

Matériel testé :  
*Equipment under test:*

**i-Q350 RMU**

Constructeur:  
*Manufacturer:* **IDENEC SOLUTIONS AG**  
Millennium Park 2  
A-6890 Lustenau - Austria

Rapport délivré à :  
*Issued to:* **IDENEC SOLUTIONS AG**  
Millennium Park 2  
A-6890 Lustenau - Austria

Référence de la proposition : 032016-21869  
*Proposal number:*

Date de l'essai : Du 18 au 24 mai 2016 / 25 juin 2016  
*Date of test:* May 18<sup>th</sup> to 24<sup>th</sup>, 2016 / June 25<sup>th</sup>, 2016

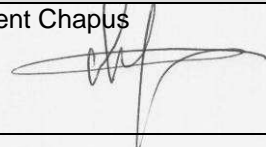
Objectif des essais : EMC qualification accordingly to following standards:  
*Test purpose:*  
- CFR 47, FCC Part 15, Subpart C  
(Chapter 15.249 - Operation within the bands 902–928 MHz, 2400–2483.5 MHz, 5725–5875 MHz, and 24.0–24.25 GHz)  
- Industry Canada RSS-Gen Issue 4 & RSS-210 Issue 8+A1 section A2.9  
(Bands 902–928, 2400–2483.5 and 5725–5875 MHz)

FCC ID: OO4-ILR-IQ350RMU  
IC ID : 3538A-IQ350RMU  
Model : i-Q350 (RMU and RMU-B3m)

Lieu du test: SMEE CE-Mesures  
*Test location:* 38 VOIRON - France

Test réalisé par : Jérémy BLANCHER  
*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:	Approved by: Visa
1	June 14 <sup>th</sup> , 2016	Initial Edition	Jeremy Blancher	Laurent Chapus 
2	June 30 <sup>th</sup> , 2016	Added reference to RMU-B3m		

La copie de ce document n'est permise que sous sa forme intégrale. Ce document est le résultat d'essais effectués sur un échantillon. Il ne préjuge pas de la conformité de l'ensemble des produits fabriqués à l'objet essayé.

*This document shall not be reproduced, except in full. This document contains results related only to the item tested. It does not imply the conformity of the whole production to the item tested.*

**COORDONNEES**

SMEE  
Rue de Taille – ZI Des Blanchisseries  
38500 VOIRON - France

TEL : 04 76 65 76 50  
FAX : 04 76 66 18 30

SAS au capital de 50 000 € / RC Grenoble B534 796 453 / SIRET 534 796 453 00015 / code APE 7490B / n° TVA : FR 59 534 796 453

**Sommaire / Contents**

1. NORMATIVES REFERENCES .....	3
2. TEST SYNTHESIS.....	4
3. EQUIPMENT UNDER TEST (EUT).....	5
4. TEST CONDITIONS.....	6
5. MODIFICATIONS OF THE EUT.....	6
6. SPECIAL ACCESSORY.....	6
7. FIELD STRENGTH OF FUNDAMENTAL .....	7
8. FIELD STRENGTH OF HARMONICS.....	9
9. UNWANTED EMISSIONS.....	12
10. 99% OCCUPIED BANDWIDTH .....	29

**1. Normatives References**

FCC qualification following:		
Standards	Applied	Title
ANSI C63.4 (2014)	X	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 (2013)	X	American National Standard for Testing Unlicensed Wireless Devices
CFR47, Part 15	X	Telecommunication – Federal Communication Commission – Radio frequency devices, Sections 15.107 / 15.109 / 15.207 / 15.209 / 15.249

Industry Canada qualification following:		
Standards	Applied	Title
RSS-Gen (Issue 4/2014)	X	General Requirements and Information for the Certification of Radio Apparatus
RSS-210 (Issue8/2010+A1)	X	Licence-exempt Radio Apparatus: Category I Equipment, Section A2.9: Devices Operating in Frequency Bands for Any Application, Band 902-928

## 2. Test synthesis

TEST	Paragraph number FCC Part 15 IC RSS-210	Spec. FCC Part 15 IC RSS-210	RESULTS (comments)
<b>Conducted emissions test</b>	15.107 (a) / 15.207 (a) ICES-003: Issue 6, §6.1 RSS-Gen: Issue 8, §8.8	Table 15.107 (a) / 15.207 (a) Table §6.1 Table §8.8	N/A (1)
<b>Radiated emission test</b>	15.109 (a) ICES-003: Issue 6, §6.2	Table 15.109 (a) Table §6.2	N/A (2)
<b>Field Strength of fundamental</b>	15.249 (a) (c) RSS-210: Issue 8, §A2.9 (a)	94dB $\mu$ V/m @3m (50mV/m @ 3m)	<b>PASS</b>
<b>Field Strength of harmonics</b>	15.249 (a) (c) (e) RSS-210: Issue 8, §A2.9 (a)	54dB $\mu$ V/m @3m (0.5mV/m @ 3m)	<b>PASS</b>
<b>Unwanted emissions outside the specified frequency band and harmonics</b>	15.209 / 15.249 (d) (e) RSS-210: Issue 8, §A2.9 (b) / RSS-Gen: Issue 4, §6.13	Whichever is less stringent, either:  - 50dB below level of fundamental, or; - Table part 15.209 (a), as follow <u>Measure at 300m</u> 9-490kHz: 2400 $\mu$ V/m/F(kHz) <u>Measure at 30m</u> 0.490-1.705: 24000 $\mu$ V/m/F(kHz) 1.705-30MHz: 30 $\mu$ V/m <u>Measure at 3m</u> 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>
<b>Occupied Bandwidth</b>	RSS-Gen: Issue 4, §6.6	BW at 99%	<b>PASS</b>

N/A: Not Applicable

(1): No power cable

(2): Equipment functioning only with RF function

- **General conclusion:**

Measures and tests performed on the sample of the product *i-Q350 (RMU and RMU-B3m)*, in configuration and description presented in this test report, show compliance with standards FCC CFR 47, PART 15, Subpart C and Industry Canada RSS-Gen & RSS-210.

### 3. Equipment Under Test (EUT)

Nom /  
Identification

**i-Q350  
(RMU and RMU-B3m)**

Sn: 0.420.031.400

Alimentation /  
Power supply

3.6V dc from internal Li-SOCl<sub>2</sub> battery

Auxiliaires /  
Auxiliaries

i-PORT M350-2, IDENTEC SOLUTIONS product  
(RF configuration and communication only)  
(FCC ID: OO4-ILR-IPM350N / IC ID: 3538A-IPM350N)

Sn: 14288M3401

Entrées-Sorties /  
Input / Output

	Câbles pour essai / Cables for test	Blindé / Shielded	Prévu pour >3m / Intended for >3m
4 points cable	1m or 3m* 4 wires	No	No (max 3m)

\* depending on type version:

- RMU: 1m
- RMU-B3m: 3m with breakaway connector (Added connector at 1m from equipment)

Version programme /  
Firmware version

N.C

Mode de fonctionnement /  
Running mode

The tested sample is able to:

- Transmit a carrier frequency on low, middle and high channels (903MHz / 915MHz / 927MHz)
- Communicate with ancillary equipment
- Be in Receiver mode (no transmission)
- Be in standby mode (no transmission)

Programme de test /  
Test program /

Gen3 Tag Certification v1.0.0.24915

#### • Equipment information:

- Frequency band: 902 to 928 MHz (Frequencies from 903MHz to 927MHz, Tx & Rx)
- Frequency used in Tx/Rx mode:
  - 903MHz
  - 920MHz
  - 927MHz
- Bluetooth chip: TEXAS INSTRUMENT, model CC1101
- Equipment is configured with **-6dBm** nominal output power by internal firmware (Transmit code in decimal is **55**).
- Modulation: FSK ( $\pm 20$ kHz)
- Antenna type: Integral (PCB antenna, max antenna gain 0dBi )
- Powered by 3.6V DC Li-SOCl<sub>2</sub> internal battery (non-rechargeable)
- Equipment intended for use as a fixed station
- Equipment designed for continuous operation

#### **4. Test conditions**

Relative Humidity : 55%  
Temperature : 20°C

Power supply voltage:

Equipment under test : 3.6V DC from Li-SOCl<sub>2</sub> battery

#### **5. Modifications of the EUT**

None

#### **6. Special accessory**

None

**7. Field Strength of fundamental**

TEST: Field strength of fundamental / FCC part 15.249 – RSS 210		Verdict
<p><b>Method:</b> Measurements were made in a 3-meter Open Area Test Site (OATS) that complies to ANSI C63.4 and RSS-Gen. Measurements were performed with peak detector using a 100kHz RBW. The VBW is set to 300kHz. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (Peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. The tested equipment is set to transmit operation with modulations on lowest, middle and highest channel. Three orthogonal axis measurements on EUT are performed to obtain the maximum peak field strength.</p>		<b>Pass</b>
Laboratory Parameters:	Required prior to the test	During the test
Ambient Temperature	10 to 40 °C	13°C
Relative Humidity	10 to 90 %	60%
<b>Limits – FCC Part 15.249 (a) (c) / RSS-210 §A2.9 (a)</b>		
Frequency (MHz)	Limits (dBµV/m)	
	Level / Detector / Distance	Results
902 to 928 MHz	94dBµV/m / Pk / 3m	<b>Pass</b>
Supplementary information: Test location: SMEE – CE Mesures / Test date: May 19 <sup>th</sup> , 2016 and June 25 <sup>th</sup> , 2016 Power supply voltage: 3.6V from battery (fully charged)		

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Measuring Rec.	Rohde&Schwarz	ESRP	REC-151-002	2015/7	2018/7
Log-periodic antenna	TDK	PLP3003	ANT-101-001	2015/8	2016/8
RF cable	Div	OATS/25m	CAB-101-017	2016/3	2017/3
OATS	Div	3 / 10m	SIT-101-001	2015/8	2016/8
Antenna mast	Innco- Systems	MA4000EP	MAT-101-001	-	-
Turntable	Innco- Systems	DS1200S	PLA-101-001	-	-

Tabulated Results for Field Strength of fundamental			
FREQ (MHz)	Field Strength 3m (dBμV/m)	Limit (dBμV/m)	Result
903,0	93,0	94,0	Pass
915,0	92,6	94,0	Pass
927,0	92,9	94,0	Pass
<b>RBW:</b>	100kHz		
<b>Measurement distance:</b>	3m		
<b>Limit:</b>	FCC Part 15.249 (a) (c) / RSS-210 §A2.9		
<b>Final measurement detector:</b>	Peak		
<b>Wide Measurement Uncertainty:</b>	± 5.2dB (k=2)		
<b>RESULT:</b>	PASS		
<b>Note:</b>	<p>(1): The field strength (level) is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation is as follow:  <math display="block">FS = RA + AF + CF - AG</math>           Where FS = Field Strength            RA = Receiver Amplitude            AF = Antenna Factor            CF = Cable Factor            AG = Amplifier Gain            Total factor (dB) is AF + CF – AG            Margin value = Emission level – Limit value</p> <p>(2): EIRP is calculated using the following equation:  <math display="block">EIRP = E + 20 \times \log(D) - 104.8 - GR</math>           Where EIRP = Equivalent Isotropic Radiated Power in dBm            E = Electric field strength in dBμV/m            D = Measuring distance in meter            GR = Ground reflection in dB (4.7dB for 30MHz – 1GHz band)</p> <p>(3): Same results with version RMU or RMU-B3m</p>		



**8. Field Strength of harmonics**

<b>TEST: Field Strength of harmonics / FCC part 15.249 – RSS-210</b>		<b>Verdict</b>
<p><u>Method:</u> Measurements were made in a 3-meter Open Area Test Site (OATS) that complies to ANSI C63.4 and RSS-Gen.</p> <p>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) 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>The tested equipment is set to transmit operation with modulations on lowest, middle and highest channel. Three orthogonal axis measurements on EUT are performed to obtain the maximum peak field strength.</p> <p>A pre-scan frequency identification of the EUT has been performed in full anechoic chamber. The measured radiated field of the EUT is realised at 3-meters of distance. Antenna is 1.25-meters high.</p>		<b>Pass</b>
Laboratory Parameters:	<p>Required prior to the test</p> <p>During the test</p>	
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
	30MHz – 9.3GHz	3 m measurement distance
<b>Limits – FCC Part 15.249 (a) (c) (e) / RSS-210 §A2.9 (a)</b>		
Frequency bands for harmonics (MHz)	Limits (dBµV/m)	
	Level / Detector / Distance	Results
1804 to 1856	54.0 / AV / 3m 74.0 / PK / 3m	<b>Pass</b>
2706 to 2784	54.0 / AV / 3m 74.0 / PK / 3m	<b>Pass</b>
3608 to 3712	54.0 / AV / 3m 74.0 / PK / 3m	<b>Pass</b>
4510 to 4640	54.0 / AV / 3m 74.0 / PK / 3m	<b>Pass</b>
5412 to 5568	54.0 / AV / 3m 74.0 / PK / 3m	<b>Pass</b>
6314 to 6496	54.0 / AV / 3m 74.0 / PK / 3m	<b>Pass</b>
7216 to 7424	54.0 / AV / 3m 74.0 / PK / 3m	<b>Pass</b>
8118 to 8352	54.0 / AV / 3m 74.0 / PK / 3m	<b>Pass</b>
9020 to 9280	54.0 / AV / 3m 74.0 / PK / 3m	<b>Pass</b>
<p>Supplementary information:            Test location: SMEE – CE Mesures / Test date: May 19<sup>th</sup>, 2016 and June 25<sup>th</sup>, 2016            Power supply voltage: 3.6V from battery (fully charged)</p>		

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Log-periodic antenna	TDK	PLP3003	ANT-101-001	2015/8	2016/8
Biconnic antenna	COM-POWER	AB- 900	ANT-101-003	2015/8	2016/8
Loop antenna	EMCO	6502	ANT-101-009	2015/3	2016/3
BiConiLog antenna	EMCO	3142B	ANT-101-010	2015/8	2016/8
Horn antenna	ETS-LINDGREN	3115	ANT-141-013	2015/7	2018/7
RF cable	Div	OATS/25m	CAB-101-019	2016/3	2017/3
RF cable	Pasternack	PE302-120	CAB-131-024	2016/3	2017/3
RF cable	HUBER+SUHNER	RG214U	CAB-141-026	2016/3	2017/3
RF cable	HUBER+SUHNER	RG214U	CAB-141-029	2016/3	2017/3
RF cable	HUBER+SUHNER	SF104	CAB-141-030	2016/3	2017/3
High-pass filter	Mini-Circuit	VHF-3100+	FIL-151-006	2016/3	2017/3
Pre-amplifier	PE	PE1524	PRE-101-002	2016/3	2017/3
Anechoic chamber	COMTEST	214263	CAG-141-001	-	-
OATS	Div	10m	SIT-101-001	2015/8	2016/8
Antenna mast	Innco- Systems	MA4000EP	MAT-101-001	-	-
Turntable	Innco- Systems	DS1200S	PLA-101-001	-	-
Turntable	Innco- Systems	CT0800	PLA-141-001	-	-
Measuring Rec	Rohde&Schwarz	ESRP	REC-151-002	2015/7	2018/7
Spectrum analyzer	AGILENT HP	8563E	ASP-111-003	2013/9	2016/9

Tabulated Results for Field strength of harmonics (1GHz-9.3GHz)				
FREQ (MHz)	Field level dB $\mu$ V/m	Detector	Limit (dB $\mu$ V/m)	Result
1806,0	47,1	Pk	54 Av / 74 Pk	Pass
1830,0	48,1	Pk	54 Av / 74 Pk	Pass
1853,0	48,7	Pk	54 Av / 74 Pk	Pass
2709,0	49,1	Pk	54 Av / 74 Pk	Pass
2745,0	49,6	Pk	54 Av / 74 Pk	Pass
2780,0	49,7	Pk	54 Av / 74 Pk	Pass
3612,0	45,8	Pk	54 Av / 74 Pk	Pass
3660,0	46,2	Pk	54 Av / 74 Pk	Pass
3708,0	44,9	Pk	54 Av / 74 Pk	Pass
4515,0	49,1	Pk	54 Av / 74 Pk	Pass
4575,0	50,6	Pk	54 Av / 74 Pk	Pass
4635,0	50,5	Pk	54 Av / 74 Pk	Pass
5418,0	45,4	Pk	54 Av / 74 Pk	Pass
5490,0	46,2	Pk	54 Av / 74 Pk	Pass
5562,0	45,6	Pk	54 Av / 74 Pk	Pass
6321,0	48,4	Pk	54 Av / 74 Pk	Pass
6405,0	48,7	Pk	54 Av / 74 Pk	Pass
6489,0	49,1	Pk	54 Av / 74 Pk	Pass
7224,0	48,6	Pk	54 Av / 74 Pk	Pass
7320,0	49,1	Pk	54 Av / 74 Pk	Pass
7416,0	48,7	Pk	54 Av / 74 Pk	Pass
8127,0	48,4	Pk	54 Av / 74 Pk	Pass
8235,0	49,0	Pk	54 Av / 74 Pk	Pass
8343,0	49,2	Pk	54 Av / 74 Pk	Pass
9030,0	47,9	Pk	54 Av / 74 Pk	Pass
9150,0	48,2	Pk	54 Av / 74 Pk	Pass
9270,0	48,4	Pk	54 Av / 74 Pk	Pass
<b>RBW / VBW</b>	1MHz / 3MHz (Peak) 1MHz / 10Hz (AV)			
<b>Measurement distance:</b>	3m			
<b>Limit:</b>	FCC Part 15.249 (a) (c) (e) / RSS-210 (a)			
<b>Final measurement detector:</b>	Peak / Average			
<b>Wide Measurement Uncertainty:</b>	$\pm 5.2$ dB (k=2)			
<b>RESULT:</b>	PASS			
<b>Notes:</b>	<p>(1): The field strength (level) is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation is as follow:  <math>FS = RA + AF + CF - AG</math>            Where FS = Field Strength            RA = Receiver Amplitude            AF = Antenna Factor            CF = Cable Factor            AG = Amplifier Gain            Total factor (dB) is AF + CF - AG            Margin value = Emission level - Limit value</p> <p>(2): Test performed on OATS at 3m distance</p> <p>(3): For peak measurement below average limit, no test performed with average detector.</p> <p>(4): Same results with version RMU or RMU-B3m</p>			

## 9. Unwanted emissions

<b>TEST: Unwanted emissions outside fundamental and harmonics bands / FCC part 15.209, 15.249 - RSS-Gen</b>		<b>Verdict</b>
<p><u>Method:</u> Measurements were made in a 10 or 3-meter Open Area Test Site (OATS) that complies to ANSI C63.4. 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, Average) 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 full anechoic chamber. The measured radiated field of the EUT is realised at 3-meters of distance. Antenna is 1.25-meters high.</p>		<b>Pass</b>
Laboratory Parameters:	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
	9kHz – 30MHz	10 m measurement distance
	30MHz – 9.3GHz	3 m measurement distance
<b>Limits – FCC Part 15.209, 15.249 (d) (e) / RSS-Gen §6.13, RSS-210 (b)</b>		
<b>Whichever is less stringent, either:</b>		
Frequency (MHz)	Limits (dBµV/m)	
	Level / Detector / Distance	Results
30 to 1000	50dB below the fundamental / QP / 3m	Not used
Above 1GHz	50dB below the fundamental / Av / 3m 30dB below the fundamental / Pk / 3m	Not used
<b>Or</b>		
Frequency (MHz)	Limits (dBµV/m)	
	Level / Detector / Distance	Results
0.009 to 0.490	107.6 to 72.9 / QP / 10m	<b>Pass</b>
0.490 to 1.705	52.9 to 42.1 / QP / 10m	<b>Pass</b>
1.705 to 30	48.6 / QP / 10m	<b>Pass</b>
30 to 88	40.0 / QP / 3m	<b>Pass</b>
88 to 216	43.5 / QP / 3m	<b>Pass</b>
216 to 960	46.0 / QP / 3m	<b>Pass</b>
960-1000	54.0 / QP / 3m	<b>Pass</b>
Above 1GHz	54.0 / AV / 3m 74.0 / PK / 3m	<b>Pass</b>
Supplementary information: Test location: SMEE – CE Mesures / Test date: May 19 <sup>th</sup> , 2016 and June 25 <sup>th</sup> , 2016 Power supply voltage: 3.6V from battery (fully charged)		

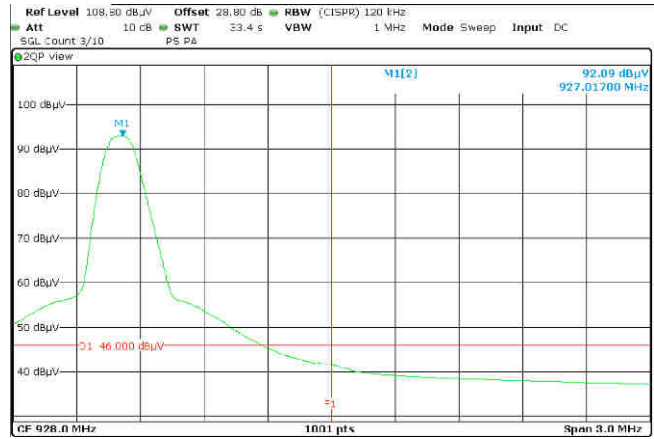
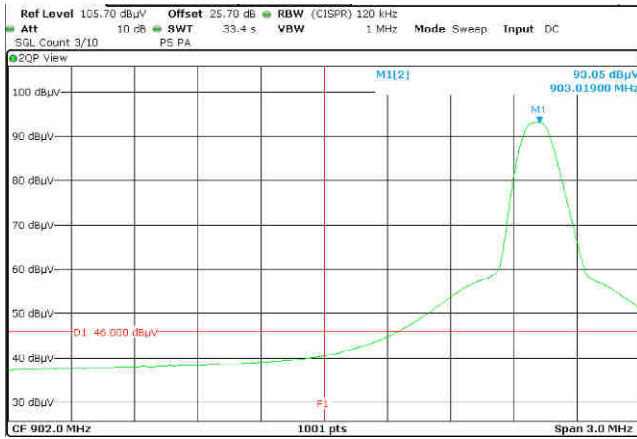
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Log-periodic antenna	TDK	PLP3003	ANT-101-001	2015/8	2016/8
Biconnic antenna	COM-POWER	AB- 900	ANT-101-003	2015/8	2016/8
Loop antenna	EMCO	6502	ANT-101-009	2015/3	2017/3
BiConiLog antenna	EMCO	3142B	ANT-101-010	2015/8	2016/8
Horn antenna	ETS-LINDGREN	3115	ANT-141-013	2015/7	2018/7
RF cable	Div	OATS/25m	CAB-101-019	2016/3	2017/3
RF cable	Pasternack	PE302-120	CAB-131-024	2016/3	2017/3
RF cable	HUBER+SUHNER	RG214U	CAB-141-026	2016/3	2017/3
RF cable	HUBER+SUHNER	RG214U	CAB-141-029	2016/3	2017/3
RF cable	HUBER+SUHNER	SF104	CAB-141-030	2016/3	2017/3
High-pass filter	Mini-Circuit	VHF-3100+	FIL-151-006	2016/3	2017/3
Pre-amplifier	PE	PE1524	PRE-101-002	2016/3	2017/3
Anechoic chamber	COMTEST	214263	CAG-141-001	-	-
OATS	Div	10m	SIT-101-001	2015/8	2016/8
Antenna mast	Innco- Systems	MA4000EP	MAT-101-001	-	-
Turntable	Innco- Systems	DS1200S	PLA-101-001	-	-
Turntable	Innco- Systems	CT0800	PLA-141-001	-	-
Measuring Rec	Rohde&Schwarz	ESRP	REC-151-002	2015/7	2018/7
Spectrum analyzer	AGILENT HP	8563E	ASP-111-003	2013/9	2016/9

Tabulated Results for Unwanted emissions (9kHz-30MHz)						
FREQ	RF field @ 30m	Limit @ 30m	Margin	Antenna angle	Table angle	Correc. Fact. (CF)
MHz	(QP) dBµV/m	(QP) dBµV/m	dB	Degree	Degree	dB
Margin > 10dB						
Supplementary information: Frequency list measured on the Open Area Test Site has been created with pre-scan results.						
<b>Frequency band investigated:</b>		9kHz-30MHz				
<b>RBW:</b>		200Hz (9kHz-150kHz) 9kHz (150kHz-30MHz)				
<b>Measurement distance:</b>		10m				
<b>Limit:</b>		FCC Part 15.209 – 15.249 / RSS-Gen §6.13 – RSS-210 §A2.3				
<b>Final measurement detector:</b>		Quasi-Peak				
<b>Wide Measurement Uncertainty:</b>		± 5 dB (k=2)				
<b>Note:</b>		CF: Correction factor = Antenna factor + Cable loss *1: Measure have been done at 10m distance and corrected according to requirements of 15.209.e) (M@30m = M@10m-19.1dB)				

Tabulated Results for Unwanted emissions (30MHz-1GHz)					
FREQ	Meter reading	Total factor	Field level	Limit	Margin
MHz	(QP) dBµV	dB	(QP) dBµV/m	(QP) dBµV/m	dB
902.0	15.1	25.7	40.8	46.0	-5.2
928.0	12.6	28.8	41.4	46.0	-4.6
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>		FCC Part 15.209 – 15.249 / RSS-Gen §6.13 – RSS-210 §A2.3			
<b>Final measurement detector:</b>		Quasi-Peak			
<b>Wide Measurement Uncertainty:</b>		± 5.2dB (k=2)			
<b>RESULT:</b>		PASS			
<b>Notes:</b>		<p>(1): The field strength (level) is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation is as follow:  <math>FS = RA + AF + CF - AG</math>            Where FS = Field Strength            RA = Receiver Amplitude            AF = Antenna Factor            CF = Cable Factor            AG = Amplifier Gain            Total factor (dB) is AF + CF – AG            Margin value = Emission level – Limit value</p> <p>(2): Limits used are FCC part 15.209 / RSS-Gen: Less stringent than fundamental field strength minus 50dB  <b>15.249 limits → 42.6dBµV/m Pk @ 3m (= 92.6dBµV/m - 50dB)</b></p> <p>(3): Same results with version RMU or RMU-B3m</p>			

Tabulated Results for Unwanted emissions (1GHz-9.3GHz)				
FREQ (MHz)	Field level dBµV/m	Detector	Limit (dBµV/m)	Result
Margin > 10dB				
<b>RBW / VBW</b>	1MHz / 3MHz (Peak) 1MHz / 10Hz (AV)			
<b>Measurement distance:</b>	3m			
<b>Limit:</b>	FCC Part 15.209 – 15.249 / RSS-Gen §6.13 – RSS-210 §A2.3			
<b>Final measurement detector:</b>	Peak / Average			
<b>Wide Measurement Uncertainty:</b>	± 5.2dB (k=2)			
<b>RESULT:</b>	PASS			
<b>Notes:</b>	<p>(1): The field strength (level) is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation is as follow:  <math>FS = RA + AF + CF - AG</math>            Where FS = Field Strength            RA = Receiver Amplitude            AF = Antenna Factor            CF = Cable Factor            AG = Amplifier Gain            Total factor (dB) is AF + CF – AG            Margin value = Emission level – Limit value</p> <p>(2): Limits used are FCC part 15.209 / RSS-Gen: Less stringent than fundamental field strength minus 50dB  <b>15.249 limits → 42.6dBµV/m Av @ 3m</b> (= 92.6dBµV/m - 50dB)</p> <p>(3): Same results with version RMU or RMU-B3m</p>			

## Graphical representation of Band-edge compliance (Radiated)



### Low band-edge compliance

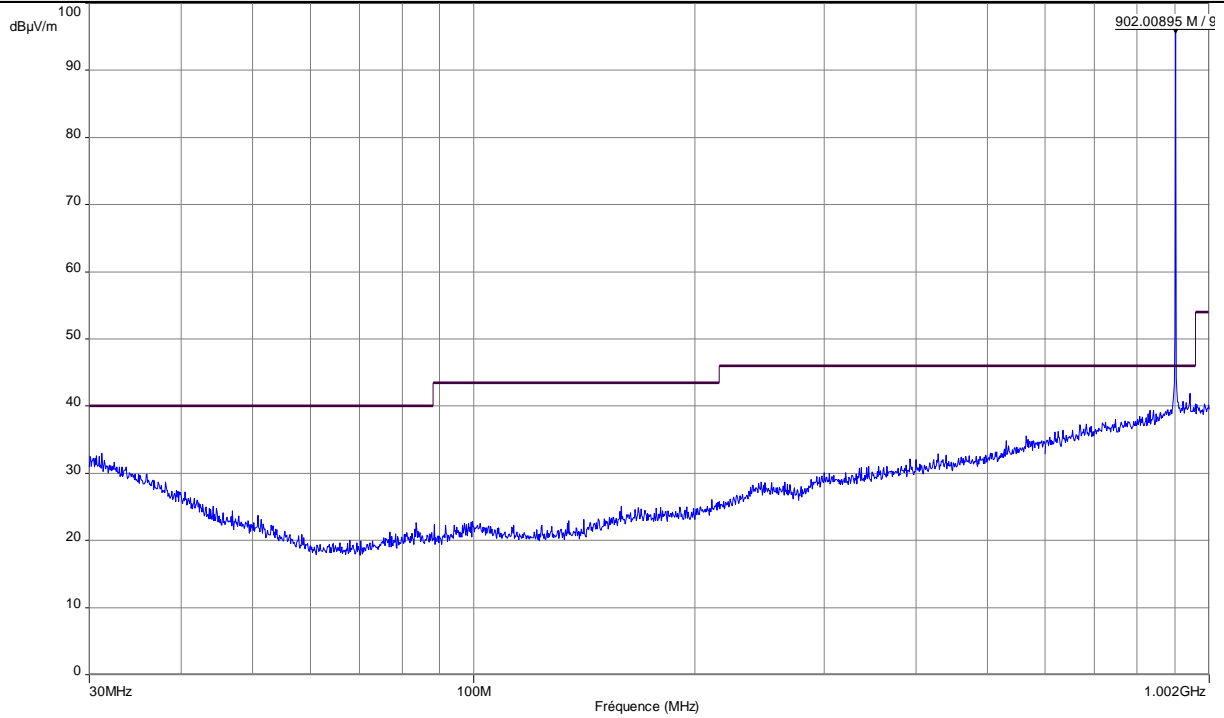
F1 = 902MHz  
 Quasi-Peak level below 902MHz is 40.8dBµV/m max at 3m  
 (limit is 46dBµV/m @ 3m)  
**RESULT: PASS**  
 Note: Radiated measurement

### High band-edge compliance

F1 = 928MHz  
 Quasi-Peak level below 928MHz is 41.4dBµV/m max at 3m  
 (limit is 46dBµV/m @ 3m)  
**RESULT: PASS**  
 Note: Radiated measurement



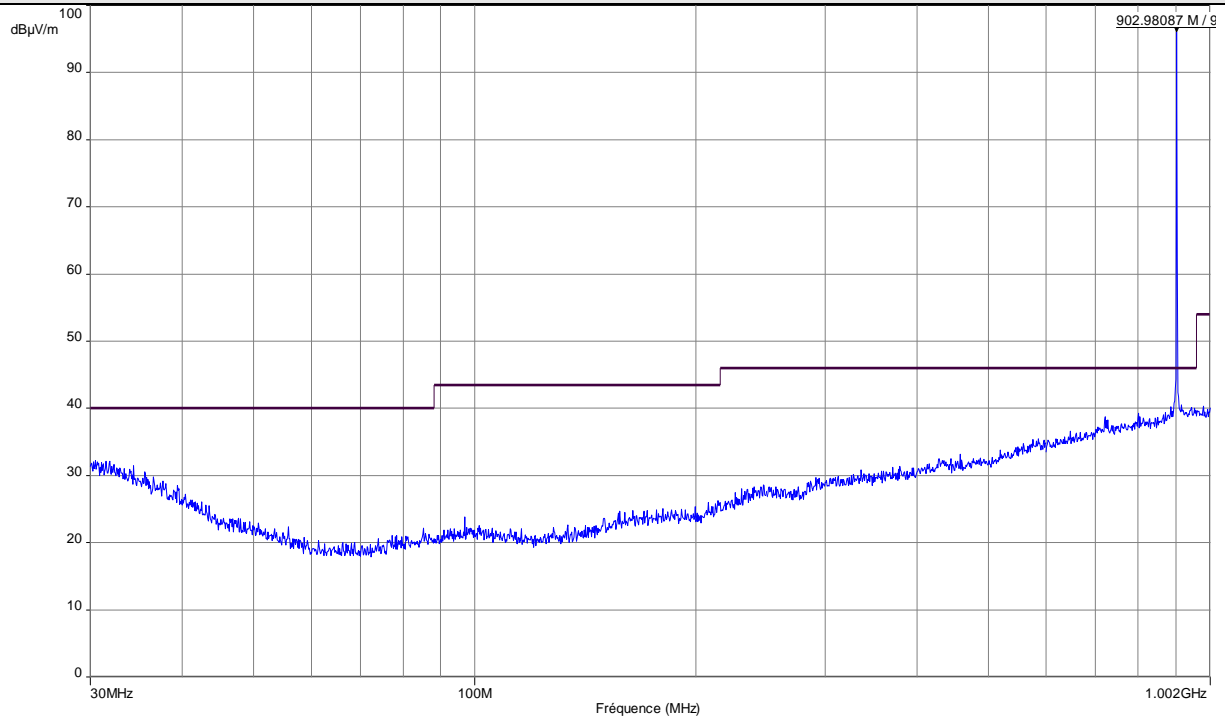
**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Horizontal / Transmit mode at 903MHz)**



Note: Pre-scan graph only for identification purpose.

<b>Frequency band investigated:</b>	30MHz-1GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	100kHz
<b>Antenna polarization :</b>	Horizontal
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)

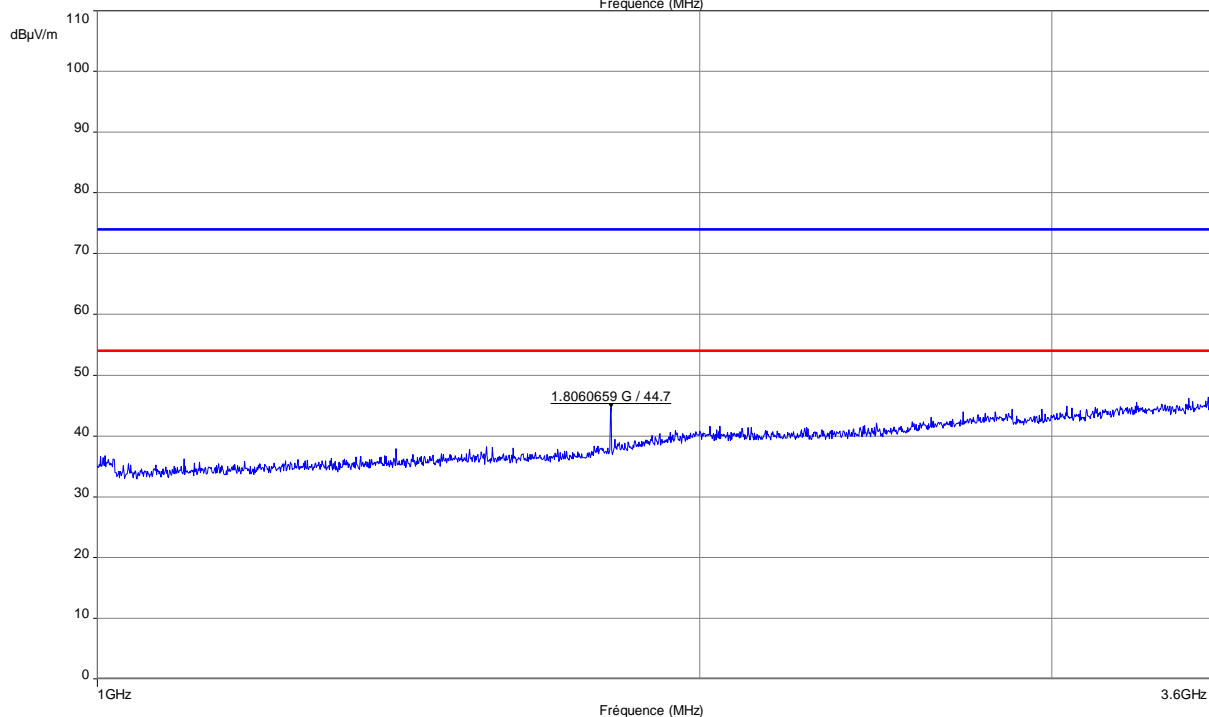
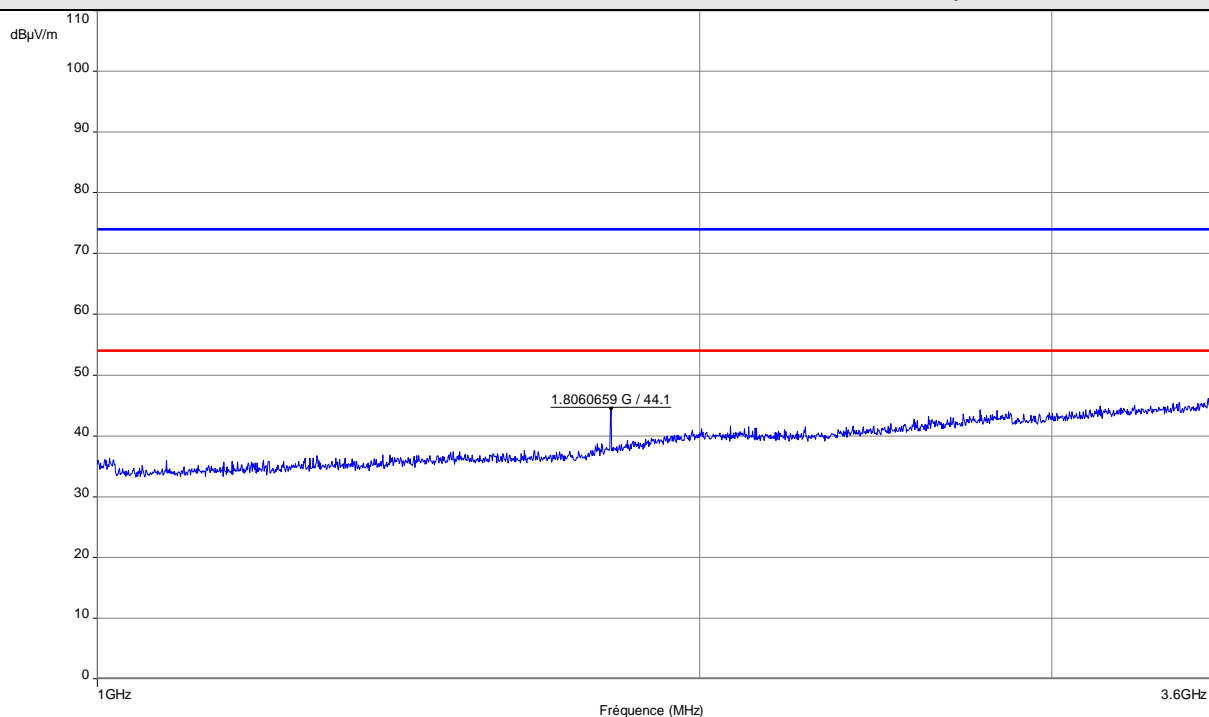
**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Vertical / Transmit mode at 903MHz)**



Note: Pre-scan graph only for identification purpose.

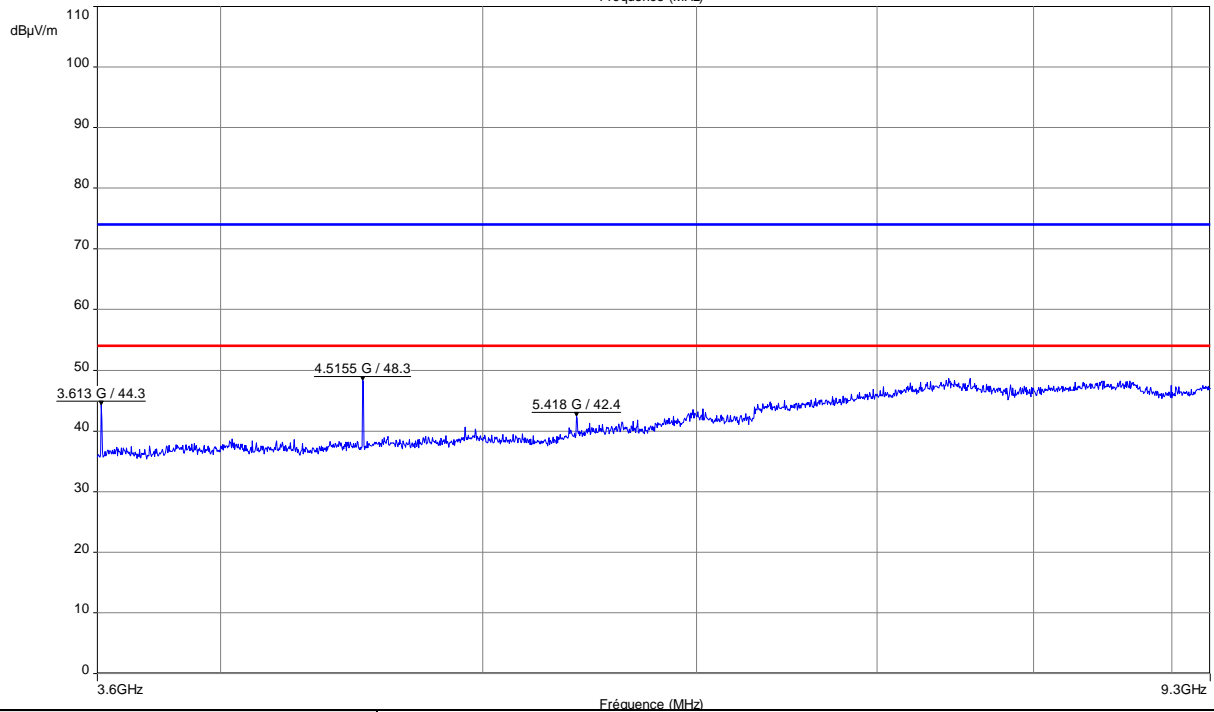
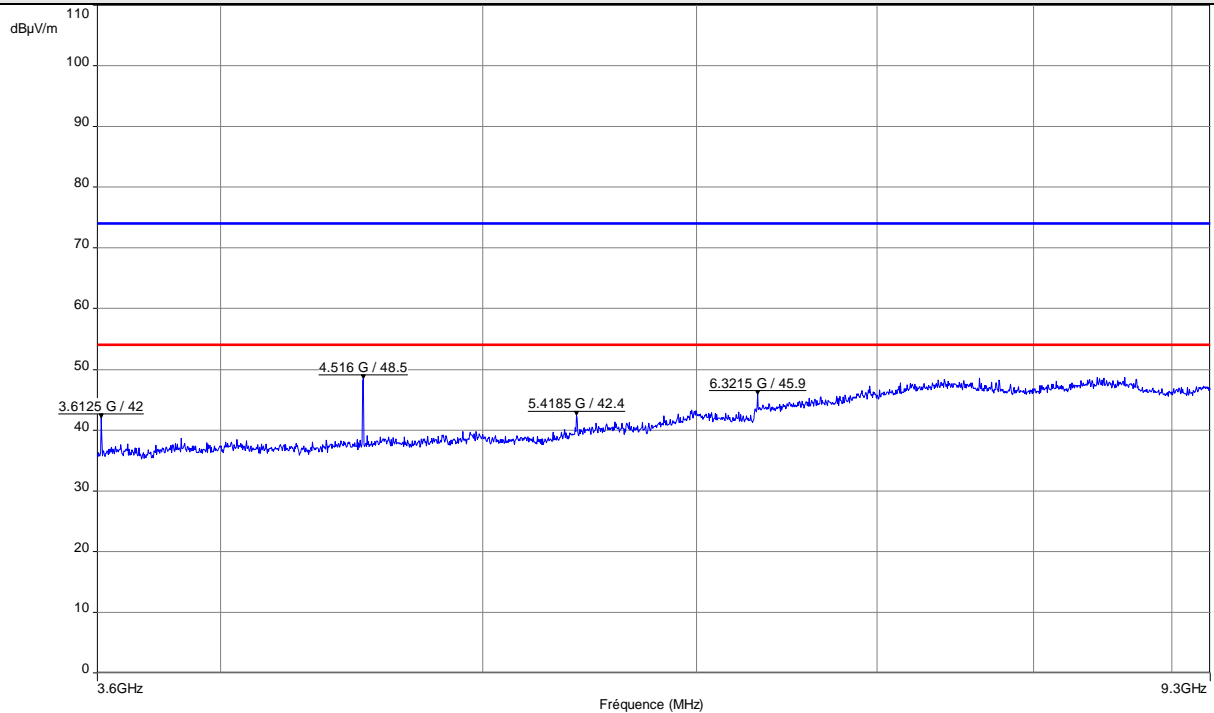
<b>Frequency band investigated:</b>	30MHz-1GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	100kHz
<b>Antenna polarization :</b>	Vertical
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)

**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 1GHz-3.6GHz / 3m / Horizontal & Vertical / Transmit mode at 903MHz)**



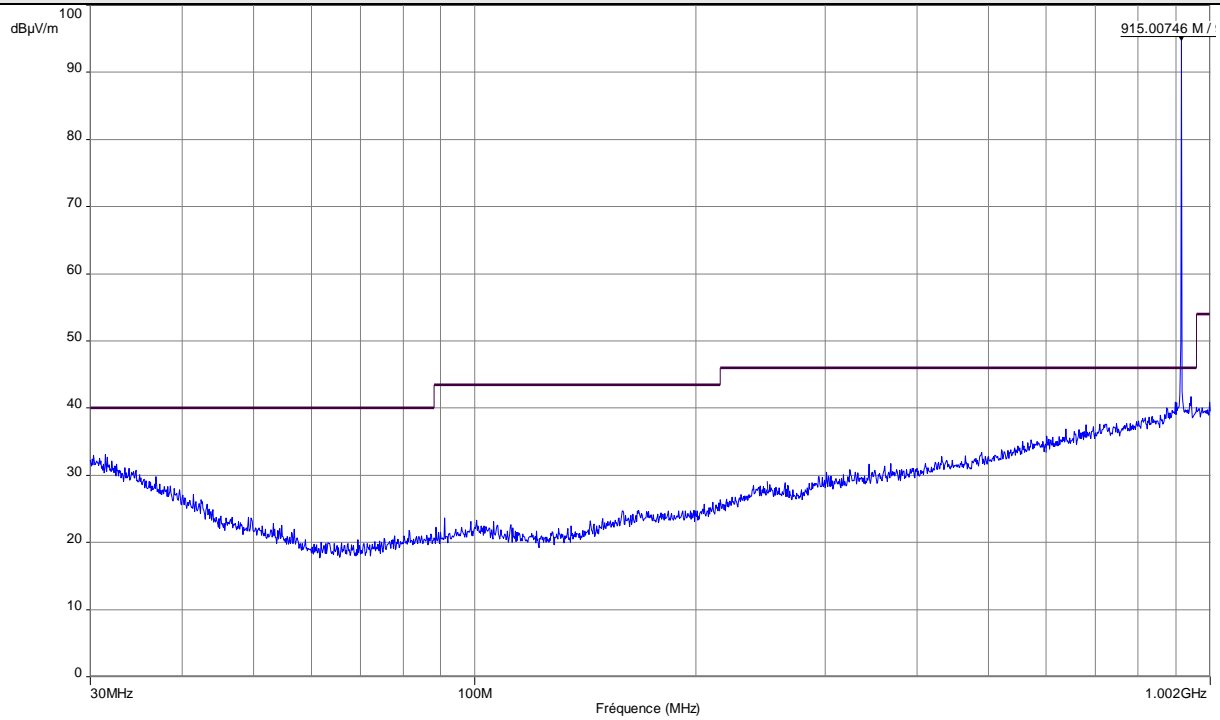
<b>Frequency band investigated:</b>	1GHz-3.6GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	1MHz
<b>Antenna polarization :</b>	Horizontal & Vertical
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)

**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 3.6GHz-9.3GHz / 3m / Horizontal & Vertical / Transmit mode at 903MHz)**



<b>Frequency band investigated:</b>	3.6GHz-9.3GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	1MHz
<b>Antenna polarization :</b>	Horizontal & Vertical
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)

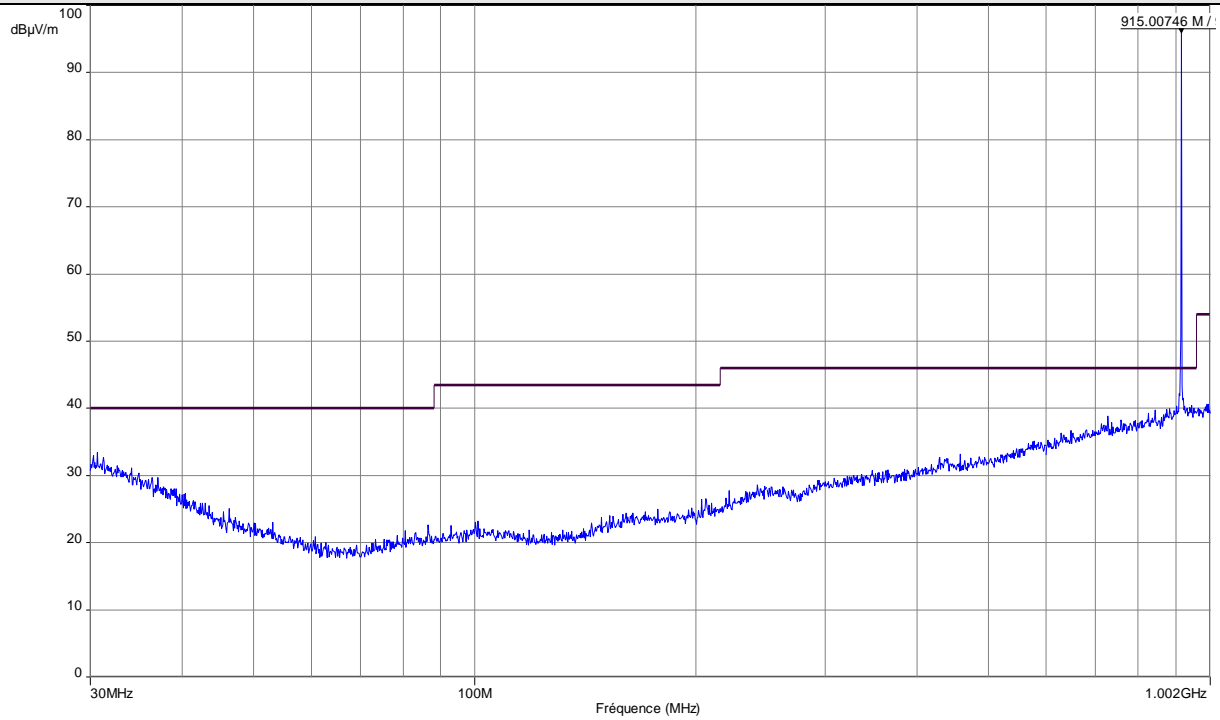
**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Horizontal / Transmit mode at 915MHz)**



Note: Pre-scan graph only for identification purpose.

<b>Frequency band investigated:</b>	30MHz-1GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	100kHz
<b>Antenna polarization :</b>	Horizontal
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)

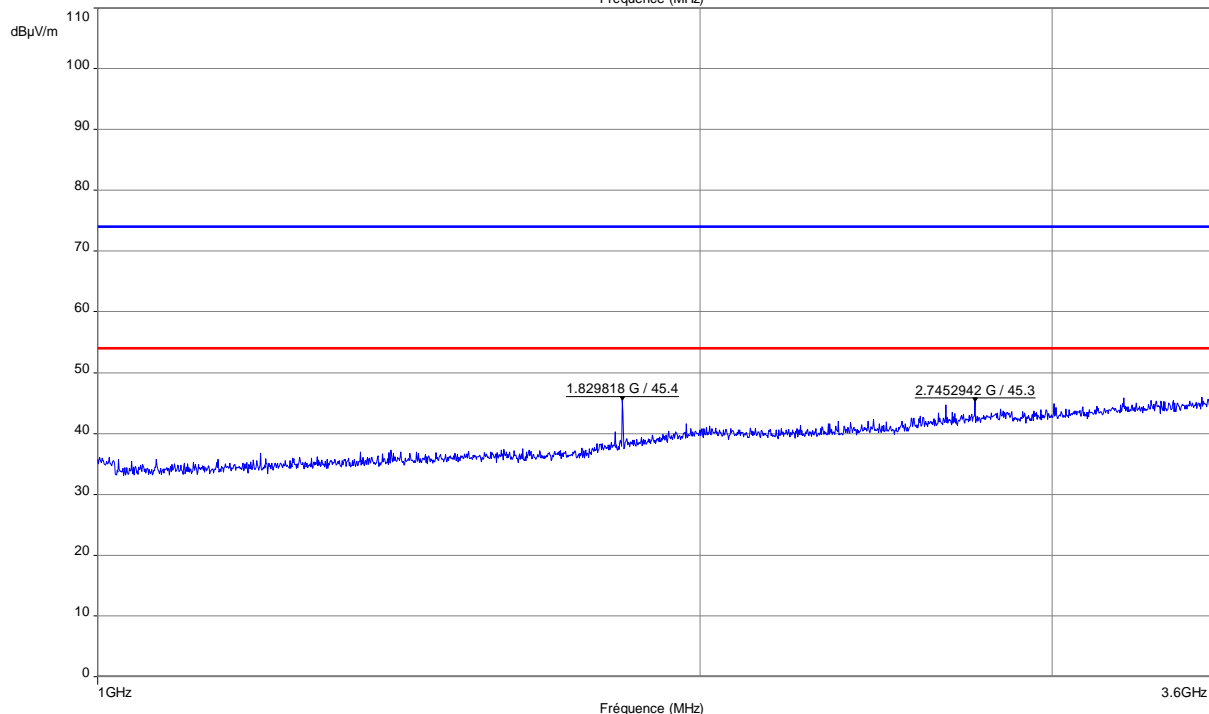
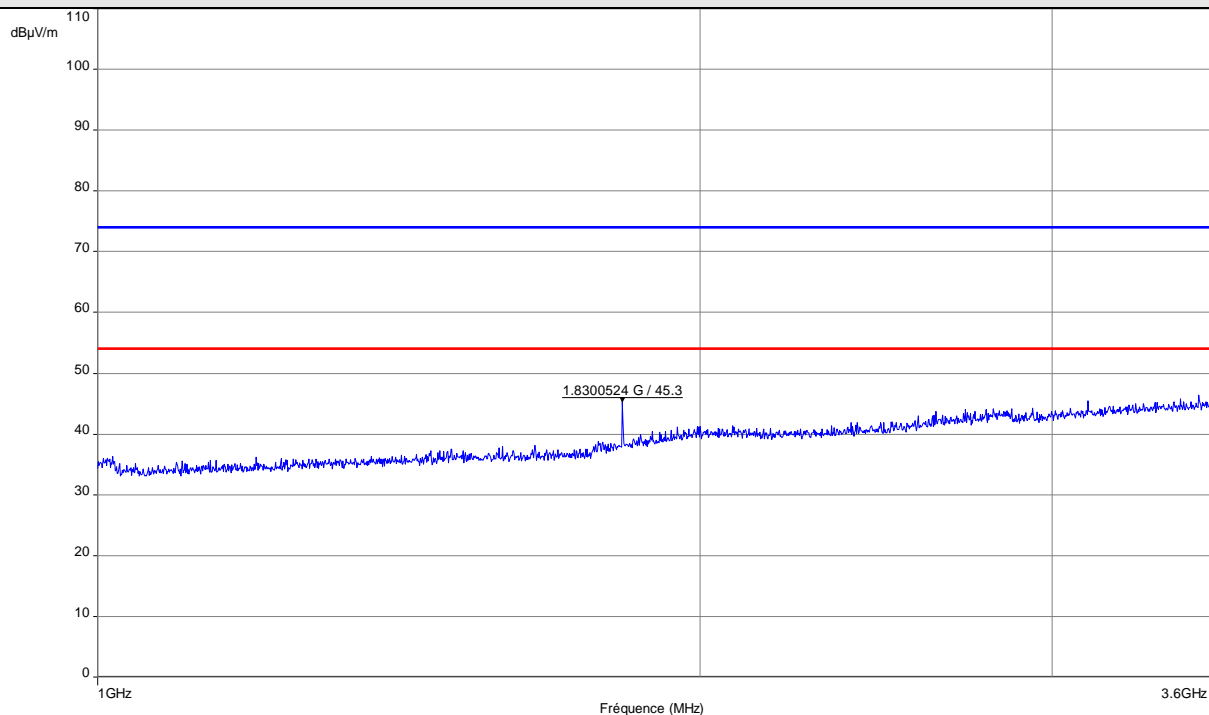
**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Vertical / Transmit mode at 915MHz)**



Note: Pre-scan graph only for identification purpose.

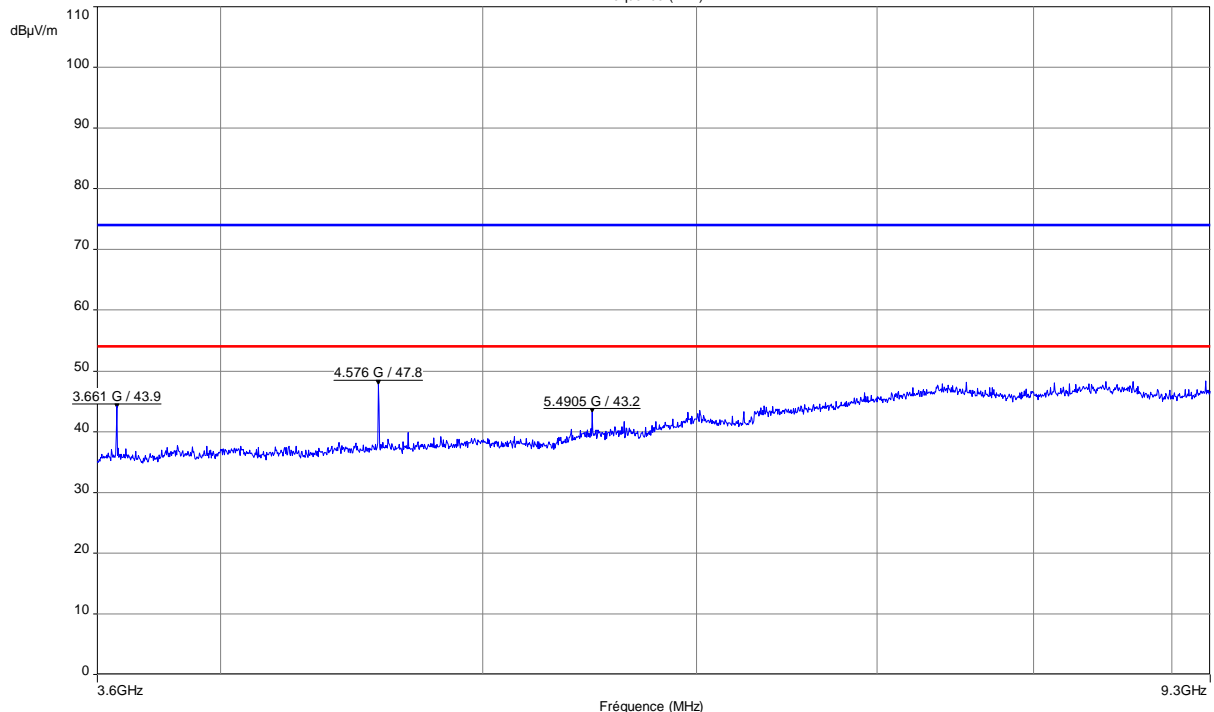
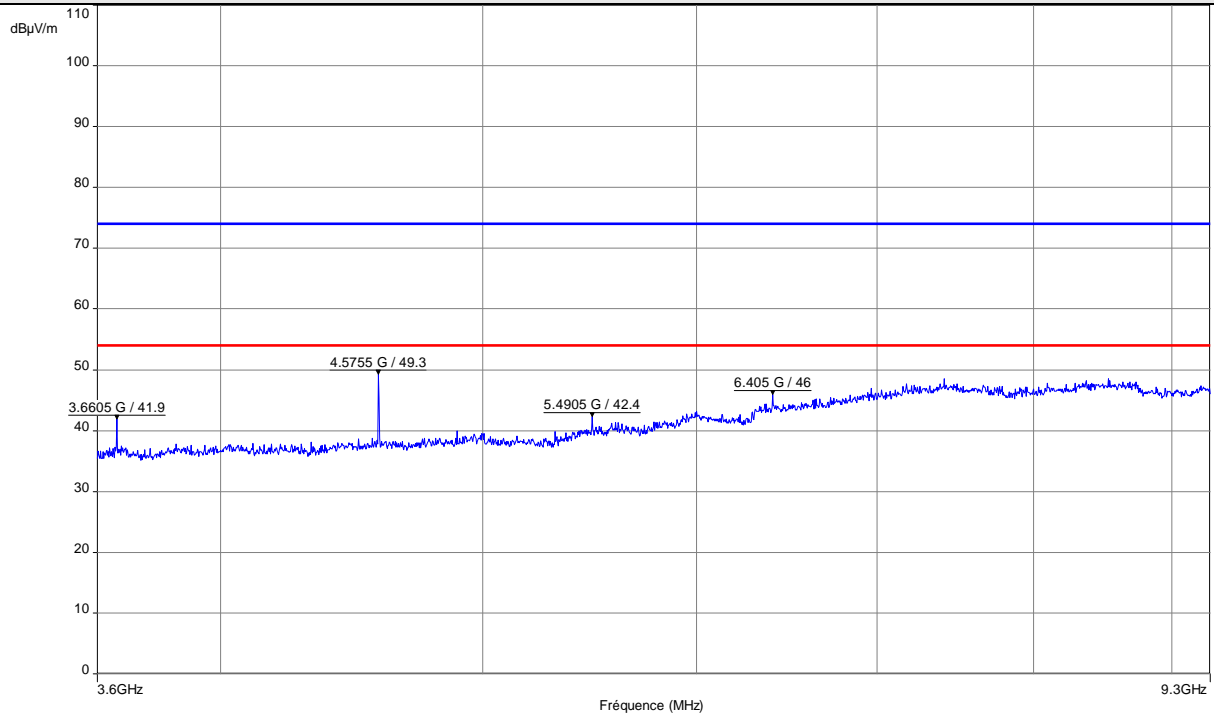
<b>Frequency band investigated:</b>	30MHz-1GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	100kHz
<b>Antenna polarization :</b>	Vertical
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)

**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 1GHz-3.6GHz / 3m / Horizontal & Vertical / Transmit mode at 915Hz)**



<b>Frequency band investigated:</b>	1GHz-3.6GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	1MHz
<b>Antenna polarization :</b>	Horizontal & Vertical
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)

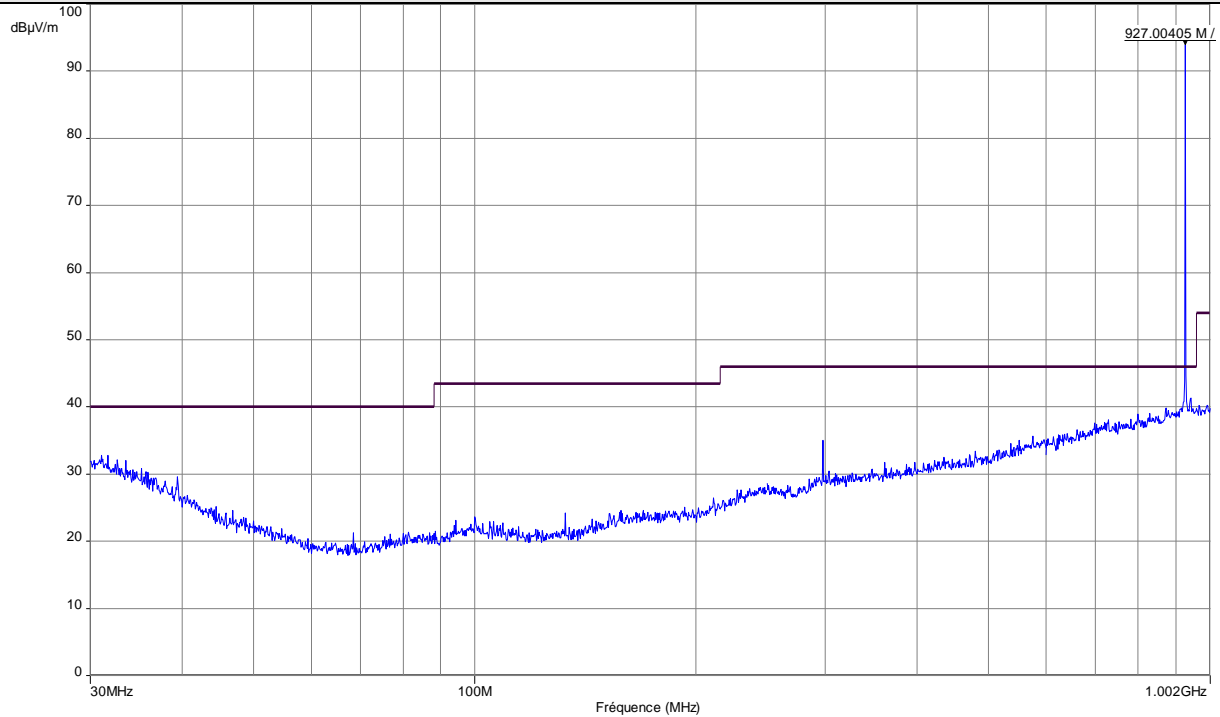
**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 3.6GHz-9.3GHz / 3m / Horizontal & Vertical / Transmit mode at 915MHz)**



<b>Frequency band investigated:</b>	3.6GHz-9.3GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	1MHz
<b>Antenna polarization :</b>	Horizontal & Vertical
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)



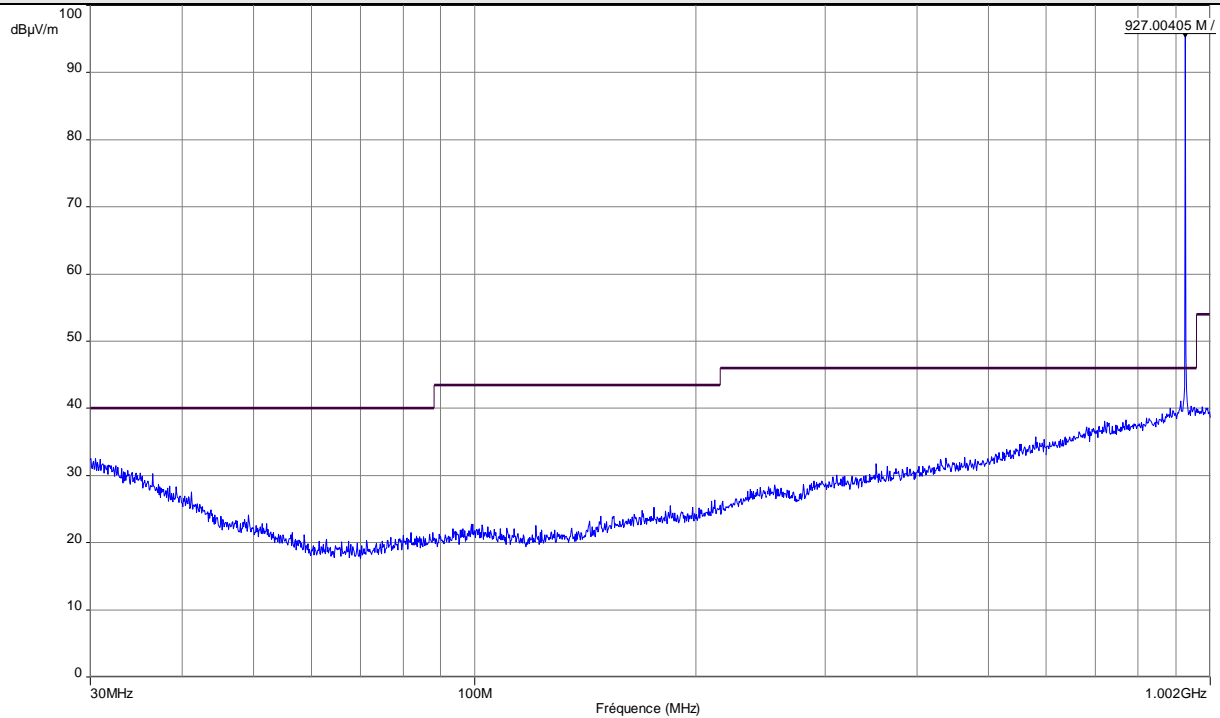
**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Horizontal / Transmit mode at 927MHz)**



Note: Pre-scan graph only for identification purpose.

<b>Frequency band investigated:</b>	30MHz-1GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	100kHz
<b>Antenna polarization :</b>	Horizontal
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)

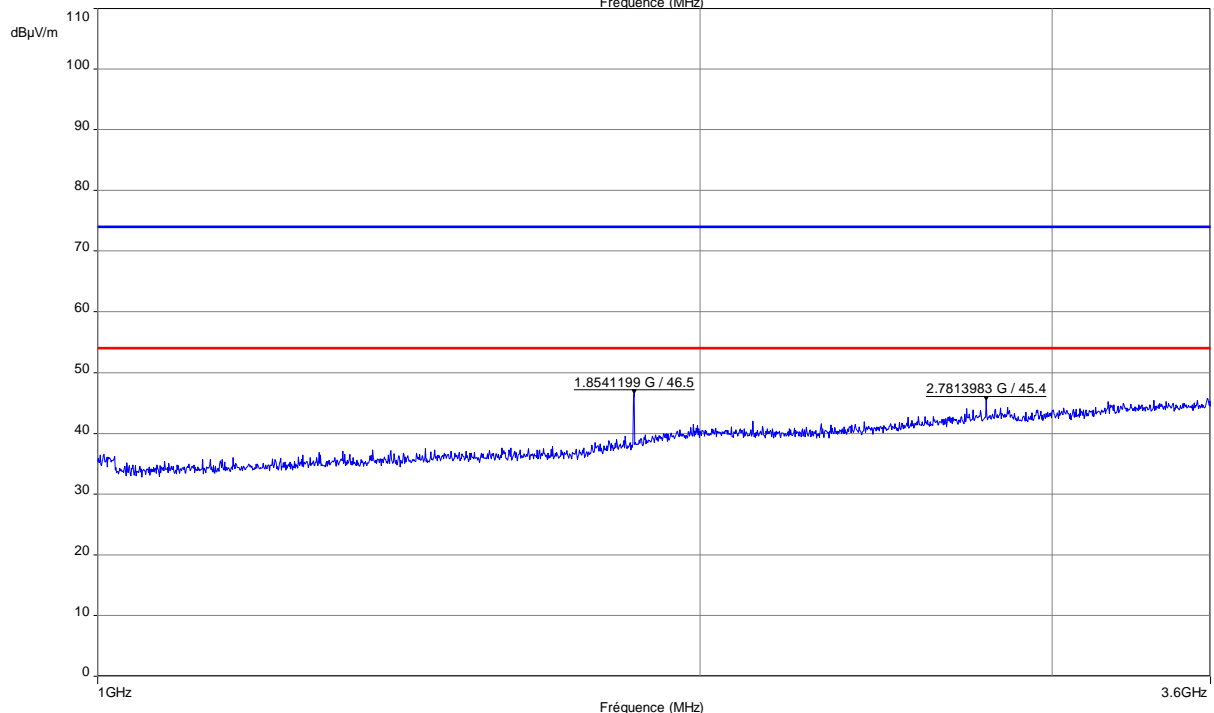
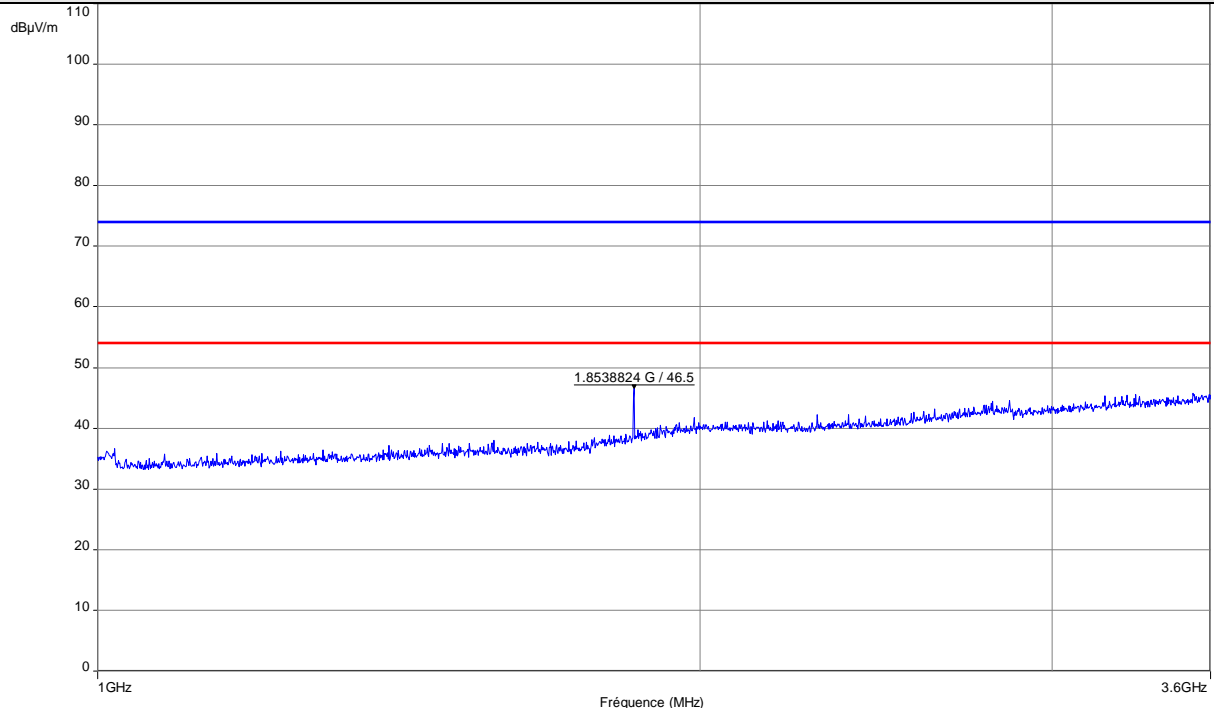
**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Vertical / Transmit mode at 927MHz)**



Note: Pre-scan graph only for identification purpose.

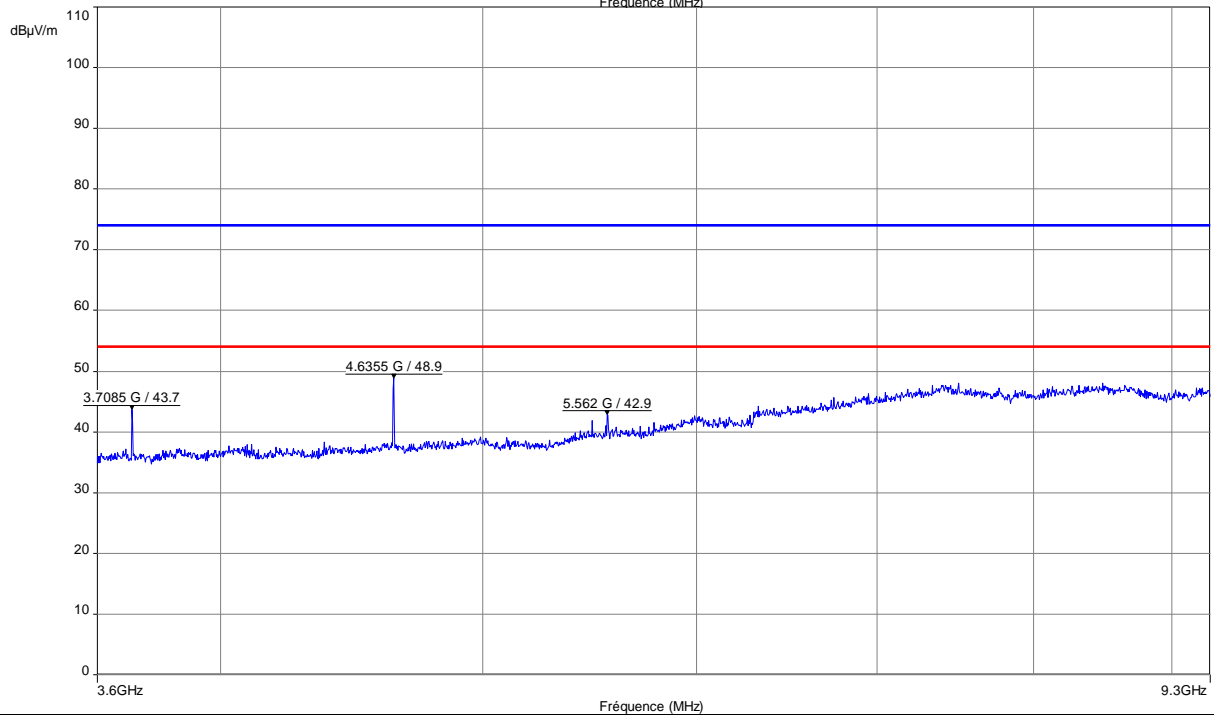
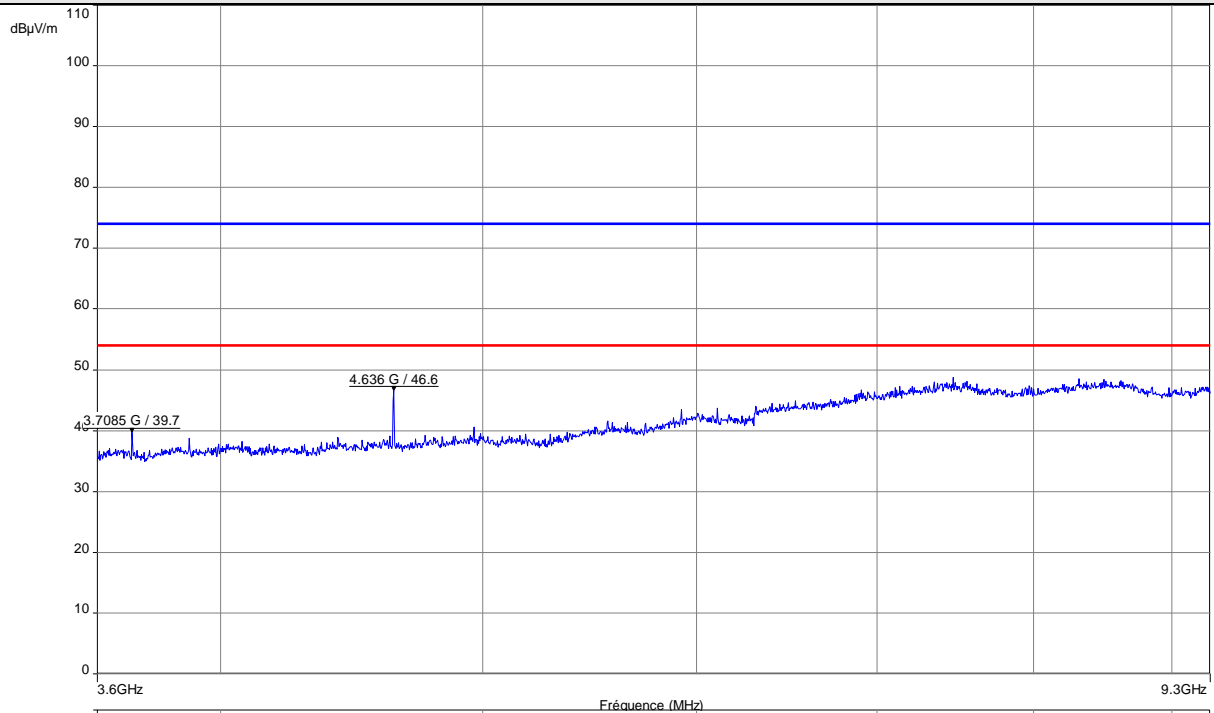
<b>Frequency band investigated:</b>	30MHz-1GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	100kHz
<b>Antenna polarization :</b>	Vertical
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)

**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 1GHz-3.6GHz / 3m / Horizontal & Vertical / Transmit mode at 927Hz)**



<b>Frequency band investigated:</b>	1GHz-3.6GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	1MHz
<b>Antenna polarization :</b>	Horizontal & Vertical
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)

**Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 3.6GHz-9.3GHz / 3m / Horizontal & Vertical / Transmit mode at 927MHz)**



<b>Frequency band investigated:</b>	3.6GHz-9.3GHz
<b>Unit :</b>	dBµV/m
<b>RBW :</b>	1MHz
<b>Antenna polarization :</b>	Horizontal & Vertical
<b>Voltage:</b>	3.6V DC
<b>Limit:</b>	15.209
<b>Measurement detector:</b>	Peak
<b>Wide Measurement Uncertainty:</b>	± 5dB (k=2)

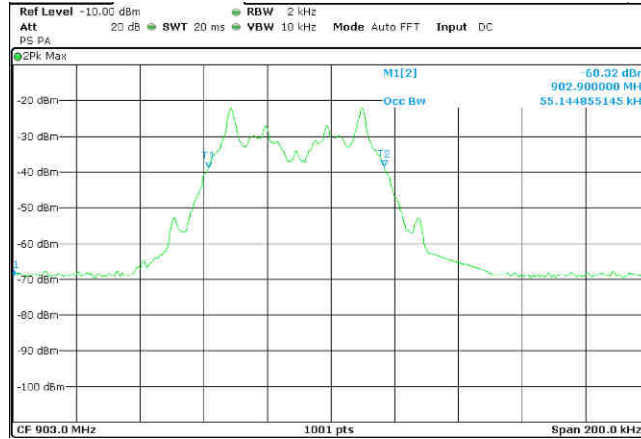
**10. 99% Occupied Bandwidth**

<b>TEST: 99% Occupied Bandwidth / RSS-Gen</b>			<b>Verdict</b>								
<p><u>Method:</u> The setup is in an anechoic chamber. The spectrum analyzer is connected to the measuring antenna.            The RBW is set in the range of 1% to 5% of the occupied bandwidth, with VBW <math>\geq 3 \times</math> RBW.            The SPAN is wide enough to capture all products of the modulation process.            A MaxHold Peak detector is used.            Measure is performed with OBW 99% function of the spectrum analyser.            The tested equipment is set to transmit operation with modulations on lowest, middle and highest channel.</p>			<b>Pass</b>								
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Laboratory Parameters:</th> <th style="width: 33%;">Required prior to the test</th> <th style="width: 33%;">During the test</th> </tr> </thead> <tbody> <tr> <td>Ambient Temperature</td> <td style="text-align: center;">10 to 40 °C</td> <td style="text-align: center;">20°C</td> </tr> <tr> <td>Relative Humidity</td> <td style="text-align: center;">10 to 90 %</td> <td style="text-align: center;">55%</td> </tr> </tbody> </table>				Laboratory Parameters:	Required prior to the test	During the test	Ambient Temperature	10 to 40 °C	20°C	Relative Humidity	10 to 90 %
Laboratory Parameters:	Required prior to the test	During the test									
Ambient Temperature	10 to 40 °C	20°C									
Relative Humidity	10 to 90 %	55%									
<b>RSS-Gen Issue 4 (§6.6)</b>											
Frequency (MHz)	Level for Bandwidth	Limit									
903.0	99% occupied bandwidth	No restriction									
215.0											
927.0											
Supplementary information: Test location: SMEE – CE Mesures / Test date: May 21 <sup>st</sup> , 2016 Power supply voltage: 3.6V from battery (fully charged)											

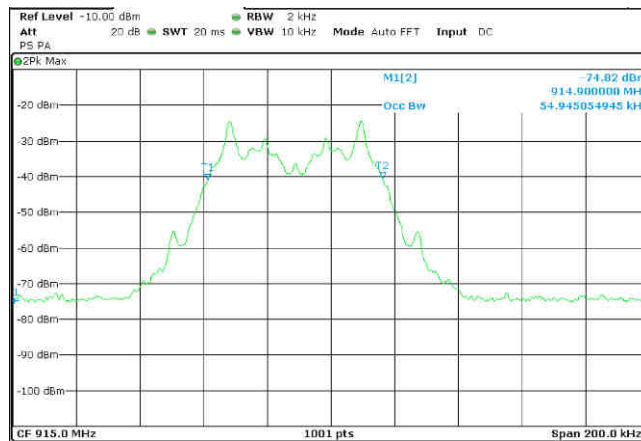
<b>Test Equipment Used</b>					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Measuring Rec.	Rohde&Schwarz	ESRP	REC-151-002	2015/7	2018/7
Horn antenna	ETS-LINDGREN	3115	ANT-141-013	2015/7	2018/7
RF cable	HUBER+SUHNER	SF104	CAB-141-030	2016/3	2017/3
RF cable	Pasternack	PE302-120	CAB-131-024	2016/3	2017/3
Anechoic chamber	COMTEST	214263	CAG-141-001	-	-
Turntable	Innco- Systems	CT0800	PLA-141-001	-	-

<b>Tabulated Results for Occupied Bandwidth</b>	
Frequency (MHz)	99% Bandwidth (kHz)
903.0	55.145 kHz
915.0	54.945 kHz
927.0	54.945 kHz

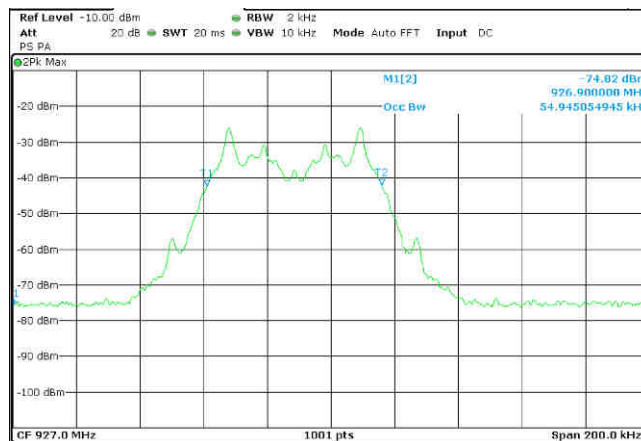
## Graphical representation of 99% Occupied Bandwidth



Low channel



Mid channel



High channel

Frequency band investigated:	902MHz to 928MHz
RBW :	2kHz
Measurement detector:	Peak