 Test Item

Name :	RØDE Microphones
FCC ID :	2AEAN173001
Industry Canada ID :	20091-173001
Model/version :	RØDELink TX-M2
Serial number :	Radiated sample: 0001 Conducted Sample: 0002
Hardware identity and/or version:	v0003 rA
Software identity and/or version :	V0003
Frequency Range :	2403 – 2481 MHz
Number of Channels :	39
Operating Modes :	USB HID (no RF) Audio (RF On)
Type of Modulation :	Digital (GFSK)
User Frequency Adjustment :	None
Rated Output Power :	0.0074 W (Conducted)
Power Supply :	Primary Batteries (2x AA cells), or Secondary Battery (3.8V Li-Ion battery pack), or USB Power (5V DC, 500mA)
Antenna Connector :	None (Integral Antennas)
Number of Antennas :	2
Antenna Diversity Supported :	Yes
Smart Antenna System :	No
Interfaces :	USB HID, USB Power

Description of Test Item

The EUT is a Digital Wireless Audio Transmitter. The equipment uses adaptive dynamic frequency selection.



1.2 Normal test condition

Temperature:	21.3 – 23.6 °C
Relative humidity:	29 - 50 %
Normal test voltage:	3.0 V DC (Nominal Battery Voltage)

All tests were performed with fresh alkaline batteries. The values are the limit registered during the test period.

1.3 Test Engineer(s)

Frode Sveinsen

1.4 Description of modification for Modification Filing

Not applicable.

1.5 Family List Rational

Not Applicable.

1.6 Antenna Requirement

Is the antenna detachable?	🗌 Yes	🛛 No
If detachable, is the antenna connector non-standard?	🗌 Yes	🗌 No
Type of antenna connector: Reverse SMA		

Ref. FCC §15.203

1.7 Comments

It was checked that output power remained constant when the EUT was powered from USB, the USB voltage was also varied by $\pm 10\%$.



2 TEST REPORT SUMMARY

2.1 General

All measurements are tracable to national standards.

The tests were conducted for demonstrating compliance with FCC CFR 47 Part 15, paragraph 15.247 and ISED RSS-247 Issue 2.

Tests were performed in accordance with ANSI C63.4-2014 and and ANSI C63.10-2013.

Radiated tests were made in a semi-anechoic chamber at measuring distances of 1m and 3m.

A description of the test facility is on file with the FCC and ISED.

New Submission

Production Unit

Class II Permissive Change

DTS Equipment Code

Pre-production Unit
 Family Listing



THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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2.2 Test Summary

Name of test	FCC Part 15 reference	RSS-247 Issue 2, RSS-GEN Issue 4 reference	Result
Supply Voltage Variations	15.31(e)	6.11 (RSS-GEN)	Complies
Antenna Requirement	15.203	8.3 (RSS-GEN)	Complies
Power Line Conducted Emission	15.107(a) 15.207(a)	8.8 (RSS-GEN)	Complies
Occupied Bandwidth	N/A	6.6 (RSS-GEN)	Complies
Minimum 6 dB Bandwidth	15.247(a)(2)	5.2 (1) (RSS-247)	Complies
Peak Power Output	15.247(b)	5.4 (RSS-247)	Complies
Power Spectral Density	15.247(d)	5.2 (2) (RSS-247)	Complies
Spurious Emissions (Antenna Conducted)	15.247(c)	5.5 (RSS-247)	Complies
Spurious Emissions (Radiated)	15.247(c) 15.109(a) 15.209(a)	5.5 (RSS-247) 6.13 (RSS-GEN) 8.9 (RSS-GEN)	Complies



3 TEST RESULTS

3.1 Power Line Conducted Emissions

FCC Part 15.207 (a)

ISED RSS-GEN Issue 4, Clause 8.8

Test Performed By: Thanh Tran	Date of Test: 24-April-2017
-------------------------------	-----------------------------

Measurement procedure:	ANSI C63.4-2014 using 50 μ H/50 ohms LISN
Test Results:	Complies.
Measurement Data:	See attached graph, (Peak detector).

Highest measured value (L1 and N):

All emissions are below the limits in FCC 15.207

Powered from USB Adaptor, Active Link:

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Corr. (dB)
0.272		25.32	51.06	25.74	1000	9	L1	GND	10.1
0.276	39.76		60.94	21.18	1000	9	Ν	GND	10.1
0.412	35.86		57.61	21.75	1000	9	L1	GND	10.1
0.416		27.76	47.53	19.77	1000	9	L1	GND	10.1
0.556		25.55	46.00	20.45	1000	9	L1	GND	10.1
0.560	33.29		56.00	22.71	1000	9	L1	GND	10.1
0.676	27.43		56.00	28.57	1000	9	L1	GND	10.1
0.964		23.25	46.00	22.75	1000	9	L1	GND	10.1
0.964	29.40		56.00	26.60	1000	9	L1	GND	10.1

The test was performed with an Apple A1400 USB adaptor (Flextronics, EU version). Input voltage to the adaptor was 120V 60Hz.



Full Spectrum



Powered from USB Adaptor, Active Link



3.2 Occupied Bandwidth

FCC Part 15.247 (a)(1)(iii)

Test Results: Complies

Measurement Data: 39 RF channels in use

Carrier Frequency	Occupied Bandwidth (99%) (MHz)
2403 MHz	1.36
2441 MHz	1.36
2481 MHz	1.35

Occupied Bandwith is reported for information only.

See attached plots.

Requirements:

No requirements for Digital Transmission Systems.



MultiView	B Spectrum	Spo	ectrum 2	X					
Ref Level 20	.00 dBm Offse	t 10.50	dB • RBW 20	kHz kHz Mode Au	to FET				
1 Occupied Ba	ndwidth	210 µ3 ((3) (B (1)100	KHZ MOUCAU					⊙1Pk Max
								M1[1]	5.84 dBm 40304000 GHz
10 dBm					MI			2	
					X				
0 dBm					12mg				
					w.				
-10 dBm				~~~		The Ar			
			and we			(In		
-20 dBm		.~~	7°V						
		~~~					$  \sim  $		
-30 dBm	Λ						) N	ί	
-40 dBm	J NN	$\mathcal{M}$					, v	m has	
-10 0511	. M							/ v/	
-50 dBm									mr 1
m									m
-60 dBm									î.
-70 dBm									
CF 2.403 GHz			1001 pt	s	40	0.0 kHz/			Span 4.0 MHz
2 Marker Tabl	e					_			
Type   Ref		X-Value	HZ	Y-Value	Occ Bw	Function		Function Re	esult
T1	1	2.40236525 (	GHz	-12.12 dBm	Occ Bw Cer	ntroid		2.403044	1271 GHz
T2	1	2.40372329 (	GHz	-13.36 dBm	Occ Bw Fre	q Offset		44.27054	1745 kHz
							Measuring		03.04.2017

#### 99% Bandwidth, 2403 MHz



99% Bandwidth, 2441 MHz





99% Bandwidth, 2481 MHz



### 3.3 Minimum 6 dB Bandwidth

FCC Part 15.247 (a)(2)

Test Results: Complies

#### **Measurement Data:**

Carrier Frequency	Minimum 6 dB Bandwidth (kHz)
2403 MHz	615
2441 MHz	663
2481 MHz	601

Power supply variation within 85 % to 115% of nominal value has no influence on measured value.

#### **Requirements:**

For Digital Transmission Systems in the 2400-2483.5 MHz band the minimum 6 dB bandwidth shall be at least 500 KHz.



MultiView	B Spec	trum	🖾 Sp	ectrum 2	X						
Ref Level 20.	00 dBm 10 dB	Offset	: 10. 42.04.us (~9	50 dB 🖷 RB 1 ms) VB	W 100 kHz W 300 kHz	Mode 4	uto FET				
1 Frequency St	ween	0111	12.01 µ3 ( 5.	1 1113/ 10	11 300 1012	mode /	ato III				●1Pk Max
i frequency o	псер									M1[1]	8 20 dBm
										2	40304000 GHz
10 40-1							M1			-	
10 dBm							× .				
				T1				T2			
0 dBm								~			
			$\sim$								
		-									
-10 dBm	/										
20 dBm											
-30 dBm											
-50 abiii											
-40 dBm											
-50 dBm											
60 ID											
-60 dBm-											
-70 dBm											
CF 2.403 GHz				100	1 pts		20	 00.0 kHz/			Span 2.0 MHz
2 Marker Table	2										
Type Ref			X-Value		V-V.	alue		Function		Eunction R	esult
M1	1		2.40304 G	Hz	8.20	dBm	ndB	1 41150011		6 (	) dB
TI	1		2.4027123.0	GHz	22	5 dBm	ndB down	BW		615.40 k	Hz
T2	1		2.4033277	GHz	2.2	3 dBm	O Factor				04.9
	-						2.0000	1			03 04 2017
	Л								Measuring		14:21:49

### Minimum 6 dB Bandwidth, 2403 MHz

MultiVi	ew 🔠 Specti	rum 🖾 Spectr	JM 2 🖾			
Ref Lev	rel 20.00 dBm C	Dffset 10.50 dB	RBW 100 kHz	Auto FET		
1 Freque	ncy Sweep		I I I I I I I I I I I I I I I I I I I			●1Pk Max
						M1[1] 7.93 dBm 2.44104400 GHz
10 dBm				MI		
			T1		т2	
0 dBm				F ~	-	
						<u> </u>
-10 dBm		-				
-20 dBm—						~
-30 dBm						
-40 dBm						
-50 dBm						
-60 dBm						
-70 dBm—						
CF 2.441	GHz		1001 pts	200.0 kHz/		Span 2.0 MHz
2 Marker	. Table					
Type	Ref Trc	X-Value	Y-Value	Function		Function Result
M1 T1	1	2.441044 GHZ 2.4407203 GHz	1.95 aBM 1.94 dBm	ndB ndB down BW		663.30 kHz
T2	i	2.4413836 GHz	1.94 dBm	Q Factor		3679.9
[					Measuring	<b>03.04.2017</b> 14:23:03

#### Minimum 6 dB Bandwidth, 2441 MHz



MultiView	8 Spectru	m 🖾 Spectru	m 2 🖾				
Ref Level 2	0.00 dBm Off	set 10.50 dB •	RBW 100 kHz	Auto EET			
1 Frequency	Sweep	1 42.04 µs (~9.1 ms)	VBW SOURIE MOULE	Autonn		●1P	к Мах
						M1[1] 7.8	30 dBm
						2,481046	00 GHz
10 dBm							
			T1 V	1	T2		
0 dBm							
-10 dBm							
	-						~
-20.dBm							
-							
-30 dBm							
-40 dBm							
E0 d0m							
-50 UBIII							
-60 dBm							
-70 dBm							
CE 2.481 GHz	7		1001 pts	200.0 kHz		Span 2.	0 MHz
2 Marker Tal	- nle				1		
Type Re	ef   Trc	X-Value	Y-Value	Functi	on	Function Result	
M1	1	2.481046 GHz	7.80 dBm	ndB		6.0 dB	
	1	2.4807263 GHz 2.4813277 GHz	1.76 dBm 1.80 dBm	ndB down BW O Factor		601.40 KHZ 4125.5	
12	<u>т</u>	2.4010277 GHZ	1.00 dbm	QTOCO		4120.0	017
					Measuring	14:2/	1.45 /

Minimum 6 dB Bandwidth, 2481 MHz



### 3.4 Peak Power Output

FCC part 15.247 (b)

**Test Results: Complies** 

#### Measurement Data:

Carrier Frequency	2403 MHz	2441 MHz	2481 MHz
Conducted Power (dBm)	8.7	8.4	8.1
Conducted Power (mW)	7.4	6.9	6.5
Field Strength (dBµV/m)	107.7	107.0	106.7
EIRP, Calculated (mW)	17.6	14.9	13.9
Antenna gain (dBi)	3.7	3.3	3.3

Antenna gain = 10*log(EIRP/Conducted power) dBi

EIRP is calculated from measured field strength by the formulas in KDB 412172 D01 Determining ERP and EIRP v01.

Power supply variation within 85 % to 115% of nominal value has no influence on measured value.

Radiated Power was measured on both antennas and the EUT was rotated in 3 planes to find the maximum value. Only the maximum value is reported.

#### See attached plots.

#### **Requirements:**

The maximum peak output power shall not exceed the following limits:

For Digital Transmission Systems in the 2400 - 2483.5 MHz band: 1 Watt

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced below the stated value above by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



MultiView	Spectrum	🖾 Spec	trum 2	X						
Ref Level 20.0 Att TRG:RFP(8GHz)	00 dBm Offse 10 dB • SWT	t 10.50 dB ● RB\ 200 µs VB\	NY 3 MHz NY 10 MHz							SGL
1 Time Domain	Power									●1Pk Max
	M1								M1[	1] 8.71 dBm 3.600 μs
10 dBm-	×									
0 dBm										
-10 dBm							$\uparrow\uparrow$			
-20 dBm										
-30 dBm										
-40 dBm										
-50 dBm										
ligo las m M										
-70 dBm								1, 10,		
	9			100				I	Ů	
CF 2.403 GHz				100	1 pts					20.0 µs/
2 Marker Table Type   Ref M1	Trc   1	X-Value <b>3.6 μs</b>		Y-Value 8.71 dBm	TD Pow Pe	Function eak			Function Re 8.71 dB	esult M
							Re	ady 🔳		03.04.2017

Conducted Power, 2403 MHz

MultiView	Spectrum	🖾 sp	ectrum 2	🕱 Spectr	um 3 🛛 🛛	2			
Ref Level 11 Att TRG:VID TDF	7.00 dBµV/m 10 dB ● :	SWT 200 µs	RBW 3 MHz VBW 10 MHz						
1 Zero Span									●1Pk Max
								M1[1]	107.68 dBµV/m 6.600 µs
110 deµV/m									
100 dBµV/m									
90 dBµV/m									
N									
80 dBµV/m								$\vdash$	
70 dBµV/m									
-60 dBµV/m	TRG 60.000 dBµV/n								
50 авµv/m									Wallhum Mondown
40 dBµV/m									
30 dBµV/m									
20 dBµV/m									
CF 2.403 GHz				1001	pts		•		20.0 µs/
							Measuring		05.04.2017

Radiated Power, 2403 MHz (Max: EUT H2, Ant2, VP)



MultiView	Spectrum	🕱 Spe	ctrum 2	X						
Ref Level 20.0 Att TRG:RFP(8GHz)	00 dBm Offse 10 dB • SWT	et 10.50 dB ● RB 200 µs VB	SW 3 MHz SW 10 MHz							SGL
1 Time Domain	Power									●1Pk Max
	M1								M1[	1] 8.40 dBm 3.600 µs
10 dBm-	ž						$\overline{\mathbf{h}}$			
0 dBm							+			
-10 dBm										
-20 dBm										
-30 dBm										
-40 dBm										
-50 dBm								Maria	Heller M. M.	nmh ha ha
								. Mille	ind . I dia M	h dhala ah
TRG	3							U		U
CF 2.441 GHz				100	l pts	1	1		1	20.0 µs/
2 Marker Table					•					
Type   Ref	Trc	X-Value		Y-Value		Function			Function Re	sult
M1	1	3.6 µs		8.40 dBm	TD Pow Pe	ak			8.40 dB	m
							Re	ady 🔳	·····	03.04.2017

Conducted Power, 2441 MHz

MultiView	Spectrum	🖾 sp	ectrum 2	X Spectr	um 3 🛛 🛛			
Ref Level 11 Att TRG:VID TDF	7.00 dBµV/m 10 dB ● \$	SWT 200 µs	RBW 3 MHz VBW 10 MHz					
1 Zero Span								●1Pk Max
							M1[1]	106.95 dBµV/m 6.400 µs
110 dBµV/m								
100 dBµV/m								
9D dBµV/m								
80 dBuV/m								
00 00000								
70 dBµV/m								
- <del>60 dBµV/m</del>	TRG 60.000 dBµV/n	n						
50 dBuV/m-								
00 00000							· · · · ·	Kithandunde
40 dBµV/m								
30 dBµV/m								
20 dBuV/m								
CE 2 441 CH2			1	1001	nto			20.0.00
GI 2.441 GHZ	Υ			1001	pts		B 410	2010 µs7
	Л					 Measuring	676	

Radiated Power, 2441 MHz (Max: EUT H2, Ant2, VP)



MultiView	Spectrum	🖾 Spect	rum 2 🖾	l				
Ref Level 20.0 Att TRG:RFP(8GHz)	00 dBm Offse 10 dB • SWT	et 10.50 dB • RBW 200 µs • VBW	3 MHz 10 MHz					SGL
1 Time Domain	Power							●1Pk Max
	M1						M1[	1] 8.12 dBm 3.600 µs
10 dBm-	×							
0 dBm								
-10 dBm								
-20 dBm								
-30 dBm								
-40 dBm								
-50 dBm								, Antonio
+ <b>\$</b> \$\$\$\$							WAR WAR AND A	
-70 dBm	6						U	
CF 2.481 GHz			1	1001 pts	I	1	1	20.0 µs/
2 Marker Table								
Type   Ref	Trc	X-Value	Y-V-	alue	Function	n	Function Re	esult
M1	1	3.6 µs	8.12	dBm TD	Pow Peak		8.12 dB	m
						Ready		03.04.2017

Conducted Power, 2481 MHz

MultiView	Spectrum	🖾 Sp	ectrum 2	X Spectr	um 3 🛛 🛛				
Ref Level 11 Att	7.00 dBµV/m 10 dB ● \$	SWT 200 µs	RBW 3 MHz VBW 10 MHz						
1 Zero Span									●1Pk Max
1 2010 0 pair								M1[1]	106.66 dBµV/m 6.400 µs
110 dBµV/m									
			· · · · · ·						
100 dBµV/m									
9D dBuV/m									
55 dbp1jm									
, 80 dBµV/m									
70 dBµV/m									
60 dBµV/m	-TRG 60.000 dBuV/n	 n							
50 dBµV/m									mundudun
40 dBµV/m									
30 dBµV/m									
20 dBµV/m							-		
CF 2.481 GHz	1	1	1	1001	pts	1	1	1	20.0 µs/
	Y				•		Measuring		05.04.2017
L	JL						-		

Radiated Power, 2481 MHz (Max: EUT H2, Ant2, VP)



### 3.5 Conducted Emissions at Antenna Connector

#### FCC Part 15.247 (d)

**Test Results: Complies** 

#### Measurement Data:

Carrier Frequency	Highest Value (dBc)	Margin (dB)	Verdict
2403 MHz	> 60	> 40	Pass
2441 MHz	> 60	> 40	Pass
2481 MHz	> 60	> 40	Pass

Measured with Peak Detector

RF conducted power to 25 GHz: see attached plots.

Limit

Peak measurement	RMS averaging
20 dBc or more in 100 kHz bandwidth	30 dBc or more in 100 kHz bandwidth

Detector type shall be the same as used for measuring Output Power.

Attenuation below the general limits specified in part 15.209(a) is not required.



MultiView 🖽 Spectrum 🛛 🖾	Spectrum 2 🛛 🖾		
Ref Level 10.00 dBm Offset 10.50 dB	RBW 100 kHz		
1 Erequency Sweep	VBW SUUKHZ Mode Auto Sweep		●1Pk Max
Limit Check LineFCC15 247 20DB PE <mark>AK</mark>	PASS PASS		M1[1] -62.98 dBm 2.368830 GHz
0 dBm			
FCC15 247 20DB PEAK			
-20 dBm			
-30 dBm			
-40 dBm			
-50 dBm			
-60 dBm			رين المولي المراجع
\$70 dBm	hallen en often aller	eripeiskaforsenheiskladunghen feinskeisklamentikkeiseterte bestätte	Werkensteraliteliteren weteren werten ander ander ander ander ander and the second and the secon
-80 dBm			
1.0 MHz	2501 pts	239.9 MHz/	2.4 GHz
			Measuring 03.04.2017 14:05:26

#### Conducted Emissions, 1 – 2400 MHz, 2441MHz



Conducted Emissions, 2350 – 2450 MHz, 2403MHz



MultiView 🗄 Spectrum 🛛 🖾 Spe	ectrum 2 🛛 🖾			
Ref Level 10.00 dBm Offset 10.50 dB • RE	SW 100 kHz Node Auto Support			
1 Frequency Sweep	WY SOURIZ MODE AUTO SWEEP			●1Pk Max
FCC15 2世济自动DEREAK	PASS		M2[1]	-52,49 dBm
LineFCC15 247 20DB PEAK	PASS		2	.4835270 GHz
0 dBm			2	.4806880 GHz
	] {			
-10 dBm				
-20 dBm				
N 100	M I I I I I I I I I I I I I I I I I I I			
-30 dBm	1			
-40 aBm-				
-50 dBm				
مملد	Sugar 1			
-60 dBm	" WUMMAN ALLAND			
and strange and an and a strange and a st		Mariahand million and the second many provident and	Mahahahama Mara bar an al	
			a a to construct the second starter and the particulation of the second s	adiate that with a second way
-70 dBm				
-80 dBm				
2.45 GHz	2501 pts	10.0 MHz/	1	2.55 GHz
			Measuring 🚺 🗰 🗰	03.04.2017

### Conducted Emissions, 2450 – 2550 MHz, 2481MHz

MultiView 8	Spectrum								
Ref Level 10.00 c	dBm Offse DdB SWT	t 10.50 dB • RE	3W 100 kHz SW 300 kHz N	Inde Auto Sween					
1 Frequency Swee	ep	75.2 m3 VE							●1Pk Max
Limit Check	47 2008 DE		PAS	S				M1[1]	-69.03 dBm
Einer Gold Z	47 2000112								
U dBm									
FCC15 247 20DB PEAK									
-20 dBm									
-30 dBm									
-50 0.011									
-40 dBm									
50 d0m									
-30 0611									
-60 dBm									
							M1		
-70 aBm	line data to sea da ta a lana	الباستة المالية المحمد الان	And I have a second second	and water to be the state of the		allan an <mark>darih bilan dari an </mark> ara	a manual all a		and the state of the state
-80 dBm	In the second stress of the second stress of	Management of the part of		and the second second second			Product and a	a second and any second and and and and and and and and and a	
2.4835 GHz			10001 pt	ts	751	L.65 MHz/			10.0 GHz
							Measuring 【		03.04.2017 13:54:49

Conducted Emissions, 2483.5 – 10000 MHz, 2441MHz



MultiView 8	Spectrum								
Ref Level 10.0	00 dBm Offse 10 dB SWT	t 10.50 dB • RE 150 ms VE	3W 100 kHz 3W 300 kHz M	ode Auto Sweep					
1 Frequency Sy Limit Che LineFCC1	weep ck 5 247 20DB PE	AK	PAS	S S				M1[1]	●1Pk Max -65.01 dBm 24.96780 GHz
0 dBm									
FCC15 247 20DB PEA	AK								
-20 dBm									
-30 dBm									
-40 dBm									
-50 dBm									
-60 dBm					Larun Hadaa Ul	the she was a second	la conta company fortun	ւ տեն ու լույե	M
-79,dBm	the second second								
-80 dBm									
10.0 GHz			10001 pt	S	1	.5 GHz/			25.0 GHz
							Measuring		03.04.2017 13:54:05

Conducted Emissions, 10000 – 25000 MHz, 2441MHz



### 3.6 Restricted Bands of operation

Restricted Bands of operation for FCC and ISED are defined in FCC Part 15.205 and ISED RSS-GEN, Issue 4 clause 8.10.

Generally, no fundamentals are allowed in the restricted bands and all emissions must comply with the limits in FCC 15.209 or RSS-GEN, Issue 4, clause 8.9.

FCC (MHz)	ISED (MHz)	FCC (GHz)	ISED (GHz)		
0.090-0.110		0.96-1.24 1.3-1.427	0.96-1.427		
0.495-0.505		1.435-1.6265			
2.1735-2.1905		1.6455-1.6465			
	3.020-3.026	1.660-1.710			
4.125-4.128		1.7188-1.7222			
4.17725-4.17775		2.2-2.3			
4.20725-4.20775		2.31-2.39			
	5.677-5.683	2.4835-2.5			
6.215-6.218		2.69-2.9	2.655-2.9		
6.26775-6.26825		3.26-3.267			
6.31175-6.31225		3.332-3.339			
8.291-8.294		3.3458-3.358			
8.362-8.366		3.6-4.4	3.5-4.4		
8.37625-8.38675		4.5-5.15			
8.41425-8.41475		5.35-5.46			
12.29-12.293		7.25-7.75			
12.51975-12.52025		8.025-8.5			
12.57675-12.57725		9.0-9.2			
13.36-13.41		9.3-9.5			
16.42-16.423		10.6-12.7			
16.69475-16.69525		13.25-13.4			
16.80425-16.80475		14.47-14.5			
25.5-25.67		15.35-16.2			
37.5-38.25		17.7-21.4			
73-74.6		22.01-23.12			
74.8-75.2		23.6-24.0			
108-121.94 123-138	108-138	31.2-31.8			
149.9-150.05		36.43-36.5			
156.52475-156.52525		Above 38.6			
156.7-156.9					
162.0125-167.17					
167.72-173.2					
240-285					
322-335.4					
399.9-410					
608-614					

Frequencies in **Bold** text are specific for FCC or ISED, all other frequencies are common.



### 3.7 Spurious Emissions (Radiated)

FCC 15.205, 15.209

**Test Results: Complies** 

#### Measurement Data:

#### Band-edge conducted power

	Measured field str	rength (dBμV/m)	Limit	Mai	rgin		
	2390 MHz	2483.5 MHz	dBµV/m	d	dB		
Peak Detector	52.1	46.5*	74	21.9	27.5		
Average Detector	45.0	39.4*	54	21.9	14.6		

*Measured with Marker Delta Method

Average Detector values are measured with Peak Detector and corrected for Duty Cycle.

Both antennas were tested and the EUT was rotated in 3 planes to find the maximum value. Band Edge values were measured in the maximum position and antenna.

See attached plots.

#### Marker Delta Method:

Peak level at 2481MHz RBW=1MHz:	106.62 dBµV/m
Marker Delta 100kHz:	60.12 dB
Peak Level at Band Edge:	46.50 dBµV/m
Av Level at Band Edge:	39.40 dBµV/m

#### **Duty Cycle Correction Factor Calculation:**

Duty Cycle = slot length / frame length

Duty Cycle Correction factor = -20 x log(Duty Cycle) = 7.1 dB

Maximum Duty Cycle Correction Factor per Para 15.35 (b): 7.1 dB



MultiView	+ Spectru	m 🛛	Spectrum 2	X Spectr	um 3 🛛 🛛					$\bigtriangledown$
Ref Level 11 Att TDF	7.00 dBµV/m 10 dB	<b>SWT</b> 1.01 m	● RBW 1 MHz s VBW 3 MHz M	ode Auto Sweep	)	-				
1 Frequency S	weep								01	Pk Max
Limit Che	sck		PAS	S				M2[1]	52.13 2.3865	dBµV/m 700 GHz
110 dBµV/m				0				M1[1]	107.43 2.4029	dBµV/m 600 GHz
100 dBµV/m									++	
90 dBµV/m										
80 dBµV/m										
FCC15PK 24GHZ										
70 dBµV/m										
60 dBµV/m										+
50 dBµV/m			Licks area	habelland marine	walk walker have been	www.www.walu	who amended	mynomentalite		why
initration	monstructul	with								
30 dBµV/m										
20 dBµV/m										
2.31 GHz			1001 pt	S	10	0.0 MHz/			2.	41 GHz
	T						Measuring		05.04	.2017

Lower Band Edge, 2403MHz, Peak (Max: EUT H2, Ant 2, VP)



Upper Band Edge, 2481MHz, Peak (Max: EUT H2, Ant 2, VP)



MultiView	B) Spectrum	x S	pectrum 2	X					
Ref Level 20	.00 dBm Offse	t 10.50 dB • F	BW 100 kHz	Anda Auto Curoor					
1 Frequency S	weep	1.05 IIIs 1	BWY JOURNZ IV	IOUE AUTO SWEEL					●1Pk Max
								M2[1]	-51.80 dBm
									2.4837040 GHz
10 dBm		M1						M1[1]	8.32 dBm
10 0.011		L X							2,4810560 GHz
		$  \rangle \rangle$							
0 dBm-									
-10 dBm									
		$ \rangle$ $\langle$							
00.40-		$I \rightarrow I$							
-20 UBIII									
		4 \							
-30 dBm	pl pl		1						
			A						
-40 dBm									
E0 d0m			JA M2						
-30 uBm	1 min		W						
mound	m			mounter					
-60 dBm					www.www.	mound	www.washan	- Alan and the second	- Amanaham
-70 dBm				1			1		
CF 2.4875 GHz	z		1001 pt	S	2	2.5 MHz/			Span 25.0 MHz
							Measuring		21.04.2017

Upper Band Edge, 2481MHz, Marker Delta



### 3.8 Radiated Emissions, below 1GHz

FCC 15.205, 15.209 ISED RSS-GEN, Issue 4, Clause 8.9 Test Results: Complies

#### Radiated emission 30 - 1000 MHz.

Detector: Quasi-Peak

Measuring distance 3 m

Tested in during normal operation with active connection and with diversity

#### Measured values:

Frequency	RF channel	RF channel Field Strength, QP		Margin
MHz	L,M,H	dBµV/m @3m	dBµV/m	dB
50.3*	м	28.1	40	11.9
30-88 (other freqs)	м	< 20 (Peak)	40	>20
88-216	М	< 30 (Peak)	43.5	>13.5
216-960	м	< 35 (Peak)	46	>11
960-1000	М	< 25 (Peak)	54	>29

*Not in a restricted band

See attached plots.

#### Requirements/Limit

FCC	Part 15.209 @ frequencies defined in §15	Part 15.209 @ frequencies defined in §15.205						
ISED	RSS-GEN Issue 4, Clause 8.9 @ frequent	cies defined in clause 8.10						
	Radiated emission	Radiated emission limit @3 meters						
Frequency (MHz)	Quasi Peak (μV/m)	Quasi Peak (µV/m) Quasi Peak (dBµV/m)						
30 – 88	100	40.0						
88 – 216	150	43.5						
216 – 960	200	46.0						
Above 960	500	54.0						





Date: 5.APR.2017 13:09:26

Radiated emissions, 30 -200MHz, HP, Peak





Date: 5.APR.2017 13:07:27

Radiated emissions, 30 -200MHz, VP, Peak





Date: 5.APR.2017 12:57:37

Radiated emissions, 200 -1000MHz, HP, Peak





Date: 5.APR.2017 12:55:29

Radiated emissions, 200 -1000MHz, VP, Peak



### 3.9 Radiated Emissions, above 1GHz

FCC 15.205, 15.209

ISED RSS-GEN, Issue 4, Clause 8.9

**Test Results: Complies** 

Measurement Data:

#### Radiated Emissions, 1-25 GHz

Measuring distance: 3m (1 - 8.5 GHz)1m (8 - 18 GHz)

A pre-scan was performed above 18 GHz and no spurious emissions were detected.

#### Measured values:

Frequency	RF channel	Field Strength Peak	Field Strength AV	Limit	Marg	in dB
GHz	L,M,H	dBµV/m @3m	dBµV/m @3m	dBµV/m	Peak	AV
All freqs	М	< 54	< 34	74/54	>20	>20

No spurious emissions were detected.

Average Detector values are calculated from Peak values by Duty Cycle Correction Factor.

Antenna factor, amplifier gain and cable loss are included in spectrum analyzer "Transducer factor".

Both antennas were tested and the EUT was rotated in 3 planes.

See plots.

#### **Requirements/Limit**

FCC	Part 15.209 @ frequencies defined in §15.205				
ISED	RSS-GEN Issue 4, Clause 8.9 @ frequencies defined in clause 8.10				
	Radiated emission limit @3 meters				
Frequency (MHz)	AV (dBμV/m)	Peak (dBµV/m)			
Above 1 GHz	54.0	74.0			



MultiView 8	Spectrum	🖾 Sp	ectrum 2	Spectr	'um 3 🛛 🛛				$\nabla$
Ref Level 107 Att	.00 dBµV/m 10 dB <b>5</b>	SWT 1.39 ms	RBW 1 MHz VBW 3 MHz M	ode Auto Sweep	)				<u> </u>
1 Frequency Sy	veen								o1Pk Max
Limit Cheo	:k		PAS	S				M1[1]	44.72 dBµV/m
LineFCC15	5247PK		PAS	s					2.37940 GHz
100 dBµV/m									
90 dBµV/m									
80 dBµV/m									
70 dBuV/m									
60 dBµV/m									
50 dBµV/m									
									. M1
40 dBµV/m				control laterater	MUNAMANA	and the second second	www.www.www.www.	and the second state of th	Hulling and and and a state of the
www.www.www.w	www.	www.c.l.l.conversed	and the second of the second	and the second second second					
30 dBuV/m									
20 dBuV/m									
20 00000									
10 dBµV/m									
1.0 GHz		1	1251 pt	5	13	9.0 MHz/	1	1	2.39 GHz
							Measuring		05.04.2017

### Radiated emissions, 1000 -2390MHz, HP, 2403MHz, EUT H2, Ant 1

MultiView 🕀	Spectrum	X Spe	ectrum 2	Spectr	um 3 🛛 🕅				
Ref Level 107.0 Att	00 dBµV/m 10 dB <b>S'</b>	● F WT 1.39 ms ● V	NBW 1 MHz NBW 3 MHz M	ode Auto Sweep					
1 Frequency Swe	еер								●1Pk Max
Limit Check	(		PAS	S				M1[1]	46.59 dBµV/m
LineFCC152	247PK		PAS	S					2.38500 GHz
100 dBpv/m									
90 dBµV/m									
80 dBµV/m									
FCC15247PK									
70 dBµV/m									
60 dBµV/m									
50 dBµV/m									M
									a la mandal
40 dBUV/m	www.www.	hronwichum	winderheimenden	rentered	My handley of the sector	hley pake and a party of	ᡩᡣᡂᢛᢔᢤᡇᠿᢗᡃᡌᢐ᠂ᢚᡗᠣ᠊ᠥᢛᢦ	<del>გიად ის იადი აკერე დები</del> თ	11/1916-1916-1917-1917-
30 dBµV/m									
20 dBµV/m									
10 dBµV/m									
1.0 GHz			1251 pt	6	13	9.0 MHz/			2.39 GHz
							Measuring	444	05.04.2017

Radiated emissions, 1000 -2390MHz, VP, 2403MHz, EUT H2, Ant 1



MultiView	Spectrum	🖾 Sp	ectrum 2	Spect	rum 3 🛛 🛛	< )			$\bigtriangledown$
Ref Level 97.0 Att TDF	0 dBµV/m 10 dB <b>S\</b>	● F WT 1.39 ms ● V	NBW 1 MHz /BW 3 MHz Mo	ode Auto Sweep					<b>```</b>
1 Frequency Sw	eep								●1Pk Max
Limit Chec	k 247PK		PAS	S S				M1[1]	48.06 dBµV/m 2.38720 GHz
90 dBµV/m									
80 dBµV/m									
ECC152470K									
70 dBµV/m									
60 dBµV/m									
50 dBµV/m									M
40 dBuV/m								. ever endedated	wwwwwwww
mmmmm	www.www.ww	groundarrest	white he was	hunananahadaah	and bear and early	harrander	ala and and a second of a second of a second se		
30 dBµV/m									
20 dBµV/m									
10 dBµV/m									
0 dBµV/m									
1.0 GHz			1251 pt	s	13	89.0 MHz/			2.39 GHz
							Measuring		05.04.2017

Radiated emissions, 1000 -2390MHz, HP, 2403MHz, EUT H2, Ant 2

MultiView 🕀 Sp	pectrum 🛛 🗶 S	pectrum 2	🖾 Spectr	um 3 🚶 🛛	< )			
Ref Level 97.00 dB Att : TDF	µV/m 10 dB <b>SWT</b> 1.39 ms ●	RBW 1 MHz VBW 3 MHz Mod	e Auto Sweep					<u> </u>
1 Frequency Sweep								●1Pk Max
Limit Check		PASS					M1[1]	50.31 dBµV/m
LineFCC15247	PK	PASS						2.38720 GHz
90 06pv/m								
80 dBµV/m								
FCC15247PK								
70 dBµV/m								
60 dBµV/m								
50 dBµV/m								M.
40 dBuV/m							material to a face of 19 Labor	andownlater
unnunnun	hourselfun	ralgementation	whenter	hallow the the the sector of the	and the state of the second	0000000 · · · · · · · · · · · ·		
30 dBµV/m								
20 dBµV/m								
10 dBµV/m								
0.40.42/m								
U dBµV/m								
1.0 GHz		1251 pts		13	9.0 MHz/			2.39 GHz
						Measuring	499	05.04.2017

Radiated emissions, 1000 -2390MHz, VP, 2403MHz, EUT H2, Ant 2



MultiView 🖽 Spectrum 🛛 🕱	Spectrum 2 🛛 🕅 Spect	rum 3 🛛 🕅		
Ref Level 97.00 dBµV/m           Att         10 dB         SWT         1.26 ms	RBW 1 MHz VBW 3 MHz Mode Auto Sweep			
1 Frequency Sween				●1Pk Max
Limit Check	PASS		M1[1]	47.64 dBuV/m
LineECC15247PK	PASS			2.500280 GHz
90 dBµV/m	1100		-	
80 dBuV/m				
FCC15247PK				
70 dBµV/m				
60 dBµV/m				
50 dBμV/m				
Aller in a				
Mouther & was a set of a set of the		mumericanter faller as pour blocked storage	and more particular and a property of the property of the second se	A work the way the make
40 dBµV/m ~ 5000 m ~ 6000 m ~ 60000 m ~ 6000 m ~ 60000 m ~ 600000 m ~ 60000 m ~ 60000 m ~ 6000 m ~ 6000 m ~ 600	WWWWWWWWWWWWWWWWWWWWWWWWWWWWW			
30 dBµV/m				
20 dBµV/m				
10 dBµV/m				<u> </u>
0 dBµV/m				1
2.5 GHz	1251 pts	70.0 MHz/	• •	3.2 GHz
			Measuring	05.04.2017

### Radiated emissions, 2500 -3200MHz, HP, 2481MHz, EUT H2, Ant 1

MultiView 🗄 Spectrum	Spectrum 2	Spectrum	3 🖾			$\nabla$
Ref Level 97.00 dBµV/m ● Att 10 dB SW	● RBW 1 MHz VT 1.26 ms ● VBW 3 MHz Mo	de Auto Sweep				
TDF						O 1 Dk Mov
Limit Check	PAS	S		М	1[1]	46.29 dBuV/m
LineFCC15247PK	PAS	s I			-1-1	2.515390 GHz
90 dBµV/m						
80 dBµV/m						
FCC15247PK						
70 ubµv/m						
60 dBµV/m						
50,dBh∧/w						
Million Muder Marson Marson Marson Marson and a	and be deland the state when the	www.www.	worther with enter man and the	North and the second day to the later of	mound	- markely Marchane
40 aBµV/m						
30 dBµV/m						
20 dBuV/m						
10 dBµV/m						
0 dBµV/m						
2.5 GHz	1251 pts	6	70.0 MHz/	I	1	3.2 GHz
				Measuring		05.04.2017

Radiated emissions, 2500 -3200MHz, VP, 2481MHz, EUT H2, Ant 1



MultiView	Spectrum	n 🗶 Sp	ectrum 2	Spectr	um 3 🛛 🛛				
Ref Level 97. Att TDF	.00 dBµV/m 10 dB <b>S</b>	● R WT 1.26 ms ● V	BW 1 MHz BW 3 MHz Mo	de Auto Sweep					
1 Frequency S	weep								●1Pk Max
Limit Che	ck		PAS	S				M1[1]	48.99 dBµV/m
LineFCC1	5247PK		PAS	S					2.504200 GHz
90 авµv/m—									
80 dBµV/m									
FCC15247PK									
70 dBμV/m									
60 dBµV/m									
41									
50 dBμV/m									
and Manager									
40 dBuil/m	Malerougeneral	multiprover and address	allow ward out an	whitehousehousehouse	whether derived	howtherebuildericht	Holasoundation	harrow hat a she was a second	who how have the second the
40 dbpv/m									
30 dBµV/m									
20 dBµV/m									
10 dBuilden									
10 00µV/III									
0 dBµV/m									
2.5 GHz		1	1251 pt	S	70	0.0 MHz/	1	1	3.2 GHz
	)[						Measuring		05.04.2017

Radiated emissions, 2500 -3200MHz, HP, 2481MHz, EUT H2, Ant 2

MultiView 🗄 Spectrum	Spectrum 2	Spectrum	3 🖾			$\bigtriangledown$
Ref Level 97.00 dBµV/m ● Att 10 dB SWT TDF	● RBW 1 MHz 1.26 ms ● VBW 3 MHz Mod	e Auto Sweep				
1 Frequency Sweep						●1Pk Max
Limit Check	PASS				M1[1]	52.05 dBµV/m
LineFCC15247PK	PASS					2.501960 GHz
90 dBholw						
80 dBµV/m						
FCC15247PK						
70 dBµV/m						
60 dBµV/m						
11						
The dBuV/m						
10 day war and have a start of the start of	yohn marging and the second and the second	wallow washing to be	hangelonder Libertalander	how we want reader whe	a mar and part when the	Munumuhali
TO OBPVIII						
30 dBµV/m						
20 авµv/m						
10 dBµV/m						
0 dBµV/m						
2.5 GHz	1251 pts		70.0 MH	lz/	1	3.2 GHz
				Measuring		05.04.2017

Radiated emissions, 2500 -3200MHz, VP, 2481MHz, EUT H2, Ant 2



MultiView 🗄 Spect	trum 🛛 🕅 Sp	ectrum 2	🖾 Spectr	'um 3 🛛 🛛	Z			$\nabla$
Ref Level 82.00 dBµV/n ● Att 10 df	n • F B SWT 16.5 ms • N	RBW 1 MHz /BW 3 MHz Mo	de Auto Sween					
PA TDF	0 011 1010 110 - 1							
1 Frequency Sweep	_							●1Pk Max
		PAS	S			M	1[1]	51.78 dBµV/m
to applineFCC15PK		PAS	s					8.29660 GHz
75 dBµV/m								
FCC15PK								
70 dBµV/m								
65 dBµV/m								
60 dBµV/m								
55 dBu) (/m								
SS dBp v/m								M1
50 dBµV/m							t is the construction during	L. LANDAR HAND
				a barbara	ist also a subactive of the	ad topoten all without the	Aldelin Moder to Advanda	dalar in the second
45 dBµV/m		In Law the ship have been star	I A A A A A A A A A A A A A A A A A A A	a dama ka Abata ya Abata ya Abata ya Ab	testillerhausbol, alvet			
a harmental hands a second black and hard hard harmental	hab of the second state of the	When where the second	den and to					
40 dBµV/m								
35 dBµV/m								
3.0 GHz			5	55	0.0 MHz/			8.5 GHz
						Measuring	499	05.04.2017

Radiated emissions, 3000 -8500MHz, HP, 2441MHz, EUT H2, Ant 1

MultiView 🕀	Spectrum	🖾 Spe	ectrum 2	Spectr	um 3 🛛 🛛				$\nabla$
Ref Level 82.0 Att	0 dBµV/m 10 dB <b>SV</b>	● R VT 16.5 ms ● V	BWI1MHz BWI3MHz Mo	de Auto Sweep					
PA TDF									
1 Frequency Sw	/eep		DAG	c			M	1[1]	IPk Max 51 07 dBuy/ma
80 dBµV/meFCC15	N N N N N N N N N N N N N N N N N N N		PAS	8 5			IVI	1[1]	8.25700 GHz
				Ŭ.					0120700 0112
75 dBµV/m									
FCC15PK									
70 dBµV/m									
65 dBµV/m									
60 dBµV/m									
55 dBµV/m									
									M1
50 dBµV/m							and the second states	Ros Kontabation Marka A.A.A.A	HUN HILL BURNER WITH HAL
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45 dBµV/m		and the second the	LIL AL WALKER AND THE PARTY OF	han offer the state of the stat	And Weiker Market Market and Market Market and Market And Market And Market And Market And Market And Market A	And the rest of the second			
a with an old like with a	harvelly to the line paper of	uukriiskeen en a	And deaders.						
40 dBµV/m									
35 dBµV/m									
			0501						
3.0 GHZ	(		2501 pt	S	55	U.U MHZ/			8.5 GHZ
	L						Measuring	4/0	15:06:59

Radiated emissions, 3000 -8500MHz, VP, 2441MHz, EUT H2, Ant 1



MultiView 🕀	Spectrum	X Sp	ectrum 2	Spectr	um 3 🛛 🕅				
Ref Level 82.0 Att PA TDF	0 dBµV/m 10 dB <b>SV</b>	● R N/T 16.5 ms ● V	BW 1 MHz BW 3 MHz Mo	de Auto Sweep					×
1 Frequency Sw	eep								●1Pk Max
Limit Chec	k		PAS	S			M	1[1]	51.53 dBµV/m
80 dBµV/mercc15	PK		PAS	s					8.48350 GHz
75 dBµV/m									
FCC15PK									
70 dBµV/m									
65 dBµV/m									
60 dBµV/m									
55 dBµV/m									
50 dBuV/m								h	M: L. L. L
				and the second state of th	halalahahahahahahahaha	anty-leven anther working that	pridulphility and international data	berthollo i frankrigen and an	all ^{all} a half of the second s
45 dBµV/m		Hun any himan which have	AND A CHANGE AND A C	And Alexandre					
	all the second	a descent of the second							
to apprent									
35 dBµV/m									
3.0 GHz		1	2501 pt	5	55	0.0 MHz/	1	1	8.5 GHz
						· []	Measuring		05.04.2017

Radiated emissions, 3000 -8500MHz, HP, 2441MHz, EUT H2, Ant 2

MultiView 8	Spectrum	X Spe	ectrum 2	Spectr	um 3 🛛 🕅				$\nabla$
Ref Level 82.00 Att PA TDF	0 dBµV/m 10 dB <b>S∀</b>	● RI VT 16.5 ms ● VI	BW 1 MHz BW 3 MHz Mo	de Auto Sweep					
1 Frequency Sw	еер								●1Pk Max
Limit Check	<		PAS	S			M	1[1]	52.77 dBµV/m
80 dBuV/MercC15i	PK		PAS	ទ					8.34060 GHz
75 dBµV/m									
FCC15PK									
70 dBµV/m									
65 dBu\\/m									
60 dBµV/m									
EE de Méri									
55 UBDV/III									M1
50 dBµV/m								une Ukachi Amana da Alaber	will falle all whether the second
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45 dBµV/m	I	And destroyed and Miller	Villana to Pully of Hay Marting	AN AN MUMBER					
analyshappy ghankaananyy daa	adilar shaka a sa	an a data data data data data data data	ada a						
40 dBμV/m									
35 dBµV/m									
3.0 GHz			2501 pt	S	55	0.0 MHz/			8.5 GHz
							Measuring	4/4	05.04.2017

Radiated emissions, 3000 -8500MHz, VP, 2441MHz, EUT H2, Ant 2





Date: 18.APR.2017 16:20:39

Radiated emissions, 8000 -12000MHz, HP, 2441MHz, EUT H2, Ant 1, @1m





Date: 18.APR.2017 16:18:50

Radiated emissions, 8000 -12000MHz, VP, 2441MHz, EUT H2, Ant 1, @1m





Date: 18.APR.2017 16:26:06

Radiated emissions, 8000 -12000MHz, HP, 2441MHz, EUT H2, Ant 2, @1m





Date: 18.APR.2017 16:24:17

Radiated emissions, 8000 -12000MHz, VP, 2441MHz, EUT H2, Ant 2, @1m



MultiView 🗄 S	pectrum	Sp	ectrum 2	Spectr	um 3 🛛 🛛	Z			$\nabla$
Ref Level 72.00 dE Att	BµV/m Off 10 dB SW	set -9.50 dB ● T 18 ms ●	RBW 1 MHz VBW 3 MHz M	<b>Mode</b> Auto Swee	p				
1 Frequency Sweet	<b>n</b>								●1Pk Max
FCC15PK imit Check	-		PAS	S			M	1[1]	45.03 dBuV/m
70 dBuy/merconspr			PAS	5				-1-1	17.47580 GHz
65 dBuV/m									
co do stra									
60 UBµV/III									
55 dBµV/m									
50 dBµV/m									
									N41
45 dBµV/m								10 X	
		a straight	ta dalam ta ta ta	nake larka - atto nake	المتراطية والألبان والمراجع	I Have a well the West of States	ward and a start of the start of the	alphilles MAMMANIL with	hadden by hall have had been been
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Hinamo, alata Ita et Labelladat alda e									
35 dBµV/m									
20 dBu)//m									
oo aapvym									
25 aBµV/m									
12.0 GHz			2501 pt	<u> </u> S	60	0.0 MHz/	1	1	18.0 GHz
								AM	05.04.2017

Radiated emissions, 12000 -18000MHz, HP, 2441MHz, EUT H2, Ant 1, @1m

	Spectrum 2 SR	Spectrum 3		$\bigtriangledown$
Ref Level 72.00 dBµV/m Offset -9 Att 10 dB SWT	.50 dB ● RBW 1 MHz 18 ms ● VBW 3 MHz Mode Au	uto Sweep		
PA TDF		'		
I Frequency Sweep	PASS		M1	IPK Max [1] 44.56 dBuV/m
	PASS			17.91720 GHz
65 dBu//m				
os abpvym				
60 dBµV/m				
55 dBµV/m				
50 dBµV/m-				
45 dBµV/m				M1
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35 dBµV/m				
30 dBµV/m				
25 08µV/m				
12.0 GHz	2501 pts	600.0 N	MHz/	18.0 GHz
			Measuring	05.04.2017

Radiated emissions, 12000 -18000MHz, VP, 2441MHz, EUT H2, Ant 1, @1m



MultiView 8	Spectrum	Sp	ectrum 2	Spectr	-um 3 🛛 🛛				$\nabla$
Ref Level 72.0 Att PA TDF	0 dBµV/m Of 10 dB SV	fset -9.50 dB ● VT 18 ms ●	RBW 1 MHz VBW 3 MHz M	Mode Auto Swee	p				
1 Frequency Sw	eep								●1Pk Max
FCC15PKLimit Check	k		PAS	S			M	1[1]	44.94 dBµV/m
^{70 dBµ} V/INeFCC15	PK		PAS	S					17.87640 GHz
65 dBµV/m									
60 dBµV/m									
55 dBµV/m									
50 dBµV/m									
45 dBµV/m						ال المراجعة الم		total Istado alla	tinutistiisi ana
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35 dBµV/m	r								
20 40.57/m									
30 UBµV/M									
25 dBµV/m									
12.0 GHz			2501 pt	S	60	U.U MHz/			18.0 GHz
[   ][						]	Measuring		05.04.2017

Radiated emissions, 12000 -18000MHz, HP, 2441MHz, EUT H2, Ant 2, @1m

MultiView	B Spectrum	Spe	ectrum 2	Spectr	um 3 🛛 🕅				$\bigtriangledown$
Ref Level 72. Att PA TDF	.00 dBµV/m Of 10 dB SV	fset -9.50 dB ● VT 18 ms ●	RBW 1 MHz VBW 3 MHz M	Mode Auto Swee	p				
1 Frequency S	weep								●1Pk Max
FCC15PKLimit Che	ck		PAS	S			M	1[1]	45.48 dBµV/m
An gen (Welccl	SPK		PAS	s					17.93880 GHz
65 dBµV/m									
60 dBuV/m									
55 dBµV/m									
50 dBµV/m									
45 dBµV/m								e ta concerción	M1
la nualauluzali	outh hilded model as it	And when the service and the service	hennyinghidaniahada	highlight	Malanana yana shahani	www.worthalkala.co.	yddynyhyddint wrai yllana prifyyd	happhing production products	MAHH WANN WALKAR MAN
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35 dBµV/m									
30 dBµV/m									
05 40.57/2									
25 dBµV/m			0504						10.0.011
12.0 GHz			2501 pt	S	60	U.U MHZ/			18.0 GHz
							Measuring	4/6	05.04.2017

Radiated emissions, 12000 -18000MHz, VP, 2441MHz, EUT H2, Ant 2, @1m



. <b>MARK</b>	MARKER 1 24.9552 GHz					* RBW 1 MHz Marker 1 [T1 ] VBW 3 MHz 60.48				] 8 dBuV/m
Ref	82 d	BµV/m		*Att :	l0 dB	SWT 4	15 ms	24.955200000 GHz		
-80										
-75										
-70										
-65										
-60	Hullinger	160 16. 11Ma	and all suffers	en contrali con e	. un hashakhika	Vintellioteneite	ullur Mr. Maria	MMMMMM	a spin he will	and which have been a start of the A
-55	<u> </u>	<u>antiv tantina va</u>		<u>thing with the state</u>	Manada a A		· • •			
-50										
-45										
-40										
-35										

Date: 19.APR.2017 15:19:26

Pre-scan, 18000 -25000 MHz, 2441MHz, Ant 1, @ approx 10cm



24.81	52 GHz				VBW 3	3 MHz		60.0	2 dBµV/m
Ref 82	2 dBµV/m		*Att 1	0 dB	SWT 4	15 ms	2	24.81520	0000 GHz
-80									
-75									
-70									
-65									1
-60-	Mulline set of the	Antherender Marson	ta m ^a lla Alassa dalla	huma para	himphaluma	Munder Mundeling	had a state of the	and water mar	alah unily hu ya hudun
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-50									
-45									
-40									

Date: 19.APR.2017 15:21:02

Pre-scan, 18000 -25000 MHz, 2441MHz, Ant 2, @ approx 10cm



### 3.10 Power Spectral Density (PSD)

FCC part 15.247(e)

**Test Results: Passed** 

#### Measured and Calculated Data:

The measurement procedures PKPSD described in ANSI C63.10-2013 was used.

Carrier Frequency	2402 MHz	2440 MHz	2480 MHz	
Measured value (dBm)	-2.6	-3.0	-3.0	

The measured values with 10kHz RBW are corrected by a Bandwidth Correction Factor of -5.2 dB.

#### **Requirements:**

The Power Spectral Density of a Digital Transmission System shall be no greater than +8 dBm in any 3kHz band





PSD, 2403MHz



PSD, 2441MHz





PSD, 2481MHz



# 4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		Uncertainty
Output Power		±0.5 dB
Power Spectral Density		±0.5 dB
Out of Band Emissions, Conducted	< 3.6 GHz	±0.6 dB
	> 3.6 GHz	±0.9 dB
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	> 1 GHz	±2.2 dB
Emission Bandwidth		±4 %
Power Line Conducted Emissions		+2.9 / -4.1 dB
Spectrum Mask Measurements	Frequency	±5 %
	Amplitude	±1.0 dB
Frequency Error		±0.6 ppm
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2



# 5 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

No.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	FSW26	Spectrum Analyzer	Rohde & Schwarz	LR 1640	2017.01	2018.01
2	ESU40	Measuring Receiver	Rohde & Schwarz	LR 1639	2016.12	2017.12
3	6810.17B	Attenuator	Suhner	LR 1669	Cal b4 use	
4	6HC3000/18000	Highpass Filter	Trilithic	LR 1614	Cal b4 use	
5	317	Pre-amplifier	Sonoma Instrument	LR 1687	2016.05	2017.05
6	8449A	Pre-amplifier	Hewlett Packard	LR 1322	2016.10	2017.10
7	6812B	AC Power Source	Agilent	LR1515	Cal b4 use	
8	3115	Horn Antenna	EMCO	LR 1330	2016.10	2021.10
9	PM7320X	Antenna Horn	Sivers Lab	LR 102	2009.01	2019.01
10	DBF-520-20	Antenna Horn	Systron Donner	LR 100	2009.01	2019.01
11	638	Antenna Horn	Narda	LR 098	2010.06	2020.06
12	HK116	Biconical Antenna	Rohde & Schwarz	LR 1260	2013.12	2018.12
13	HL223	LogPeriod Antenna	Rohde & Schwarz	LR 1261	2013.12	2018.12
14	Model 87V	Multimeter	Fluke	LR 1597	2016.10	2017.10
15	ESCI3	Measuring receiver	Rohde & Schwarz	N-4259	2015.08	2017.08
16	ESH3-Z2	Pulse Limiter	Rohde & Schwarz	LR 1074	2016.05	2017.05
17	ESH3-Z5	Two-Line V-Network	Rohde & Schwarz	N-3403	2015.07	2017.07

Test Software List								
Description	Manufacturer	Model	Version					
EMC Software for Conducted tests	Rohde & Schwarz	EMC32	9.26.00					



# 6 BLOCK DIAGRAM

### 6.1 Power Line Conducted Emission



### 6.2 Test Site Radiated Emission



Measurements at 1GHz and above were performed with turntable height 1.5m and with the ground plane covered by absorbers.



# **Revision history**

Version	Date	Comment	Sign
1.0	2017.04.21	First edition	FS
1.1	2017.06.28	Added comments	FS