

TEST REPORT

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EUT DESCRIPTION RADIOMODULE EQUIPMENT (IEEE 802.15.4 Protocol)

EUT TRADEMARK Power-one

EUT MODEL EMB-PWO

REFERENCE STANDARDS: Class II permissive change (FCC Part 15.247)

TEST REPORT NUMBER FCCTR 121295-1

TEST REPORT ISSUE DATE 30/11/2012

TESTING LABORATORY Prima Ricerca & Sviluppo S.r.l.

Via Campagna, 92 -22020 Faloppio (Co) -Italy

TESTING LOCATION As Above

DATE OF TEST SAMPLE 25/10/2012

RECEIPT

DATE OF TEST 25-26/10/2012

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Boy Fraico

Giocano Arnellini

The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have be obtained. Reproduction of this Test Report, should not be reproduced, except in full, without the written authorization of the Laboratory



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2 RELEASE CONTROL RECORD

TEST REPORT NUMBER	REASON OF CHANGE	DATE OF ISSUE
FCCTR_121295-0	Original Release	30/11/2012
FCCTR_121295-1	Typing error	12/12/2012
FCCTR_121295-2	Missing dattta	08/01/2013



TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

3.1 E.U.T. identification

Brand name:	Power-One		
EUT description	RADIOMODULE EQUIPMENT (IEEE 802.15.4 Protocol)		
Model name	EMB-PWO		
Serial Number	Not present		
Country of manufacturer:	ITALY		
Wi-Fi module	Microchip MRF24WBOMB		
ZigBee module	EMB-PWO (PCB ZGX.V0J02.2) FCC ID: X6W-EMBZ		
Antenna Type	2 different antenna type: - A24-HASM450 (antenna gain 1,14~2,14 dBi) - BT-STUBBY (antenna gain 0 dBi)		
CHANGES INTRODUCED IN THE EUT (REF. FCCTR_120174-1)	 Additional antenna assembly types adopted for Zigbee radio part: Three different antenna/cable assemblies: CableBelden, type RF 195 Series (RG type: 58/U), 15 meter long + Mobile Mark Antenna, type ECO5-2400-BLK in the "PT" pigtail cable option which provides a direct coax into the antenna Coaxial CableBelden, type RF 195 Series (RG type: 58/U), 15 meter long + RF Antenna Technologies, type EA-79F (1/2 wave antenna) with swivel RP-SMA connector Coaxial cable Belden (RG type 316/U), 15 meter long+RF Antenna Technologies, type EA-79F (1/2 wave antenna) with swivel RP-SMA connector All used antenna employ a permanently attached or "unique" antenna coupler (all connections between the module and the antenna, including the cable). 		

ASSEMBLY GAIN OF ANTENNA & RF CABLE COMBINATION (SEE ABOVE TABLE)

Exte Coa Cal	xial	Coaxi al cable Lengt h [m]	Cable Att [dB/m] @2.5GH z	Total Cable Attenuatio n [dB]	Internal Coaxial Cable Insertion Loss [dB] @3GHz	Connector Insertion Loss	Antenn a Gain [dBi]	Assembly Gain [dB]
RF	195	15	0,6	9	2	0,2	5	-6,2





RG316	15	1,55	23,25	2	0,2	3	-22,45
RG316	10	1,55	15,5	2	0,2	3	-14,7



3.2 Technical data

FCC class:	Intentional radiators	
Operating frequency range:	2,400 – 2,483 MHz	
Supply voltage:	5Vdc	
Typical usage :	Data concentrator for photovoltaic inverters	
EUT single or system:	Single	
Composed by	Single unit	
EUT dimensions :	See photographic documentation	

3.3 Modifications incorporated in E.U.T.

The following items are the modifications introduced in the equipment under test:

None

3.4 Ports identification

This section contains descriptions of all ports, the length and the type of the cable provided by manufacturer needed for the tests. Moreover it is specified if the ports are ever or optionally connected.

Poi	rt	Description	Connection
1	Enclosure	Plastic case	Screws
2	AC power input/output ports	Port not present	
3	DC power input/output ports	5Vdc	Connector
4	Signal and control ports	2 x RS485	RJ11
5	Telecomm.	1 ETHERNET	RJ45
5	Antenna port	2 x antenna connector	SMA connector

Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.

3.5 Auxiliary equipment

Notebook Toshiba, mod Satellite Pro C660



4 TEST CONDITIONS

4.1 Operating test modes and test conditions

The equipment has been tested according to the operative conditions described in the user/installation manual provided by the manufacturer and by following reference standards: Reference Standard:

FCC Part 15, Subpart C § 15.207; § 15.209; § 15.247

In the following table there are the operating conditions adopted during tests identified by an indicator (#..) at which has been referred the item "Operating condition of the equipment under test" of all technical sheets of the tests (see Section 4)

Operating condition	Description
#1	System switched ON, WiFi and ZigBee carrier set on at maximum power, continuous ping via LAN

4.2 Test overview

The appliance is classified as "intentional radiator" in conformity to FCC Part 15 Sub. C The application is mainly used as data concentrator for photovoltaic inverters.

Note:

For the compliance to § 15.247 requirements, the host product Model CDD contains the RF component Microchip 802.11b MRF24WBOMB miniCard and radio module EMB-PWO (PCB ZGX.V0J02.2) integrated by the host product Manufacturer according to the RF module Manufacturer instructions. That modules was authorized by FCC with the grant of certification according to 47 CFR FCC Part 15 Subpart C so the EUT does not require additional testing (for the Wi-Fi module see Report No. 30853571.001 issued by TUV Rheinland on 06/03/2009 for the ZigBee module see Report No. FCCTR_111254B_5 issued by Prima Ricerca & Sviluppo on 30/08/2012)



5 REFERENCE STANDARD FOR PERFORMED TESTS

Reference standard :	Title:
FCC Part 15 part A	Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communication Commission (FCC)
FCC Part 15 part C	Code of Regulations Part 15 (Radio Frequency Devices), Subpart C (Intentional Radiators) of the Federal Communication Commission (FCC)
ANSI C63.4	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz



6 SUMMARY OF TEST RESULTS

6.1 Emission tests

	Port	Phenomena	Basic standard	Operating condition ¹	Result
1	Enclosure	Radiated Emissions	FCC Part 15 § 15.209, § 15.247(d)	#1	Within the limit
2	Antenna Port	RF conducted Spurious Emissions at the Transmitter Antenna Terminal	FCC Part 15 § 15.247 (d), 15.209	#1	Within the limit
2	Antenna Port	Maximum Peak Output Power	FCC Part 15 §15.247 (b) (3)	#2	Within the limit



7 TEST RESULTS

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TEST 1.

MAXIMUM PEAK OUTPUT POWER

REFERENCE DOCUMENT

FCC CFR 47 Part 15

• TEST LOCATION: Semi-anechoic chamber

• TEST EQUIPMENT USED FOR TEST: EMI receiver Rohde & Schwarz Mod. ESU40

Chase Antenna Mod. CBL 6111

Rohde & Schwarz Antenna Mod. HBL050

Spectrum Analyzer Rohde & Schwarz Mod. FSP40

• TESTED PORT: Antenna Port

EMISSION LIMITS:
 Acc. to Section 15.247 of reference document

• UNCERTAINTY OF MEASURE: Combined uncertainty = \pm 1.75 dB

Total uncertainty = $(k=2) \pm 3.5 dB$

TEST CONDITIONS:			MEASURED
Ambient temperature :	15 - 35 °C		23,5 ± 3 °C
Ambient humidity:	25 - 75 %rH		39 ± 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :			115Vac 60Hz

OPERATING CONDITION (Rif. Section. 2): #1

RESULT: WITHIN THE LIMIT



CONDUCTED MEASUREMENT @ ANTENNA PORT

Channel	Output Power (dBm)	Limit (dBm)
Ch11	21.34	30
Ch18	20.77	30
Ch26	20.31	30

RADIATED MEASUREMENT

ANTENNA PORT CONFIGURATION					
		Coaxial Cable:	BALDEN, type RF 195 Series (RG type: 58/U)		
ANTENNA ASSEMBLY Cable Length:		Cable Length:	15m		
		Antenna:	Mobile Mark Antenna, type ECO5-2400-BLK		
Channel	Output	Power (dBm)	Limit (dBm)		
Ch11 15.14		15.14	30		
Ch26		14.11	30		

ANTENNA PORT CONFIGURATION					
		Coaxial Cable:	BALDEN, type RF 195 Series (RG type: 58/U)		
ANTENNA ASSEMBLY Cable Length:		Cable Length:	15m		
Antenna:		Antenna:	RF Antenna Technologies, type EA-79F (1/2 wave antenna)		
Channel	hannel Output Power (dBm)		Limit (dBm)		
Ch11	Ch11 13.14		30		
Ch26		12.11	30		

ANTENNA PORT CONFIGURATION					
		Coaxial Cable:	BALDEN, type RG 316/U		
ANTENNA ASSEMBLY Cable Length:		Cable Length:	15m		
ANTENNAAO	Antenna:		RF Antenna Technologies, type EA-79F (1/2 wave antenna)		
Channel	Output	Power (dBm)	Limit (dBm)		
Ch11 6.64		6.64	30		
Ch26		5.61	30		



TEST 2.

RADIATED SPURIOUS EMISSIONS

REFERENCE DOCUMENT FCC CFR 47 Part 15

• TEST LOCATION: Semi-anechoic chamber

• TEST EQUIPMENT USED FOR TEST: EMI receiver Rohde & Schwarz Mod. ESU40

Chase Antenna Mod. CBL 6111

Rohde & Schwarz Antenna Mod. HBL050

• TESTED PORT: Enclosure

EMISSION LIMITS: Acc. to Section 15.247 of reference document

• **UNCERTAINTY OF MEASURE**: Combined uncertainty = ± 1.75 dB

Total uncertainty = $(k=2) \pm 3.5 dB$

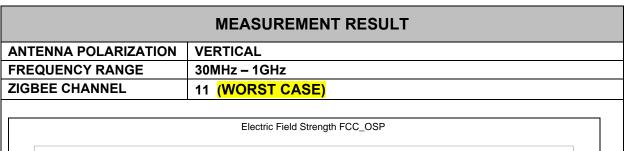
TEST CONDITIONS:			MEASURED
Ambient temperature :	15 - 35 °C		23,5 ± 3 °C
Ambient humidity:	25 - 75 %rH		39 ± 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :			115Vac 60Hz

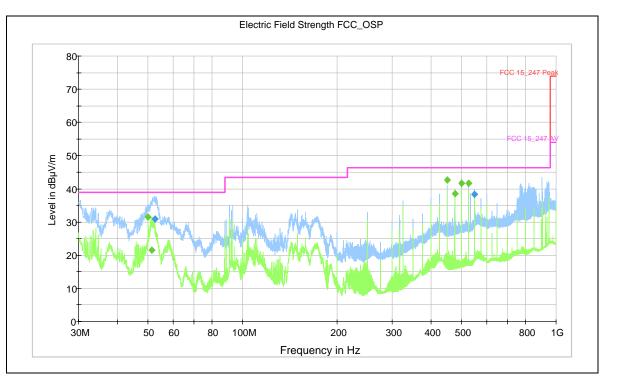
OPERATING CONDITION (Rif. Section. 2): #1

RESULT: WITHIN THE LIMIT



ANTENNA PORT CONFIGURATION					
	Coaxial Cable:	BALDEN, type RF 195 Series (RG type: 58/U)			
ANTENNA ASSEMBLY	Cable Length:	15m			
	Antenna:	Mobile Mark Antenna, type ECO5-2400-BLK			





Quasi - Peak Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)
52.680000	30.9	100.0	V	201.0	8.10	39.00
550.000000	38.2	100.0	V	201.0	8.20	46.40

Average - Final Result

Frequency (MHz)	Average (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Margin (dB)	Limit (dBµV/m)					
50.000000	31.4	100.0	V	99.0	7.60	39.00					
51.240000	21.5	100.0	V	167.0	17.50	39.00					
450.000000	42.7	142.0	V	68.0	3.70	46.40					
475.000000	38.5	124.0	V	201.0	7.90	46.40					



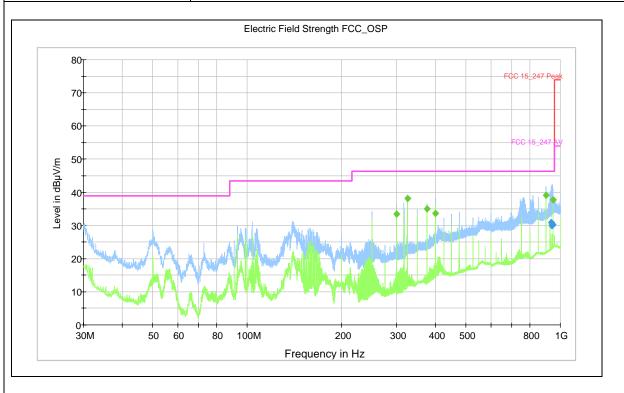


500.000000	41.7	124.0	V	201.0	4.70	46.40
525.000000	41.7	100.0	V	201.0	4.70	46.40



ANTENNA PORT CONFIGURATION				
	Coaxial Cable:	BALDEN, type RF 195 Series (RG type: 58/U)		
ANTENNA ASSEMBLY	Cable Length:	15m		
	Antenna:	Mobile Mark Antenna, type ECO5-2400-BLK		

MEASUREMENT RESULT					
ANTENNA POLARIZATION	HORIZONTAL				
FREQUENCY RANGE	30MHz – 1GHz				
ZIGBEE CHANNEL	11 (WORST CASE)				



Quasi – Peak Final Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
935.640000	30.9	1000.0	120.000	126.0	Н	111.0	28.7	15.50	46.40
939.680000	30.0	1000.0	120.000	201.0	Н	201.0	28.9	16.40	46.40
939.760000	30.1	1000.0	120.000	301.0	Н	111.0	28.9	16.30	46.40
943.080000	30.2	1000.0	120.000	201.0	Н	201.0	29.0	16.20	46.40
944.160000	30.3	1000.0	120.000	100.0	Н	111.0	29.1	16.20	46.40
944.560000	30.3	1000.0	120.000	250.0	Н	23.0	29.1	16.10	46.40

Average Final Result

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
300.000000	33.5	1000.0	120.000	100.0	Н	201.0	15.8	12.90	46.40
325.000000	38.1	1000.0	120.000	100.0	Н	174.0	16.2	8.30	46.40
375.000000	34.9	1000.0	120.000	100.0	Н	201.0	17.7	11.50	46.40
400.000000	33.7	1000.0	120.000	100.0	Н	201.0	18.9	12.70	46.40



900.000000	39.1	1000.0	120.000	100.0	Н	188.0	27.5	7.30	46.40
950.000000	37.8	1000.0	120.000	100.0	Н	173.0	29.3	8.60	46.40

950.000000	37.8 1000	120.000	100.0 H	1/3.0	29.3	8.60	46.40	L	
ANTENNA PORT CONFIGURATION									
		Coaxial Cable	: BALDEN	type RF 195 Se	ries (R0	G type: 5	8/U)		
ANTENNA ASSE	EMBLY	Cable Length	: 15m						
			Mobile M	ark Antenna, typ	e ECO	5-2400-B	LK		

MEASUREMENT RESULT					
FREQUENCY RANGE 1GHz – 12.75GHz					

	Zigbee: Ch11 (2.405GHz) VERTICAL POLARIZATION									
Freq. (GHz)	Level (dBµV/m)	Margin (dB)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes			
4.810	53.4	39.12	92.52	125.0	V	23.0	2nd harmonic of zigbee ch11 Carrier			
7.215	79.1	13.42	92.52	100.0	V	16.0	3rd harmonic of zigbee ch11 Carrier			
9.620	78.0	14.52	92.52	194.0	V	-15.0	4th harmonic of zigbee ch11 Carrier			
	Zigbee: Ch11 (2.405GHz) HORIZONTAL POLARIZATION									
		Lighte	. O (2100	· · · · · · · · · · · · · · · · · · ·	<u> </u>	NIAL I OLA	INIZATION			
Freq. (GHz)	Level (dBµV/m)	Margin (dBm)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes			
		Margin	Limit	Heigth		Azimuth				
(GHz)	(dBµV/m)	Margin (dBm)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes			

	Zigbee: Ch26 (2.480GHz) VERTICAL POLARIZATION								
Freq. (GHz)	Level (dBµV/m)	Margin (dB)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes		
7.440	66.0	25.49	91.49	100.0	V	181.0	3rd harmonic of zigbee ch11 Carrier		
9.920	69.0	22.49	91.49	250.0	V	-1.0	4th harmonic of zigbee ch11 Carrier		
		Zigbee	e: Ch26 (2.480	GHz) H	ORIZO	NTAL POLA	ARIZATION		
Freq. (GHz)	Level (dBµV/m)	Margin (dBm)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes		
- 440	64.0	29.69	91.49	100.0	Н	181.0	3rd harmonic of zigbee ch11 Carrier		
7.440	61.8	29.09	91.49	100.0		101.0	ord flatifionic of zigbee citti Carrier		

^{*} par 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power Attenuation below the general limits specified in §15.209(a) is not required.



ANTENNA PORT CONFIGURATION						
	Coaxial Cable:	BALDEN, type RF 195 Series (RG type: 58/U)				
ANTENNA ASSEMBLY	Cable Length:	15m				
ANTENNA AGGEMBET	Antenna:	RF Antenna Technologies, type EA-79F (1/2 wave antenna)				

	MEASUREMENT RESULT				
FREQUENCY RANGE 1GHz – 12.75GHz					

	Zigbee: Ch11 (2.405GHz) VERTICAL POLARIZATION									
Freq. (GHz)	Level (dBµV/m)	Margin (dB)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes			
7.215	77.7	12.82	90.52	100.0	V	-1.0	3rd harmonic of zigbee ch11 Carrier			
9.620	77.2	13.32	90.52	250.0	V	-1.0	4th harmonic of zigbee ch11 Carrier			
		Zigbee	e: Ch11 (2.405	GHz) H	ORIZO	NTAL POLA	ARIZATION			
Freq.	Level	Margin	Limit	Heigth		Azimuth				
(GHz)	(dBµV/m)	(dBm)	(dBµV/m) *	(cm)	Pol.	(deg)	Notes			
(GHz) 7.215	(dBµV/m) 65.5	•			Pol.		Notes 3rd harmonic of zigbee ch11 Carrier			

	Zigbee: Ch26 (2.480GHz) VERTICAL POLARIZATION									
Freq. (GHz)	Level (dBµV/m)	Margin (dB)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes			
7.440	65.9	23.59	89.49	100.0	V	181.0	3rd harmonic of zigbee ch11 Carrier			
9.920	68.6	20.89	89.49	250.0	V	1.0	4th harmonic of zigbee ch11 Carrier			
		Zigbee	e: Ch26 (2.480	GHz) H	ORIZO	NTAL POLA	ARIZATION			
Freq. (GHz)	Level (dBµV/m)	Margin (dBm)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes			
7.440	61.9	27.59	89.49	100.0	Н	181.0	3rd harmonic of zigbee ch11 Carrier			
9.920	71.3	18.19	89.49	100.0	Н	1.0	4th harmonic of zigbee ch11 Carrier			

^{*} par 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power Attenuation below the general limits specified in §15.209(a) is not required.



ANTENNA PORT CONFIGURATION						
	Coaxial Cable:	BALDEN, type RG 316/U				
ANTENNA ASSEMBLY	Cable Length:	15m				
ANTENNA AGGEMBET	Antenna:	RF Antenna Technologies, type EA-79F (1/2 wave antenna)				

MEASUREMENT RESULT						
FREQUENCY RANGE	FREQUENCY RANGE 1GHz – 12.75GHz					

		Zigb	ee: Ch11 (2.40	05GHz)	VERTI	CAL POLAF	RIZATION				
Freq. (GHz)	Level (dBµV/m)	Margin (dB)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes				
7.215	77.6	6.42	84.02	100.0	V	1.0	3rd harmonic of zigbee ch11 Carrier				
9.620	77.2	6.82	84.02	250.0	V	1.0	4th harmonic of zigbee ch11 Carrier				
	Zigbee: Ch11 (2.405GHz) HORIZONTAL POLARIZATION										
Freq. (GHz)	Level (dBµV/m)	Margin (dBm)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes				
7.215	66.6	17.42	84.02	100.0	Н	271.0	3rd harmonic of zigbee ch11 Carrier				
9.620	75.7	8.32	84.02	100.0	Н	-1.0	4th harmonic of zigbee ch11 Carrier				

		Zigbo	ee: Ch26 (2.48	B0GHz)	VERTIC	CAL POLAR	RIZATION			
Freq. (GHz)	Level (dBµV/m)	Margin (dB)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes			
7.440	65.4	17.59	82.99	100.0	V	181.0	3rd harmonic of zigbee ch11 Carrier			
9.920	70.6	12.39	82.99	250.0	V	-1.0	4th harmonic of zigbee ch11 Carrier			
	Zigbee: Ch26 (2.480GHz) HORIZONTAL POLARIZATION									
Freq. (GHz)	Level (dBµV/m)	Margin (dBm)	Limit (dBµV/m) *	Heigth (cm)	Pol.	Azimuth (deg)	Notes			
7.440	61.0	21.99	82.99	100.0	Н	181.0	3rd harmonic of zigbee ch11 Carrier			
9.920	73.9	9.09	82.99	100.0	Н	-1.0	4th harmonic of zigbee ch11 Carrier			

^{*} par 15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power Attenuation below the general limits specified in §15.209(a) is not required.



TEST 3.

RF conducted Spurious Emissions at the Transmitter Antenna Terminal

REFERENCE DOCUMENT

FCC CFR 47 Part 15

TEST LOCATION:
 Radio Test Area

• TEST EQUIPMENT USED FOR TEST: Rohde & Schwarz Spectrum amalyzer Mod. FSP40

• TESTED PORT: Antenna Port

EMISSION LIMITS:
 Acc. to Section 15.247 of reference document

• UNCERTAINTY OF MEASURE: Combined uncertainty = \pm 1.75 dB

Total uncertainty = $(k=2) \pm 3.5 dB$

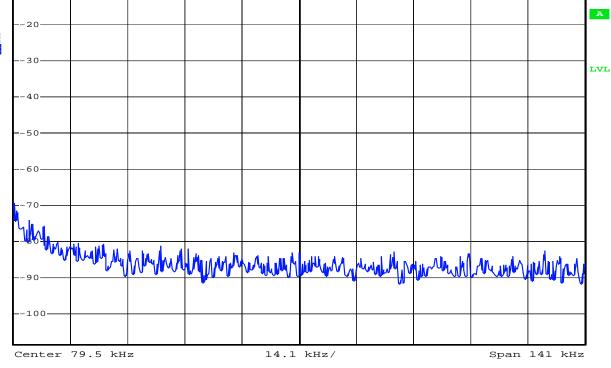
TEST CONDITIONS:			MEASURED
Ambient temperature :	15 - 35 °C		23,5 ± 3 °C
Ambient humidity :	25 - 75 %rH		39 ± 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :			115Vac 60Hz

OPERATING CONDITION (Rif. Section. 2): #1

RESULT: WITHIN THE LIMIT



	MEASUR	EMENT RESULT								
ZIGBEE CHANNEL	11									
FREQUENCY RANGE	9kHz ·	- 150kHz								
CONDUCTED PEAK CARRIER I	POWER 21.340	21.34dBm 1.34dBm								
CONDUCTED SPURIOUS LIMIT	1.34dl									
RESULT	NO SF	PURIOUS DETECTE	D							
Ref -8.4 dBm	Att 10 dB	*RBW 300 Hz *VBW 1 kHz SWT 1.6 s								
10 -Offset 11 6 dB										
					A					
1 PK MAXH										
					LVL					





				MEAS	SUREME	NT RES	ULT							
ZIGBE	E CHANN	EL			11									
FREQ	UENCY RA	ANGE			150kHz - 30MHz									
CONE	UCTED PI	EAK CAF	RRIER PC	WER	21.34dBm									
COND	OUCTED SI	PURIOUS	SLIMIT			1.34dBm								
RESU	LT				NO SPU	RIOUS D	ETECTED							
%	Ref -8.	4 dBm		Att	10 dB	*RBW 9 kHz *VBW 30 kHz 0 dB SWT 1.85 s								
	-10 -0ff :	set 11	6 dB							\Box				
PK	20													
HXA	20													
	30									1	L			
	40													
	50													
	60													
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	100			1										
	Start 1	50 kHz			2.98	5 MHz/			Stop	30 MHz				

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ICRE	E CHANNEL		11								
				4011-							
	UENCY RANGE	DDIED DAVIE		30MHz – 1GHz 21.34dBm							
	UCTED PEAK CA										
	UCTED SPURIO	US LIMIT	1.34dB								
ESU	LT		ALL SP	ALL SPURIOUS DETECTED ARE WITHIN THE LIMIT							
	D. 5. 0. 4. 4D.	7.1.1	10 45	*RBW 100 kH *VBW 1 MHz		-34.89					
	Ref -8.4 dBm	Att	10 dB	SWT 100 ms		260000000	MHZ				
		.1 6 dB				2 [T1] -34.75 80000000					
PK AXH	20					3 [T1] -60.03					
	30 1	2		1		4 [T1] -33.36	LVI				
	40-				668.	260000000	MHz				
	50-		3								
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	~30 tomment	my manner	war	www.www.www	www.	Mullia	~~ ~√				
	80										
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				MEAS	UREME	NT RES	ULT							
ZIGBE	E CHANI	NEL			11									
FREQ	UENCY R	RANGE			1GHz – 2.8GHz									
COND	UCTED F	PEAK CAF	RRIER PO	WER	21.34dBm									
COND	UCTED S	PURIOUS	SLIMIT		1.34dBm	1								
RESU	LT						TECTED to the o							
8						* RBW 1 * VBW 3	MHz			.71 dBm				
) dBm		Att 5	0 dB	SWT 1	.0 ms		2.407600	000 GHz				
	30 Off	set 11	6 dB											
	-20										A			
1 RM *								1			SGL			
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	Start 1	l GHz			180	MHz/			Stop	2.8 GHz	i			

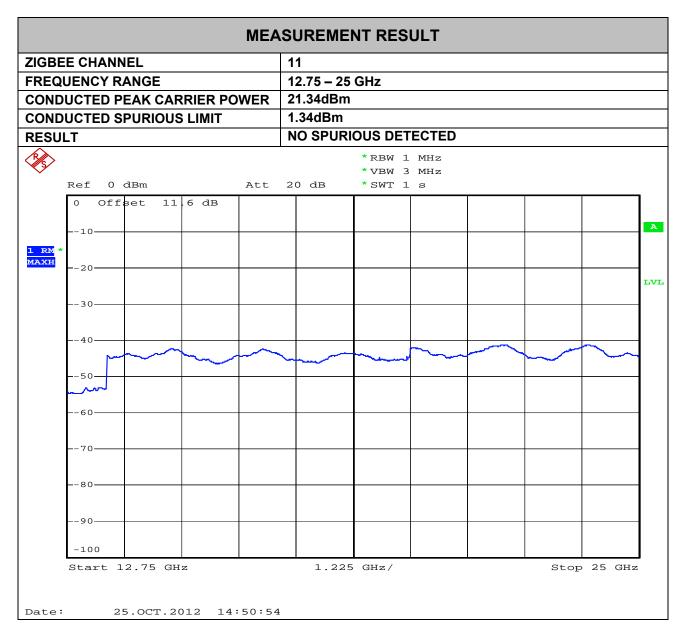
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MEAS	SUREMENT RESULT										
ZIGBEE CHANNEL	11										
FREQUENCY RANGE	2.8 – 12.75 GHz										
CONDUCTED PEAK CARRIER POWER	21.34dBm										
CONDUCTED SPURIOUS LIMIT	1.34dBm										
RESULT	ALL SPURIOUS DETECTED ARE WITHIN THE LIMIT										
Ref -25 dBm Att	* RBW 1 MHz Marker 4 [T1] * VBW 3 MHz -61.15 dBm 10 dB * SWT 1 s 12.023650000 GHz										
Offset 11.6 dB	Marker 1 [T1]										
30	2 4.809900000 GHz A Marker 2 [T1]										
1 RM *40 MAXH	-38.16 dBm 7.217800000 GHz										
50	Marker 3 [T1] LVI -39.85 dBm 9.62570000Ω GHz										
760											
70											
90											
100											
110											
120											
Start 2.8 GHz	995 MHz/ Stop 12.75 GHz										
Date: 25.OCT.2012 13:28:15											







IGBE	E CH	ANN	IEL					2	26										
			ANGE							- 150	_	<u> </u>							
			EAK (WEF		20.31dBm										
		D S	PURI	ous	LIMI	Γ				lBm									
RESUI	_T							1	10 8	PURI	OUS	DET	EC	ΓED					
%											* V	BW 3	МН	z					
	Ref		dBm				Att	2	0 d	В	S	WT 1	.6	s				1	_
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	Star	t 9	kHz							14.1	kH	z/					Stop	150 kH:	z



			MEA	SUREME	NT RES	ULT							
E CHANN	NEL		26	,									
JENCY R	ANGE		15	150kHz - 30MHz									
	EAK CA	RRIER	20	20.31dBm									
UCTED S	PURIOU	S LIMIT											
LT			N	O SPURIO	JS DETE	CTED							
Ref O	dBm		At.t.	20 dB	*VBW 3	0 kHz							
		.6 dB	1100	1	T								
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- -90 													
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	UENCY R UCTED P R UCTED S LT Ref 0 0 Off1020304050708090	R UCTED SPURIOUS LT Ref 0 dBm 0 Offset 111020304050708090	UENCY RANGE UCTED PEAK CARRIER IR UCTED SPURIOUS LIMIT LT Ref 0 dBm 0 Offset 11 6 dB1020304050708090	E CHANNEL UENCY RANGE UCTED PEAK CARRIER IR UCTED SPURIOUS LIMIT LT Ref 0 dBm Att 0 Offset 11 6 dB 10 20 30 40 50 80 90	E CHANNEL UENCY RANGE UCTED PEAK CARRIER IR UCTED SPURIOUS LIMIT NO SPURIOUS Ref 0 dBm Att 20 dB 0 Offset 11 6 dB 10 20 30 40 50 80 90	E CHANNEL UENCY RANGE UCTED PEAK CARRIER IR UCTED SPURIOUS LIMIT NO SPURIOUS DETER * RBW 1 * VBW 3 * VB	UENCY RANGE UCTED PEAK CARRIER R UCTED SPURIOUS LIMIT LT NO SPURIOUS DETECTED * RBW 10 kHz * VBW 30 kHz * VBW 30 kHz * SWT 3000 ms 0 Offset 11 6 dB102030405090	150kHz - 30MHz 150kHz 150kHz	### CHANNEL 26 150kHz - 30MHz 150kHz 150kHz	### CHANNEL #### UCTED PEAK CARRIER #### UCTED SPURIOUS LIMIT ##### UCTED SPURIOUS LIMIT ##################################			

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				ME	EAS	UREME	NT RE	SULT							
ZIGBE	E CHANN	IEL			26	26									
REQ	UENCY R	ANGE			30N	30MHz – 1GHz									
OND	UCTED P	EAK CA	ARRIER		20.31dBm										
COND	UCTED S	PURIO	US LIMIT		0.31	1dBm									
RESUI	LT				ALL	SPURIC	OUS DET	ECTED	ARE	WITHI	N THE LI	MIT			
R/S>	Ref 0	dBm		Att	- 2	0 dB	* VBW	120 kH 300 kH 340 ms	z		1 [T1 -57	.12 dBm			
			1 6 dB	Acc		Г	I	340 1118			2 [T1	h	7		
	10								1.1		_	.49 dBm			
PK IAXH	20												L		
	30												1		
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	70														
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M	EASUREMENT RESULT									
GBEE CHANNEL	26									
REQUENCY RANGE	1GHz – 2.8GHz									
ONDUCTED PEAK CARRIER OWER	20.31dBm									
ONDUCTED SPURIOUS LIMIT	0.31dBm									
ESULT	NO SPURIOUS DETECTED (the peak is related to the carrier)									
Ref 30 dBm At	*RBW 1 MHz Marker 1 [T1] *VBW 3 MHz 15.22 dBm t 50 dB *SWT 1 s 2.481400000 GHz									
30 Offset 11.6 dB										
-20-										
RM *										
10	120									
-0										
10										
20										
-30										
40										
50										
60										
-70										
Center 1.9 GHz	180 MHz/ Span 1.8 GHz									



MEASUREMENT RESULT					
ZIGBEE CHANNEL 26					
FREQUENCY RANGE	2.8 – 12.75 GHz				
CONDUCTED PEAK CARRIER POWER	PEAK CARRIER 20.31dBm				
ONDUCTED SPURIOUS LIMIT 0.31dBm					
RESULT	JLT ALL SPURIOUS DETECTED ARE WITHIN THE LIMIT				
Ref 0 dBm Att	*RBW 1 MHz Marker 2 [T1] *VBW 3 MHz -36.17 dBm 20 dB *SWT 1 s 9.924200000 GHz				
0 Offset 11 6 dB	Marker 1 [T1]				
10	-38.03 dBm 7.436700000 GHz				
1 RM * MAXH20	LVL				
30	_ 2				
40	T T				
50					
A 60					
70					
80					
90					
-100					
Start 2.8 GHz Date: 25.OCT.2012 15:03::	995 MHz/ Stop 12.75 GHz				



75 – 25 GHz 31dBm 1dBm SPURIOUS DETECTED * RBW 1 MHz * VBW 3 MHz O dB * SWT 1 S
31dBm SPURIOUS DETECTED * RBW 1 MHz * VBW 3 MHz 0 dB * SWT 1 s
1dBm SPURIOUS DETECTED * RBW 1 MHz * VBW 3 MHz O dB * SWT 1 S
* RBW 1 MHz * VBW 3 MHz 0 dB * SWT 1 s
* RBW 1 MHz * VBW 3 MHz 0 dB * SWT 1 s
*VBW 3 MHZ 0 dB *SWT 1 s
IV
IV
melandram machining and milion dad reprinting a white and the agent
1.225 GHz/ Span 12.25 GHz



8 LIST OF EQUIPMENT USED

EQUIPMENT	IDENTIFICATION NUMBER	CAL. DUE	CERTIFICATE NUMBER
EMI TEST RECEIVER 20HZ 40GHZ	EMC.359	JAN-2013	WAITING CALIBRATION CERTIFICATE FROM INRIM
ARTIFICIAL MAINS NETWORK	EMC.173	JAN-2013	WAITING CALIBRATION CERTIFICATE FROM INRIM
RF SEMI-ANECHOIC CHAMBER (CSSA)	EMC.191	AUG- 2013	PRS NSA-2012
BILOG ANTENNA	EMC.023	MAY 2014	SAIBERSDORF EH- A315/11
LOG PERIODICA ANTENNA	EMC.391	DEC 2012	RHODE & S.
VOLTAGE GENERATOR	EMC.397	FEB.2013	SPS A4909D
SPECTRUM ANALYZER 4 KHZ – 40 GHZ	EMC.332	DEC 2013	PRS EMC332_2012



9 EUT PHOTOGRAPHIC DOCUMENTATION

PHOTO N° 1 - SYSTEM IDENTIFICATION

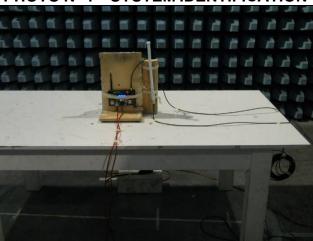












PHOTO N°2-RADIATED EMISSION SET UP

