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FCC Registration Number: 0020356952 (FRN) Test Firm Registration Number: 171131

IC Company Number: 9545A

Matériel testé :  
*Equipment under test:***TXUSB-NB1**Constructeur: **ZEPHYR AUDIO**

Manufacturer: 58, rue Pottier

78510 Le Chesnay - France

Rapport délivré à : **ZEPHYR AUDIO (M. Adrien Stachowicz)***Issued to:* 58, rue Pottier

78510 Le Chesnay - France

Référence de la proposition : 102011-20020

*Proposal number:*Date de l'essai : November 21<sup>st</sup> to 22<sup>nd</sup>, 2011*Date of test:*

Objectif des essais : Qualification FCC suivant les normes :

*Test purpose:* FCC qualification according to standards:

CFR 47, Part 15 B / C

Lieu du test: SMEE CE-Mesures

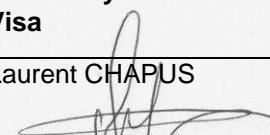
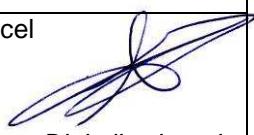
*Test location:* 38 VOIRON - France

Test réalisé par : Laurent CHAPUS

*Test realized by:*

Conclusion : L'équipement satisfait aux prescriptions des normes citées en référence.

*Conclusion:* The appliance complies with requirements of above mentioned standards.

Ed.	Date	Modifications / Pages	Written by: Visa	Approved by: Visa
1	December 21 <sup>st</sup> , 2011	Initial Edition	Laurent CHAPUS	Régis Ancel
2	January 10 <sup>th</sup> , 2012	P6 & P16 (Correction & added information)	 Digitally signed	 Digitally signed

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## Rapport d'essais / Test Report

N°: 20020-FCC-1

### SUMMARY

1. TEST PROGRAM.....	3
2. EQUIPMENT UNDER TEST (EUT) .....	4
3. TEST CONDITIONS.....	4
4. MODIFICATIONS OF THE EQUIPMENT UNDER TEST.....	4
5. CONDUCTED EMISSION MEASUREMENT .....	5
6. RADIATED EMISSION MEASUREMENT (UNINTENTIONAL RADIATION).....	8
7. OCCUPIED BANDWIDTH .....	11
8. MAXIMUM PEAK CONDUCTED OUTPUT POWER .....	13
9. SPURIOUS EMISSIONS .....	14
10. PEAK POWER SPECTRAL DENSITY .....	18



## 1. Test program

- **References**

**FCC CFR 47, PART 15, Subpart B and C**

**ANSI C63.4 (2009)**. American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

**ANSI C63.10 (2009)** American National Standard for Testing Unlicensed Wireless Devices.

Requirements for intentional radiator.

Chapter 15.247 of Subpart C (Operation within the band 2400-2483.5 MHz). Digitally modulated radiators.

FCC Guidance "Measurement of Digital Transmission Systems operating under Section 15.247".

- **Test Results**

TEST	Paragraph number (FCC Part 15.247)	Spec. (FCC Part 15.247)	RESULTS (comments)
Power line conducted emissions	15.107 / 15.207 (a)	Table 15.207 (a)	<b>PASS</b>
Unintentional radiations	15.109/ 15.209	<b>Measure at 3m</b> 30MHz-88MHz : 40 dB $\mu$ V/m 88MHz-216MHz : 43.5 dB $\mu$ V/m 216MHz-960MHz : 46.0 dB $\mu$ V/m Above 960MHz : 54.0 dB $\mu$ V/m	<b>PASS</b>
Minimum 6dB bandwidth	15.247 (a)(2)	Shall be at least 500kHz	<b>PASS</b>
Peak Output Power	15.247 (b) (3)	1W max.	<b>PASS</b>
Spurious emissions	15.247 (d)	Table 15.209 (a) for restricted bands	<b>PASS</b>
Peak Power Spectral Density	15.247 (e)	Shall not be greater than 8dBm in any 3 kHz band	<b>PASS</b>

PASS: EUT complies with standard's requirement

FAIL: EUT does not comply with standard's requirement

NA: Not Applicable

NP: Test Not Performed

- **General conclusion:**

Measures and tests performed on the sample of the product TXUSB-NB1, in configuration and description presented in this test report, show compliance with standards FCC CFR 47, PART 15, Subpart B and C.



## Rapport d'essais / Test Report

N°: 20020-FCC-1

## 2. Equipment Under Test (EUT)

Nom /  
*Identification*

TXUSB-NB1

Ref N°. #1  
FCC ID: A3BTXUSB-NB1

Alimentation /  
*Power supply*

USB 5V

Auxiliaires /  
*Auxiliaries*

Eee PC 900 ASUS (Windows XP)

Sn: 870AAQ295034

Entrées-Sorties /  
*Input / Output*

	Câbles pour essai / <i>Cables for test</i>	Blindé / <i>Shielded</i>	Prévu pour >3m / <i>Intended for &gt;3m</i>
USB (Ext. cord)	1.2m (Used for radiated meas.)	Yes	No

Version programme /  
*Firmware version*

N.C

Mode de fonctionnement /  
*Running mode*

The tested samples can be set in following mode:

- Continuous transmit mode, unmodulated or modulated on channel 0 to 15
- Continuous receive mode, unmodulated or modulated on channel 0 to 15
- Normal operation of the equipment (Transmission of MP3 audio file)

Programme de test /  
*Test program*

KDT 1.11.3 for channel and operational mode programming

Information sur l'équipement /  
*Equipment information*

The equipment is fitted with the Kleer KLR3012 system-on-chip solution

- Frequency band: 2400 to 2483.5 MHz (Transmit and receive)
- Rated power (conducted): +1.5dBm
- Number of channel: 16 (2403MHz to 2478MHz, separation 5MHz)
- Modulation: MSK, not frequency hopping
- Data rate: 2.37Mb/s
- Local oscillator: 22.5792MHz (Receiver)
- Antenna type: PCB, ALA131C3 (AMOTECH), 2.8dBi peak antenna gain
- Equipment designed for continuous operation
- Rated Occupied Bandwidth: 2.63MHz (-20dB occupied bandwidth)

Special accessories

None

## 3. Test conditions

Relative Humidity : 55%  
Temperature : 20°C

Power supply voltage:

Equipment under test: 5Vdc from USB port  
Mains : 110V/60Hz

## 4. Modifications of the equipment under test

No modification applied to the tested equipment during tests.

## 5. Conducted Emission Measurement

<b>TEST: Limits for conducted disturbance 150kHz – 30MHz (Clause 15.207 (a))</b>			<b>Verdict</b>	
Method: The LISN is placed 0,8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment were at least 0,8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on lines were made at the output of the LISN. The LISN (measure) is 50Ω / 50µH. The EUT is 80cm above the ground reference plane and 40cm from the vertical ground plane. The AC power cable is 1m length.			<b>Pass</b>	
<b>Laboratory Parameters:</b>	Required prior to the test		During the test	
Ambient Temperature	10 to 40 °C		20°C	
Relative Humidity	10 to 90 %		55%	
Fully configured sample scanned over the following frequency range	Frequency range on each side of line		Measurement Point	
	150kHz to 30MHz		AC input port (110V)	
Running mode	Wireless transmission			
Limits for AC power port				
Frequency (MHz)	Limit dB (µV)			
	Quasi-Peak	Result	Average	Result
0.15 – 0.50	66 à 56	<b>Pass</b>	56 à 46	<b>Pass</b>
0.50 – 5	56	<b>Pass</b>	46	<b>Pass</b>
5 – 30	60	<b>Pass</b>	50	<b>Pass</b>
Supplementary information: Test location: SMEE – CE Mesures / Test date: November 22 <sup>nd</sup> , 2011 Power supply voltage: 110V / 60Hz				

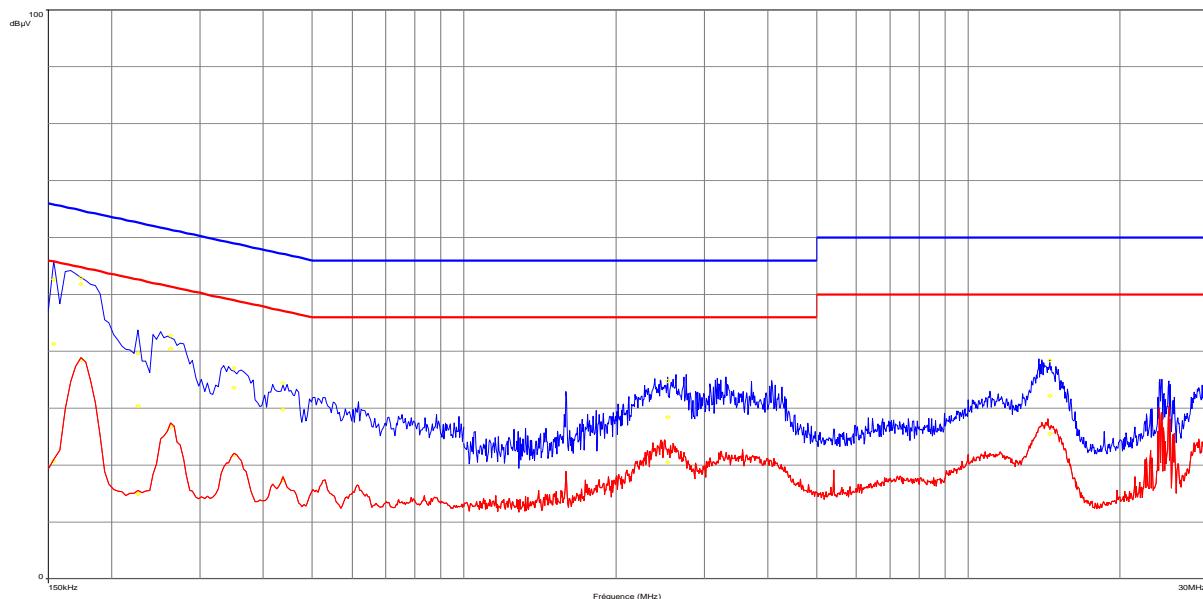
<b>Test Equipment Used</b>					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Attenuator / limiter / filter	SMEE	ATT#1	ATT-101-004	2011/3	2012/3
Cable RF	Div	2m / BNC	CAB-101-005	2011/3	2012/3
LISN (50Ω / 50µH)	AFJ	LS16C	RSI-101-001	2011/2	2012/2
LISN (50Ω / 50µH)	AFJ	LS16C	RSI-101-002	2011/2	2012/2
Reference comb gen.	SMEE	EMC-250K	REF-111-001	-	-
Measuring receiver	Rohde & Schwarz	ESL3	REC-101-001	2010/3	2012/3

**Photo of test setup for Mains Terminal Disturbance Voltage**

*Measurement on AC mains*
**Tabulated Results for Mains Terminal Disturbance Voltage on AC port**

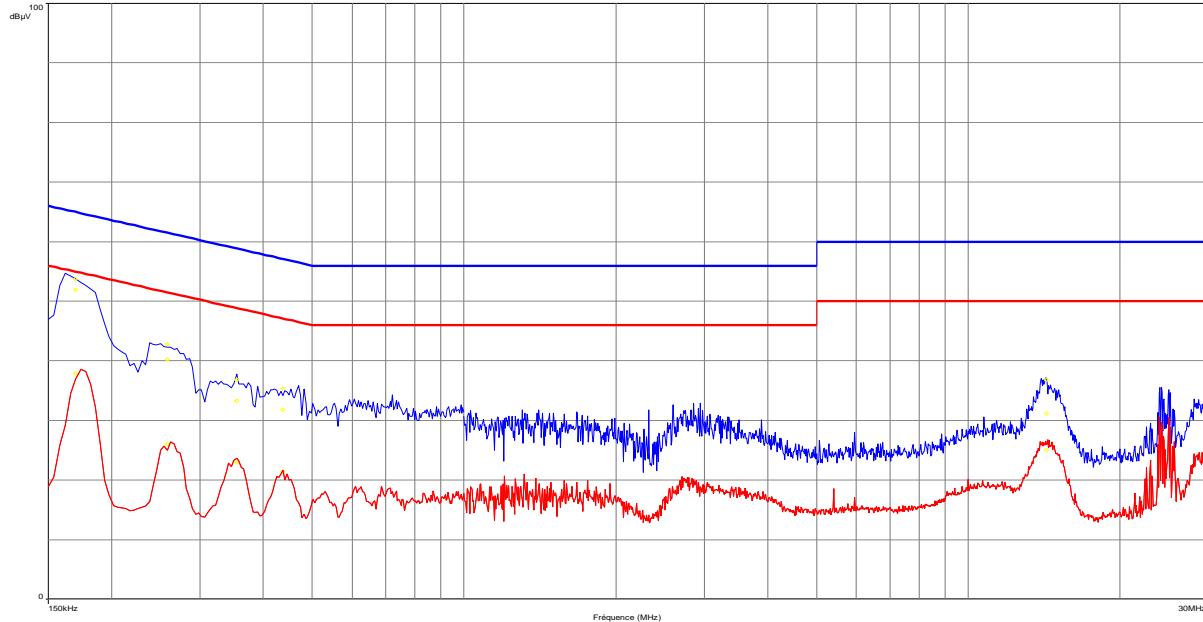
FREQ (MHz)	Meas. PK (dB $\mu$ V)	Mes. QP (dB $\mu$ V)	LIMIT QP (dB $\mu$ V)	Margin QP (dB)	Mes. AV (dB $\mu$ V)	LIMIT AV (dB $\mu$ V)	Margin AV (dB)	Line
0.154	52.6	41.3	65.8	-24.4	20.7	55.8	-35.1	L1
0.174	53.0	51.7	64.8	-13.1	38.5	54.8	-16.3	L1
0.226	39.6	30.4	62.6	-32.2	15.0	52.6	-37.6	L1
0.262	42.7	40.4	61.4	-20.9	26.6	51.4	-24.8	L1
0.350	37.0	33.6	59.0	-25.3	21.8	49.0	-27.2	L1
0.438	34.4	29.8	57.1	-27.3	17.4	47.1	-29.7	L1
2.536	34.8	28.4	56.0	-27.6	20.5	46.0	-25.5	L1
14.528	38.4	32.1	60.0	-27.9	25.5	50.0	-24.5	L1
0.170	53.7	52.0	65.0	-13.0	37.9	55.0	-17.0	Neutral
0.258	42.8	40.2	61.5	-21.3	26.0	51.5	-25.5	Neutral
0.354	36.9	33.3	58.9	-25.6	23.0	48.9	-25.9	Neutral
0.438	35.4	31.8	57.1	-25.3	21.4	47.1	-25.7	Neutral
14.304	36.9	31.2	60.0	-28.9	25.1	50.0	-25.0	Neutral
<b>Frequency band investigated:</b>		150kHz-30MHz						
<b>RBW:</b>		9kHz						
<b>Voltage:</b>		110V / 60Hz						
<b>Limit:</b>		15.207 a)						
<b>Final measurement detector:</b>		Quasi-Peak and Average						
<b>Wide Measurement Uncertainty:</b>		± 5dB (k=2)						

**Graphical representation of Conducted Disturbance Measurement (Peak and Average detection)  
AC port, Line L1**



----: Peak      ----: Average

**Graphical representation of Conducted Disturbance Measurement (Peak and Average detection)  
AC port, Neutral**



----: Peak      ----: Average

## 6. Radiated Emission Measurement (Unintentional Radiation)

<b>TEST: Limits for radiated disturbance 30MHz – 1GHz</b>			<b>Verdict</b>		
<p><b>Method:</b> Measurements were made in a 3-meter Open Area Test Site (OATS) that complies to CISPR 16. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3 meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (Peak, Quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.</p> <p>A pre-scan frequency identification of the EUT has been performed in a GTEM cell. The measured radiated field of the EUT is correlated to a measurement distance of 3m. (3-axis algorithm) The pre-characterization graphs are obtained in PEAK detection.</p>			<b>Pass</b>		
Laboratory Parameters:		Required prior to the test	During the test		
Ambient Temperature		10 to 40 °C	21°C		
Relative Humidity		10 to 90 %	55%		
Fully configured sample scanned over the following frequency range	Frequency range on each side of line		Measurement Point		
	30MHz – 1GHz		3 m measurement distance		
Running mode		EUT connected to PC (No intentional emission)			
<b>Limits – FCC Part 15.109 / 209</b>					
Frequency (MHz)	Limit (dB $\mu$ V/m)				
	Level (Detector)	Results			
30 to 88	40.0 (QP)	Pass			
88 to 216	43.5 (QP)	Pass			
216 to 960	46.0 (QP)	Pass			
Above 960	54.0 (QP)	Pass			
Supplementary information:					
Test location: SMEE – CE Mesures / Test date: November 21 <sup>st</sup> , 2011					
Power supply voltage: 230V / 50Hz (PC laptop)					

<b>Test Equipment Used</b>					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Log-periodic antenna	TDK	PLP3003	ANT-101-001	2011/8	2012/8
Biconic antenna	COM-POWER	AB- 900	ANT-101-003	2011/8	2012/8
RF cable	Div	2m	CAB-101-011	2011/3	2012/3
RF cable	Div	OATS/25m	CAB-101-017	2011/3	2012/3
GTEM cell	TESEQ	750	GTE-101-001	2011/3	2012/3
OATS	Div	3 / 10m	SIT-101-001	2011/8	2012/8
Antenna mast	Innco- Systems	MA4000EP	MAT-101-001	-	-
Turntable	Innco- Systems	DS1200S	PLA-101-001	-	-
Measuring Rec	Rohde&Schwarz	ESL3	REC-101-001	2010/3	2012/3

**Photo of test setup for Radiated Disturbance**

**Tabulated Results for Radiated Disturbance (3m measurement on Open Area Test Site)  
30MHz-1GHz**

Test Frequency (MHz)	Meter Reading dB(µV)	Detector (Pk/QP/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Total Factor(dB)	Level dB(µV/m)	Limit dB(µV/m)	Margin (dB)
120.0	20.0	QP	V	270	100	14.8	<b>34.8</b>	43.5	8.7

Supplementary information:

Frequency list measured on the Open Area Test Site has been created with pre-scan results.

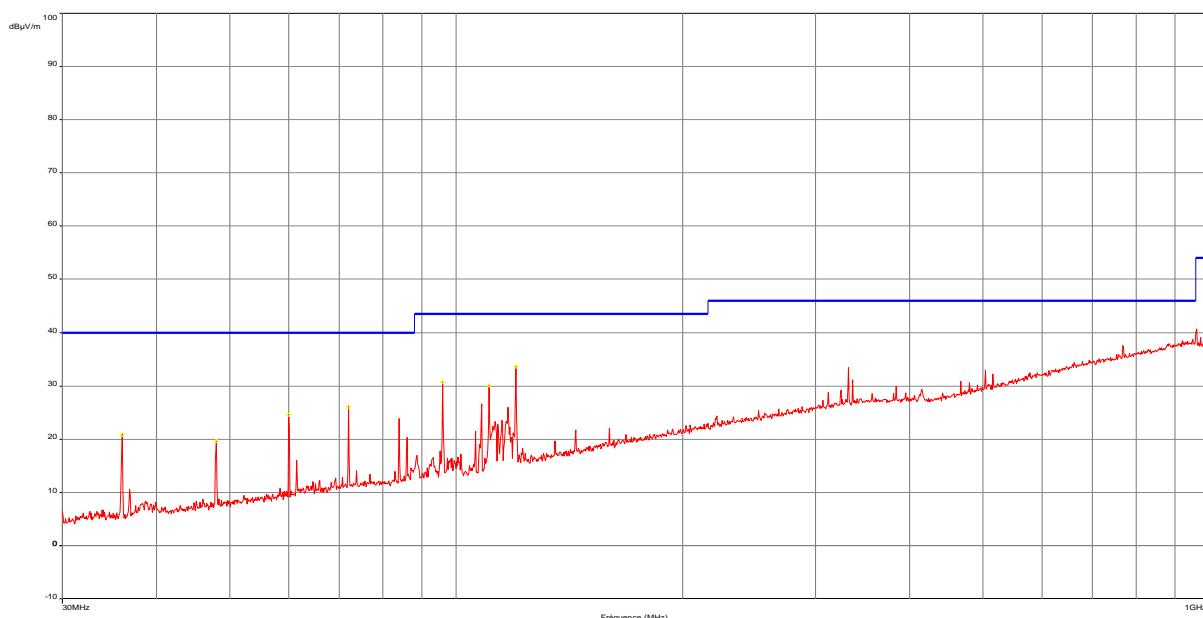
<b>Frequency band investigated:</b>	30MHz-1GHz
<b>RBW:</b>	120kHz
<b>Measurement distance:</b>	3m
<b>Limit:</b>	15.109
<b>Final measurement detector:</b>	Quasi-Peak
<b>Wide Measurement Uncertainty:</b>	± 5.2dB (k=2)
<b>Field Strength Calculation:</b>	<p>The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:</p> $FS = RA + AF + CF - AG$ <p>Where FS = Field Strength            RA = Receiver Amplitude            AF = Antenna Factor            CF = Cable Factor            AG = Amplifier Gain</p>



## Rapport d'essais / Test Report

N°: 20020-FCC-1

### Graphical representation of Radiated Disturbance Measurement (Peak detection, GTEM pre-scan)



----- : Peak measure

Frequency (MHz)	Level (dB $\mu$ V/m)
36.00	20.8
48.00	19.6
60.00	24.6
72.00	26.0
96.00	30.7
120.00	33.6

Note: Pre-scan graph only for identification purpose.



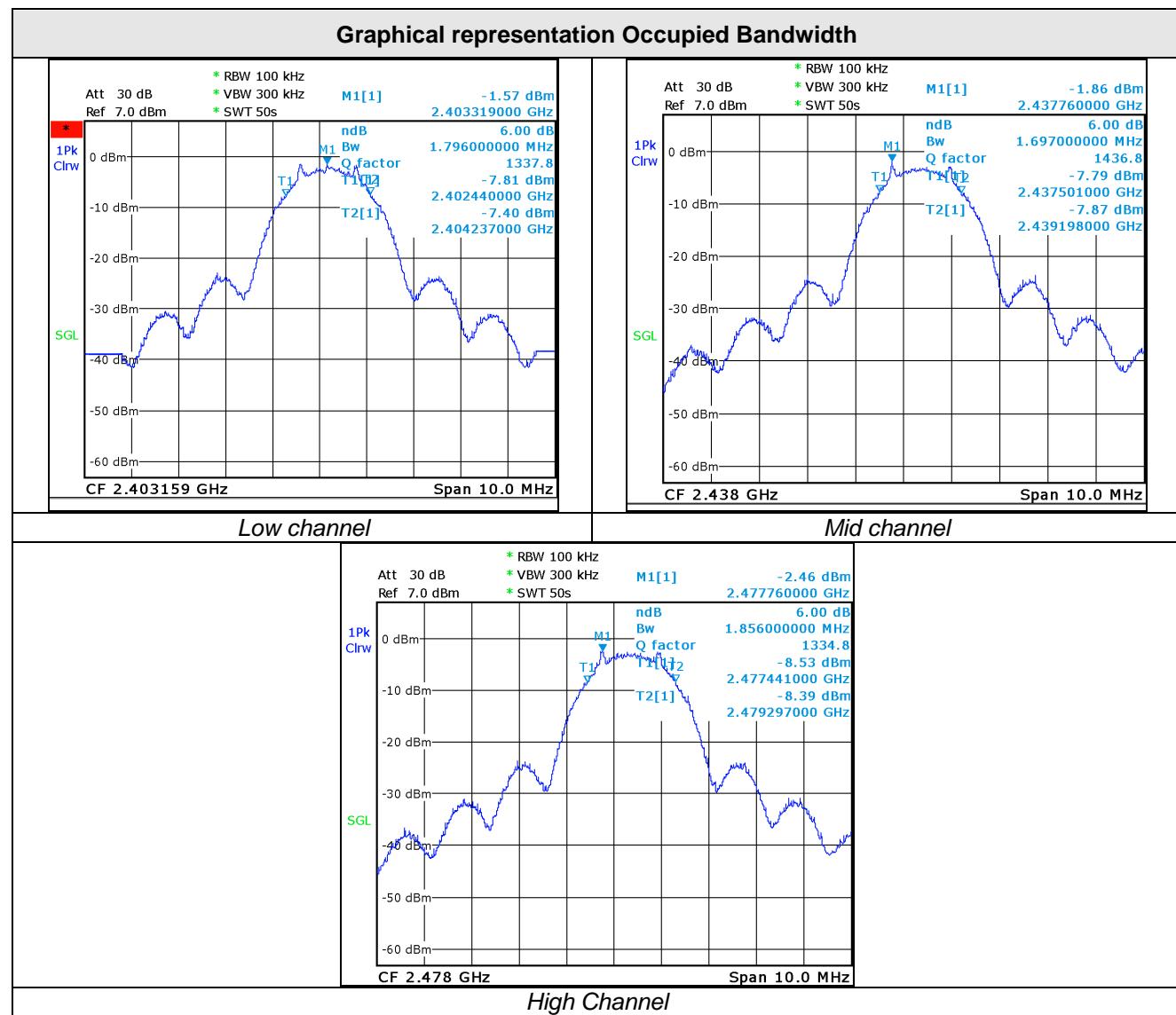
# Rapport d'essais / Test Report

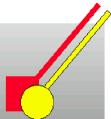
N°: 20020-FCC-1

## 7. Occupied bandwidth

TEST: Minimum 6dB bandwidth for system using Digital Modulation Techniques (Clause 15.247 (a) (2))	Verdict
<p>Method: Measurements were performed with peak detector using a 100kHz RBW. The VBW is set to 300kHz. The spectrum analyzer is connected via suitable means to the RF output of the tested equipment. The tested equipment is set to transmit operation with nominal modulation on lowest, middle and highest channel.</p> <p>Limits: The minimum 6 dB bandwidth shall be at least 500 kHz.</p>	Pass
Supplementary information:	
Test location: SMEC – CE Mesures / Test date: November 22 <sup>st</sup> , 2011	
Power supply voltage: 5V from USB port	

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Measuring Rec.	Rohde&Schwarz	ESL3	REC-101-001	2010/3	2012/3





SMEE

## Rapport d'essais / Test Report

N°: 20020-FCC-1

### Tabulated Results for Occupied Bandwidth

FREQ (MHz)	6dB bandwidth (MHz)	Limit	Result
2403	1.796	Shall be > 0.5MHz	PASS
2438	1.697	Shall be > 0.5MHz	PASS
2478	1.856	Shall be > 0.5MHz	PASS

## 8. Maximum Peak Conducted Output power

TEST: Maximum peak conducted output power (Clause 15.247 (b) (2))	Verdict																																																						
<p>Method: Measurements were performed with peak detector using a 10MHz RBW. The VBW is set to 10MHz. The spectrum analyzer is connected via suitable means to the RF output of the tested equipment. (Conducted measurement). For field strength, the measure is performed on a 3m Open Area Test Site. The tested equipment is set to transmit operation with nominal modulation on lowest, middle and highest channel.</p> <p>Limits: 1W or 30dBm (conducted) / 36dBm with antenna gain.</p>	Pass																																																						
<p>Supplementary information:</p> <p>Test location: SMEE – CE Mesures / Test date: November 22<sup>st</sup>, 2011</p> <p>Power supply voltage: 5V from USB port</p>																																																							
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<table border="1"> <thead> <tr> <th>Description</th><th>Manufacturer</th><th>Model</th><th>Identifier</th><th>Cal. Date</th><th>Cal. Due</th></tr> </thead> <tbody> <tr> <td>Measuring Rec.</td><td>Rohde&amp;Schwarz</td><td>ESL3</td><td>REC-101-001</td><td>2010/3</td><td>2012/3</td></tr> <tr> <td>Log-periodic antenna</td><td>TDK</td><td>PLP3003</td><td>ANT-101-001</td><td>2011/8</td><td>2012/8</td></tr> <tr> <td>RF cable</td><td>Div</td><td>OATS/10m</td><td>CAB-101-020</td><td>2011/3</td><td>2012/3</td></tr> <tr> <td>OATS</td><td>Div</td><td>3 / 10m</td><td>SIT-101-001</td><td>2011/8</td><td>2012/8</td></tr> <tr> <td>Antenna mast</td><td>Innco- Systems</td><td>MA4000EP</td><td>MAT-101-001</td><td>-</td><td>-</td></tr> <tr> <td>Turntable</td><td>Innco- Systems</td><td>DS1200S</td><td>PLA-101-001</td><td>-</td><td>-</td></tr> <tr> <td>Reference comb gen.</td><td>SMEE</td><td>EMR-10M</td><td>REF-111-002</td><td>-</td><td>-</td></tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>		Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due	Measuring Rec.	Rohde&Schwarz	ESL3	REC-101-001	2010/3	2012/3	Log-periodic antenna	TDK	PLP3003	ANT-101-001	2011/8	2012/8	RF cable	Div	OATS/10m	CAB-101-020	2011/3	2012/3	OATS	Div	3 / 10m	SIT-101-001	2011/8	2012/8	Antenna mast	Innco- Systems	MA4000EP	MAT-101-001	-	-	Turntable	Innco- Systems	DS1200S	PLA-101-001	-	-	Reference comb gen.	SMEE	EMR-10M	REF-111-002	-	-						
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due																																																		
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Reference comb gen.	SMEE	EMR-10M	REF-111-002	-	-																																																		

Tabulated Results for Maximum peak output power (Conducted measurement)				
FREQ (MHz)	Peak Power conducted (dBm)	Limit (dBm)	Result	
2403	1.3	30.0	PASS	
2438	1.7	30.0	PASS	
2478	1.9	30.0	PASS	

Tabulated Results for Maximum peak output power (Radiated measurement)				
FREQ (MHz)	Field Strength 3m (dB $\mu$ V/m)	Calculated EIRP (dBm)	Limit (dBm)	Result
2403	100.4	5.0	36.0	PASS
2438	102.3	6.9	36.0	PASS
2478	100.9	5.5	36.0	PASS

Note: Field strength is measured on the Open Area Test Site at a distance of 3m. Three orthogonal axis measurement is performed for both horizontal and vertical antenna (measure) polarization in order to obtain the maximum peak field strength.

The power (EIRP) was calculated using the following equation:

$$\text{EIRP} = (E \times d)^2/30$$

Where D is the distance in meters from which the field strength was measured

E is the maximum field strength in V/m



## 9. Spurious Emissions

<b>TEST: Spurious Emissions</b>		<b>Verdict</b>
<p>Method: Measurements were made in a 3-meter Open Area Test Site (OATS) that complies to CISPR 16 and ANSI C63.4 requirements. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3 meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable. EUT is placed 80cm above the ground reference plane.</p> <p>A pre-scan frequency identification of the EUT has been performed in a GTEM cell. The measured radiated field of the EUT is correlated to the corresponding measurement distance.</p> <p>The algorithm used for calculation is 3 axes measurement.</p> <p>The pre-characterization graphs are obtained in PEAK detection. For frequency above 1GHz, a manual scan is performed.</p>		<b>Pass</b>
<b>Laboratory Parameters:</b>		
Ambient Temperature	10 to 40 °C	21°C
Relative Humidity	10 to 90 %	55%
Fully configured sample scanned over the following frequency range	Frequency range on each side of line	Measurement Point
	9kHz – 25GHz	3m distance
<b>Limits – Part 15C, clause 15.247 (d)</b>		
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radiofrequency 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. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a).		
Supplementary information: Test location: SMEC – CE Mesures / Test date: November 22 <sup>st</sup> , 2011 Power supply voltage: 5V from USB port		



# Rapport d'essais / Test Report

N°: 20020-FCC-1

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Log-periodic antenna	TDK	PLP3003	ANT-101-001	2011/8	2012/8
Biconic antenna	COM-POWER	AB- 900	ANT-101-003	2011/8	2012/8
Horn antenna	COM-POWER	AH-118	ANT-101-004	2010/3	2013/3
RF cable	Div	2m	CAB-101-011	2011/3	2012/3
RF cable	Div	OATS/25m	CAB-101-019	2011/3	2012/3
RF cable	Div	OATS/10m	CAB-101-020	2011/3	2012/3
GTEM cell	TESEQ	750	GTE-101-001	2011/3	2012/3
OATS	Div	3 / 10m	SIT-101-001	2011/8	2012/8
Antenna mast	Innco- Systems	MA4000EP	MAT-101-001	-	-
Turntable	Innco- Systems	DS1200S	PLA-101-001	-	-
Measuring Rec	Rohde&Schwarz	ESL3	REC-101-001	2010/3	2012/3
Spectrum Analyzer	HP / Agilent	8563E	ASP-111-003	2010/9	2012/9
Pre-amplifier	PE	PE1524	PRE-101-002	2010/3	2012/3
Reference comb gen.	SMEE	EMR-10M	REF-111-002	-	-

## Tabulated Results for Spurious Emissions – EUT emitting on low channel (2403MHz)

No	Frequency	Measured field (MHz)	Limit (dB $\mu$ V/m)	Margin (dB)	Peak / Average	Comments
1	2403	98.9	-	-	PK	Fundamental (100kHz)
2	4806	67.5	74.0	6.5	PK	Restricted band
	4806	52.5	54.0	1.5	AV	Restricted band
3	7209	35.6	78.9	43.3	PK	
4	9612	41.3	78.9	37.6	PK	

## Tabulated Results for Spurious Emissions – EUT emitting on mid channel (2438MHz)

No	Frequency	Measured field (MHz)	Limit (dB $\mu$ V/m)	Margin (dB)	Peak / Average	Comments
1	2438	100.8	-	-	PK	Fundamental (100kHz)
2	4876	66.9	74.0	7.1	PK	Restricted band
	4876	51.9	54.0	2.1	AV	Restricted band
3	7314	35.6	74.0	38.4	PK	Restricted band
4	9752	41.3	80.8	39.5	PK	



# Rapport d'essais / Test Report

N°: 20020-FCC-1

## Tabulated Results for Spurious Emissions – EUT emitting on high channel (2478MHz)

No	Frequency (MHz)	Measured field (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Peak / Average	Comments
1	2478	99.4	-	-	PK	Fundamental (100kHz)
2	4956	66.0	74.0	<b>8.0</b>	PK	Restricted band
	4956	51.0	54.0	<b>3.0</b>	AV	Restricted band
3	7434	35.6	74.0	<b>38.4</b>	PK	Restricted band
4	9912	41.3	79.4	<b>38.1</b>	PK	

Note 1: Peak measurement with 100 kHz RBW and VBW when frequency outside restricted bands.

Peak measurement with 1MHz RBW and VBW when frequency in restricted bands.

Note 2: Average measurement with 1MHz RBW and 10Hz VBW when frequency in restricted bands.

(The average emissions were further correcting for the duty cycle of the EUT: -5.7dB)

Note 3: All other frequencies are not traceable

Note 4: Worst case measurement for three orthogonal axis of EUT, with or without USB extension cable.

Note 5: The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength

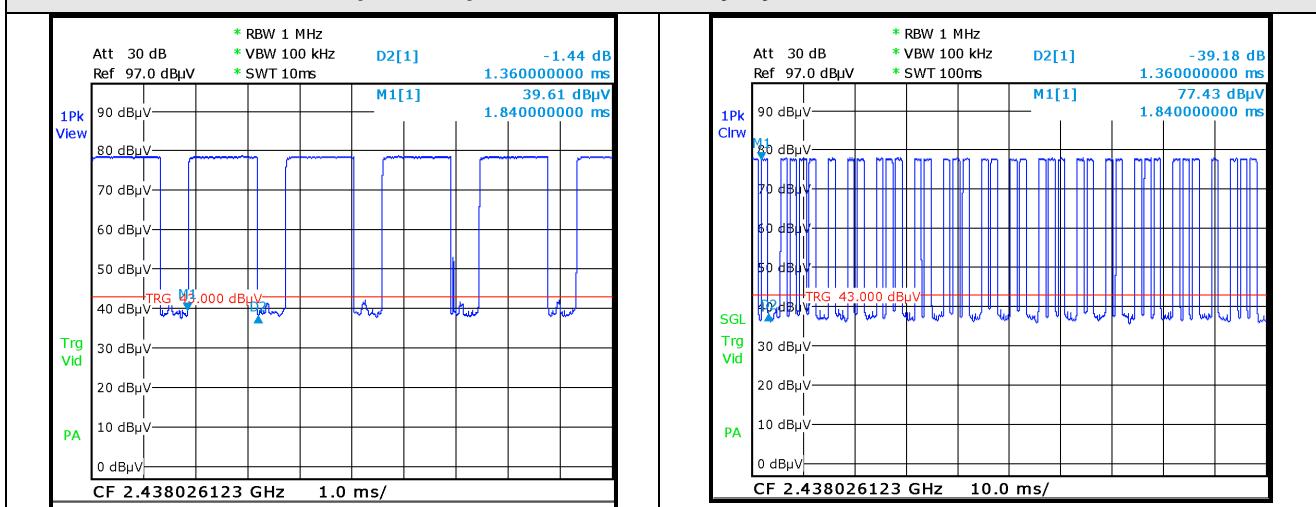
RA = Receiver Amplitude

AF = Antenna Factor

CF = Cable Factor

AG = Amplifier Gain

## Graphical representation for Duty Cycle corrector factor



Pulse width : 1.36ms

Number of pulse within 100ms: 38

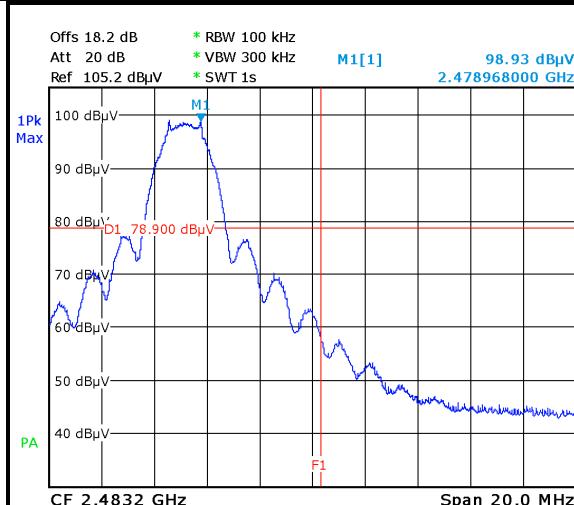
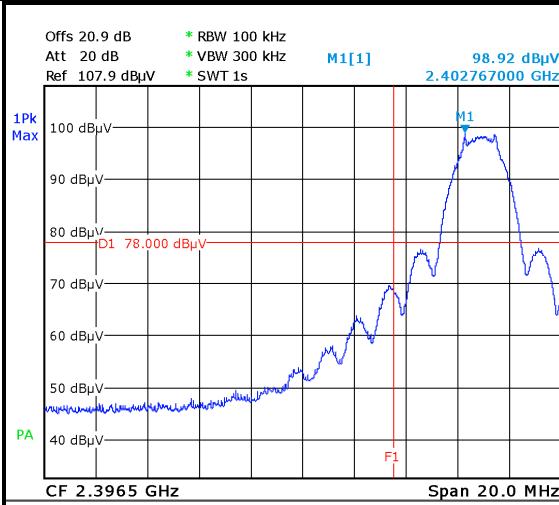
Duty cycle average factor =  $20\log(1.36*38/100) = -5.7\text{dB}$



# Rapport d'essais / Test Report

N°: 20020-FCC-1

## Graphical representation of Bandedge compliance



### Low bandedge compliance

F1: 2400MHz  
Peak level at 2400MHz is below 70dB $\mu$ V/m (limit is 78.9dB $\mu$ V/m)  
RESULT: PASS

### High bandedge compliance

F1: 2483.5MHz  
Peak level at 2483.5MHz is 59.0 dB $\mu$ V/m  
Peak Marker delta is -39.9dB  
Radiated Peak level is 61.0dB $\mu$ V/m (limit 74dB $\mu$ V/m)  
Radiated Average level is 45.3dB $\mu$ V/m (limit 54dB $\mu$ V/m)  
(Measure include duty cycle factor of -5.7dB)  
RESULT: PASS



## Rapport d'essais / Test Report

N°: 20020-FCC-1

### 10. Peak Power Spectral Density

TEST: Peak Power Spectral Density (15.247 (e))	Verdict
Method: The peak power density was measured in accordance with the FCC publication "Guidance on Measurements for Digital Transmission Systems". The emission peak within the passband was located and zoomed in. The spectrum analyzer RBW was 3kHz and VBW was 10kHz. A peak detector using the max hold function was utilized. Limits: Shall not be greater than 8dBm in any 3 kHz band	Pass
Supplementary information: Test location: SMEE – CE Mesures / Test date: November 22 <sup>st</sup> , 2011 Power supply voltage: 5V from USB port	

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Measuring Rec.	Rohde&Schwarz	ESL3	REC-101-001	2010/3	2012/3

Tabulated Results for peak power spectral density			
FREQ (MHz)	Peak PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
2403	-14.2	8.0	PASS
2438	-15.4	8.0	PASS
2478	-15.1	8.0	PASS