

Test Firm Registration Number: 171131
IC Company Number: 9545A (Test site)

Matériel testé :
Equipment under test:

STRESSIT REMOTE

Constructeur:
Manufacturer: **CORDIA**
ZAC Vilette aux Aulnes
2 rue Galilée
77290 Mitry Mory – France

Rapport délivré à :
Issued to: **CORDIA**
ZAC Vilette aux Aulnes
2 rue Galilée
77290 Mitry Mory – France

Référence de la proposition : 112015-21714
Proposal number:

Date de l'essai : Du 15 au 18 décembre 2015
Date of test: December 15th to 18th, 2015

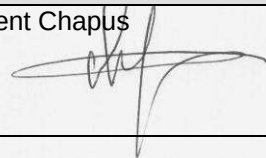
Objectif des essais : EMC qualification accordingly to following standards:
Test purpose: - CFR 47, FCC Part 15, Subpart C
(Chapter 15.231 – Periodic operation in the band 40.66–40.70 MHz and above 70 MHz)

FCC ID: 2AGZJSTREMOTE

Lieu du test:
Test location: SMEE CE-Mesures
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	January 22sd, 2016 February 22sd, 2016	Initial Edition Correction p12	Jeremy Blancher	Laurent Chapus 

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COORDONNEES

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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

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1. Normative references

Standard: FCC CFR 47, PART 15, Subpart B & Subpart C

Chapter 15.231: Periodic operation in the band 40.66–40.70 MHz and above 70 MHz

ANSI C63.4 (2014): 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): American National Standard for Testing Unlicensed Wireless Devices

2. Test synthesis

TEST	Paragraph number FCC Part 15	Spec. FCC Part 15	RESULTS (comments)
Conducted emissions test	15.107 (a)	Table 15.107 (a)	N/A (1)
Radiated emission test	15.109 (a)	Table 15.109 (a)	N/A (2)
De-activation time	15.231 (a) 1)	Automatically deactivate the transmitter within not more than 5 seconds of being released.	PASS
Periodic operations at regular intervals	15.231 (a) 3)	Maximum duration allowed 2s per hour	N/A (3)
Field strength of fundamental	15.231 (b) 1) 2)	10995.8µV/m max at 433.9MHz 80.8dBµV/m (AV) / 100.8dBµV/m (Pk)	PASS
Unwanted emissions into Non Restricted Frequency Bands	15.231 (b) 3)	-20dBc in any 100kHz outside frequency band.	PASS
Unwanted emissions into Restricted Frequency Bands	15.209 / 15.205 / 15.231 (b) 3)	Measure at 300m 9-490kHz: 2400µV/m/F(kHz) Measure at 30m 0.490-1.705: 24000µV/m/F(kHz) 1.705-30MHz: 30µV/m Measure at 3m 30MHz-88MHz : 40 dBµV/m 88MHz-216MHz : 43.5 dBµV/m 216MHz-960MHz : 46.0 dBµV/m Above 960MHz : 54.0 dBµV/m	PASS
20dB Bandwidth	15.231 (c)	Shall be lower than 0.25% of center frequency	PASS

N/A: Not Applicable

(1): No cable

(2): Exclusively transmitter radio equipment

(3): No periodic operations

• General conclusion:

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

3. Equipment Under Test (EUT)

Nom /
Identification

STRESSIT REMOTE

Sn: BA-3F200A

Alimentation /
Power supply

3V dc from 2x1.5V alkaline batteries

Auxiliaires /
Auxiliaries

- STRESSIT (CORDIA equipment, receiver, FCC ID: 2AGZJSTRESSIT)

Entrées-Sorties /
Input / Output

	Câbles pour essai / Cables for test	Blindé / Shielded	Prévu pour >3m / Intended for >3m
None	-	-	-

Version programme /
Firmware version

N.C

Mode de fonctionnement /
Running mode

The tested samples can be set in following modes:
 - Transmit a continuous modulated carrier
 - Transmit a command and communicate with STRESSIT ancillary equipment
 - Waiting for a button pushed (no command sent, equipment OFF)

Programme de test /
Test program /

N.C

Information sur l'équipement /
Equipment information

- Carrier frequency: 433.92 MHz
 - Antenna type: PCB antenna (Wire printed antenna,
 - RF chip: SEMTECH SX1231
 - Conducted output power is set at 14dBm (Firmware defined)
 - Modulations: OOK
 - Battery type Alkaline 2 x 1.5V, model AAA-LR03
 - Equipment intended for use as a portable station

Note: Bluetooth function of the microcontroller is disabled.

4. Test conditions

Humidité relative / Relative Humidity : 40 - 55%

Température / Temperature : 5 - 20°C

Tension d'alimentation / Power supply voltage:

Equipment sous test / Equipment under test : 3V DC from internal battery (New batteries used)

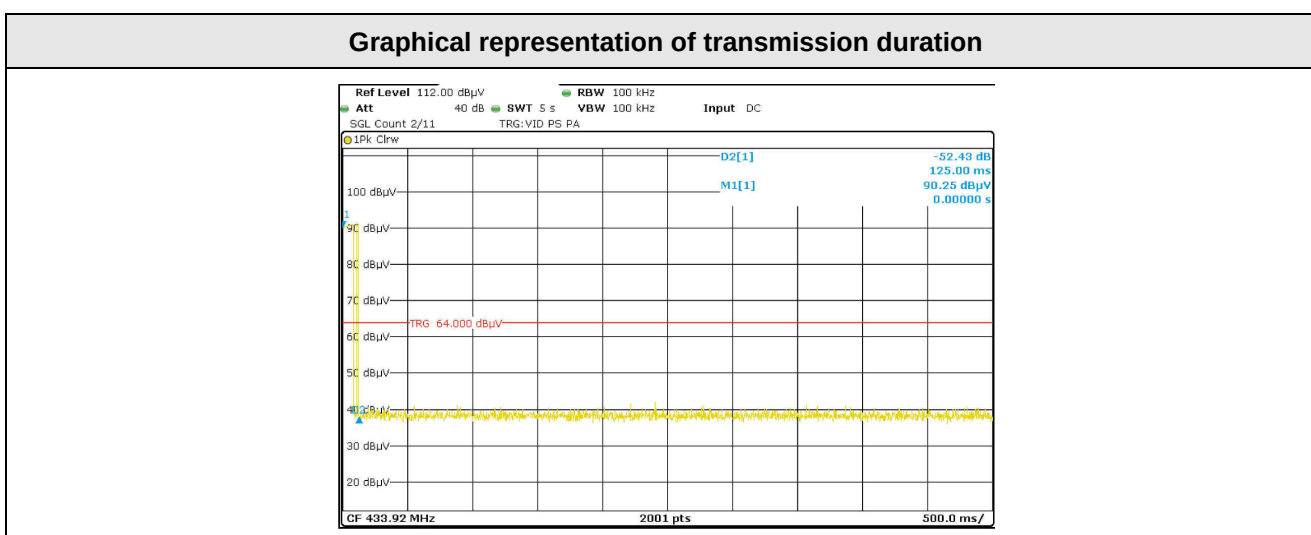
5. Modifications of the EUT

None

6. De-activation time

TEST: De-activate time / FCC part 15.231			Verdict
<u>Method:</u> Measure 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 The tested equipment is set to worst case transmit operation. Measurement is done with a zero span at fundamental frequency. The transmission duration was measured and recorded <u>Limits:</u> A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.			Pass
Laboratory Parameters:	Required prior to the test	During the test	
Ambient Temperature	10 to 40 °C	20°C	
Relative Humidity	10 to 90 %	55%	
Supplementary information: Test location: SMEE – CE Mesures / Test date: December 18th, 2015 Power supply voltage: 3V from battery			

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
BiConiLog antenna	EMCO	3142B	ANT-101-010	2015/8	2016/8
RF cable	HUBER+SUHNER	RG214U	CAB-141-026	2015/3	2016/3
RF cable	HUBER+SUHNER	RG214U	CAB-141-029	2015/3	2016/3
Anechoic chamber	COMTEST	214263	CAG-141-001	-	-
Measuring Rec.	Rohde&Schwarz	ESRP	REC-151-002	2015/7	2018/7



Tabulated Results for transmission duration			
FREQ (MHz)	Duration of pulse (s)	Limit	Result
433.92	0.125	Shall be < 5s	PASS

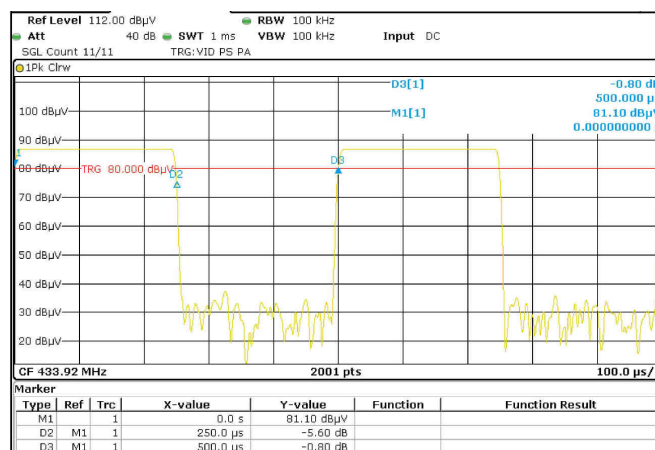
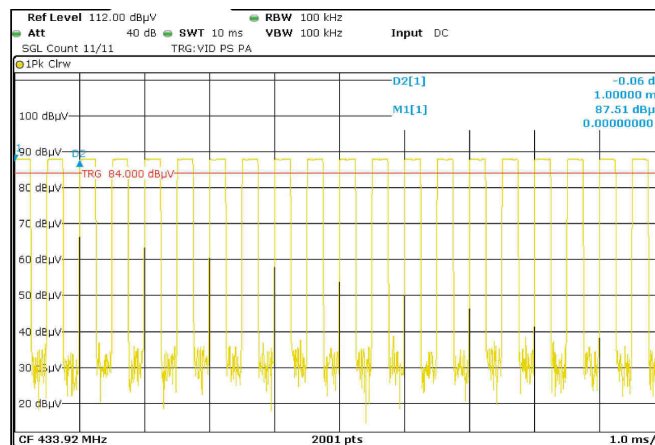
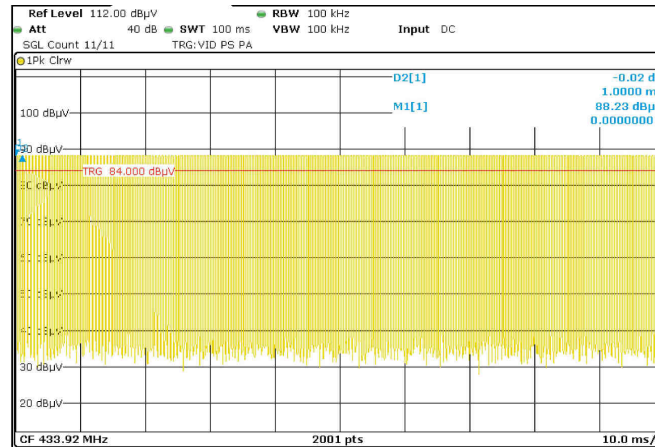
7. Field strength of fundamental

TEST: Field strength of fundamental / FCC part 15.231			Verdict
<u>Method:</u> Measurements were performed with peak detector using a 120kHz RBW. The VBW is set to 300kHz. The measure is performed on a 3m Open Area Test Site. The tested equipment is set to transmit operation with modulation.			Pass
Laboratory Parameters:	Required prior to the test	During the test	
Ambient Temperature	10 to 40 °C	9°C	
Relative Humidity	10 to 90 %	45%	
General limits – FCC Part 15.231 (b)			
Fundamental frequencies MHz	μV/m / 3m	dBμV/m / 3m	
40.66 – 40.70	2250	67.04	
70 – 130	1250	61.94	
130 – 174	1250 3750	61.94 to 71.48	
174 – 260	3750	71.48	
260 – 470	3750 to 12500	71.48 to 81.94	
Above 470	12500	81.94	
Equipment limits – FCC Part 15.231 (b)			
Fundamental Frequency MHz	Limits / Detector / Distance dBμV/m	Results	
433.92 MHz	100.8 / Pk / 3m	Pass	
433.92 MHz	80.8 / Av / 3m	Pass	
Supplementary information: Test location: SMEE – CE Mesures / Test date: December 15 th , 2015 Power supply voltage: 3V from battery			

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Measuring Rec.	Rohde&Schwarz	ESRP	REC-151-002	2015/7	2017/7
Log-periodic antenna	TDK	PLP3003	ANT-101-001	2015/8	2016/8
RF cable	Div	OATS/25m	CAB-101-017	2015/3	2016/3
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 Fundamental field strength				
FREQ	Field Strength 3m	Detector	Limit	Result
(MHz)	(dBμV/m)		(dBμV/m)	
433.92	85.8	Pk	100.8	PASS
433.92	79.8	Av	80.8	PASS
RBW:		120kHz		
Measurement distance:		3m		
Limit:		FCC Part 15.231 (b)		
Final measurement detector:		Peak		
Wide Measurement Uncertainty:		± 5.2dB (k=2)		
RESULT:		PASS		
Notes:		(1): Field strength is measured on the Open Area Test Site at a distance of 3m. Three orthogonal axis measurements are performed for both horizontal and vertical antenna (measure) polarization in order to obtain the maximum peak field strength. (2): 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 is as follow: $FS = RA + AF + CF - AG$ Where FS = Field Strength (Level dBμV/m) RA = Receiver Amplitude (Meter reading dBμV) AF = Antenna Factor CF = Cable Factor AG = Amplifier Gain Total factor (dB) is $AF + CF - AG$ Margin value = Emission level – Limit value (3): The average value of fundamental frequency emission is: $Average = Peak\ value + 20\log(Duty\ Cycle)$ Where the duty factor (DC) is calculated from following formula: $DC = Tx\ ON\ on\ a\ period\ of\ 100ms$ $DC = 50ms/100ms \rightarrow 20\log(DC) = -6dB$ Worst case for duty cycle factor calculation. See graphical duty cycle representation next page.		

Graphical representation for Duty Cycle corrector factor



Pulse width : 250μs

Number of pulse within 100ms: 200

Duty cycle average factor = $20\log(200 \times 0.25 / 100) = -6 \text{ dB}$

8. Unwanted emissions in Non-Restricted Frequency bands

TEST: Unwanted emissions in Non-Restricted Frequency Bands / FCC part 15.231			Verdict
<u>Method:</u> For radiated test, measurements were made in a 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 meters. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements 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. 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. The pre-characterization graphs are obtained in PEAK detection.			Pass
Laboratory Parameters:	Required prior to the test	During the test	
Ambient Temperature	10 to 40 °C	9°C	
Relative Humidity	10 to 90 %	45%	
Fully configured sample scanned over the following frequency range	Frequency range on each side of line	Measurement Point	
	30MHz – 4.5GHz	3 m measurement distance	
General limits – FCC Part 15.231 (b)			
Fundamental frequencies MHz	µV/m / 3m	dBµV/m / 3m	
40.66 – 40.70	225	47.04	
70 – 130	125	41.94	
130 – 174	125 375	41.94 to 51.48	
174 – 260	375	51.48	
260 – 470	375 to 1250	51.48 to 61.94	
Above 470	1250	61.94	
Equipment limits – FCC Part 15.231 (b)			
Fundamental Frequency MHz	Limits / Detector / Distance dBµV/m	Results	
433.92 MHz	80.8 / Pk / 3m	Pass	
433.92 MHz	60.8 / Av / 3m	Pass	
Supplementary information: Test location: SMEE – CE Mesures / Test date: December 15 th , 2015 Power supply voltage: 3V 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
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	2015/3	2016/3
RF cable	Pasternack	PE302-120	CAB-131-024	2015/3	2016/3
RF cable	HUBER+SUHNER	RG214U	CAB-141-026	2015/3	2016/3
RF cable	HUBER+SUHNER	RG214U	CAB-141-029	2015/3	2016/3
RF cable	HUBER+SUHNER	SF104	CAB-141-030	2015/3	2016/3
High-pass filter	Mini-Circuit	VHF-3100+	FIL-151-006	2015/3	2016/3
Pre-amplifier	PE	PE1524	PRE-101-002	2015/3	2016/3
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	2016/7
Spectrum analyzer	AGILENT HP	8563E	ASP-111-003	2013/9	2016/9

Tabulated Results for Unwanted emissions (30MHz-4.5GHz)				
FREQ (MHz)	Field level dBμV/m	Detector	Limit (dBμV/m)	Result
867.48	58.1	Pk	80.8 (Pk) / 60.8 (Av)	Pass
1735.70	47.7	Pk	80.8 (Pk) / 60.8 (Av)	Pass
RBW:		100kHz / F<1GHz 1MHz / F>1GHz		
Measurement distance:		3m		
Limit:		FCC Part 15.231 (b)		
Final measurement detector:		Peak / Average		
Wide Measurement Uncertainty:		± 5.2dB (k=2)		
RESULT:		PASS		
Notes:		(1): Field strength is measured on the Open Area Test Site at a distance of 3m. Three orthogonal axis measurements are performed for both horizontal and vertical antenna (measure) polarization in order to obtain the maximum peak field strength. (2): 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 is as follow: $FS = RA + AF + CF - AG$ Where FS = Field Strength (Level dBμV/m) RA = Receiver Amplitude (Meter reading dBμV) AF = Antenna Factor CF = Cable Factor AG = Amplifier Gain Total factor (dB) is AF + CF – AG Margin value = Emission level – Limit value (3): The average value of fundamental frequency emission is: Average = Peak value + 20log(Duty Cycle) Where the duty factor (DC) is calculated from following formula: DC = Tx ON on a period of 100ms DC = 50ms/100ms → 20log (DC) = -6dB Worst case for duty cycle factor calculation (See chapter 7.)		

9. Unwanted emissions in Restricted Frequency bands

TEST: Unwanted emissions into Restricted Frequency Bands / FCC part 15.205, 15.209, 15.231		Verdict
Method: 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. 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. The pre-characterization graphs are obtained in PEAK detection.		Pass
Laboratory Parameters:	Required prior to the test	During the test
Ambient Temperature	10 to 40 °C	9°C
Relative Humidity	10 to 90 %	45%
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 – 4.5GHz	3 m measurement distance
Limits – FCC Part 15.205, 15.209, 15.231		
Frequency (MHz)	Limits (dBµV/m)	
	Level / Detector / Distance	Results
0.009 to 0.490	107.6 to 72.9 / QP / 10m	Pass
0.490 to 1.705	52.9 to 42.1 / QP / 10m	Pass
1.705 to 30	48.6 / QP / 10m	Pass
30 to 88	40.0 / QP / 3m	Pass
88 to 216	43.5 / QP / 3m	Pass
216 to 960	46.0 / QP / 3m	Pass
960 to 1GHz	54.0 / QP / 3m	Pass
1GHz to 4.5GHz	74 / Pk / 3m 54 / Av / 3m	Pass
Supplementary information: Test location: SMEE – CE Mesures / Test date: December 18th, 2015 Power supply voltage: 3V from battery (fully charged)		

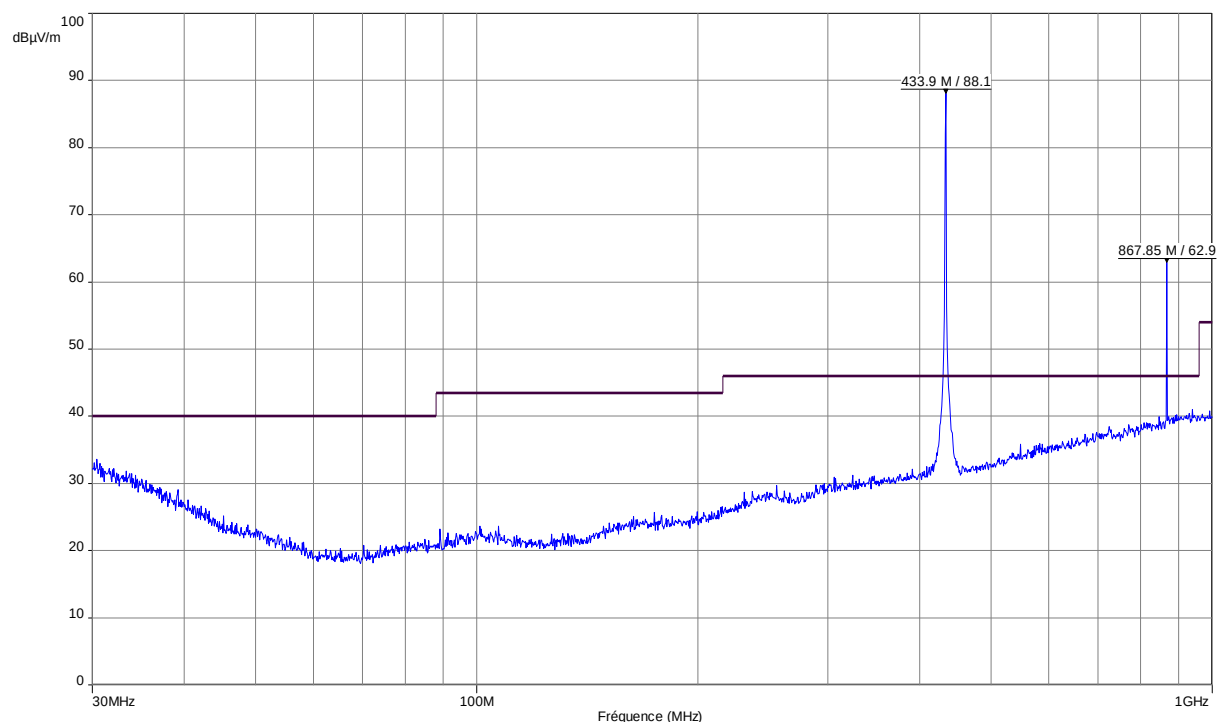
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Log-periodic antenna	TDK	PLP3003	ANT-101-001	2015/8	2016/8
Biconnic antenna	COM-POWER	AB- 900	ANT-101-003	2015/8	2016/8
BiConiLog antenna	EMCO	3142B	ANT-101-010	2015/8	2016/8
Horn antenna	ETS-LINDGREN	3115	ANT-141-013	2015/7	2018/7
RF cable	Div	OATS/25m	CAB-101-019	2015/3	2016/3
RF cable	Pasternack	PE302-120	CAB-131-024	2015/3	2016/3
RF cable	HUBER+SUHNER	RG214U	CAB-141-026	2015/3	2016/3
RF cable	HUBER+SUHNER	RG214U	CAB-141-029	2015/3	2016/3
RF cable	HUBER+SUHNER	SF104	CAB-141-030	2015/3	2016/3
High-pass filter	Mini-Circuit	VHF-3100+	FIL-151-006	2015/3	2016/3
Pre-amplifier	PE	PE1524	PRE-101-002	2015/3	2016/3
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	2016/7
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 > 20dB						
Supplementary information: Frequency list measured on the Open Area Test Site has been created with pre-scan results.						
Frequency band investigated:		9kHz-30MHz				
RBW:		200Hz (9kHz-150kHz)				
		9kHz (150kHz-30MHz)				
Measurement distance:		10m				
Limit:		FCC Part 15.205 - 15.209				
Final measurement detector:		Quasi-Peak				
Wide Measurement Uncertainty:		± 5 dB (k=2)				
Note:		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	Meter reading	CF total	Field level	Field level	Pol	Antenna height	Table angle	Limit	Margin
MHz	(QP) dBμV	(Pk) dBμV	dB	(QP) dBμV/m	(Pk) dBμV/m		cm	Degré	(QP) dBμV/m	dB
Margin > 20dB										
Supplementary information: Frequency list measured on the Open Area Test Site has been created with pre-scan results.										
Frequency band investigated:		30MHz-1GHz								
RBW:		120kHz								
Measurement distance:		3m								
Limit:		FCC Part 15.205 - 15.209								
Final measurement detector:		Quasi-Peak								
Wide Measurement Uncertainty:		± 5.2dB (k=2)								
RESULT:		PASS								

Tabulated Results for Unwanted emissions (1GHz-4.5GHz)				
FREQ (MHz)	Field level dBμV/m	Detector	Limit (dBμV/m)	Result
1301.8	46.4	Pk	74 (Pk) / 54 (Av)	Pass
3905.3	52.0	Pk	74 (Pk) / 54 (Av)	Pass
4339.2	50.4	Pk	74 (Pk) / 54 (Av)	Pass
RBW / VBW		1MHz / 3MHz		
Measurement distance:		3m		
Limit:		FCC Part 15.205 - 15.209		
Final measurement detector:		Peak / Average		
Wide Measurement Uncertainty:		± 5.2dB (k=2)		
RESULT:		PASS		
Note:		(1): Field strength is measured on the Open Area Test Site at a distance of 3m. Three orthogonal axis measurements are performed for both horizontal and vertical antenna (measure) polarization in order to obtain the maximum peak field strength. (2): 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 is as follow: $FS = RA + AF + CF - AG$ Where FS = Field Strength (Level dBμV/m) RA = Receiver Amplitude (Meter reading dBμV) AF = Antenna Factor CF = Cable Factor AG = Amplifier Gain Total factor (dB) is AF + CF – AG Margin value = Emission level – Limit value (3): The average value of emission is: $Average = Peak\ value + 20\log(Duty\ Cycle)$ Where the duty factor (DC) is calculated from following formula: $DC = Tx\ ON\ on\ a\ period\ of\ 100ms$ $DC = 50ms/100ms \rightarrow 20\log(DC) = -6dB$ Worst case for duty cycle factor calculation (See chapter 7.)		

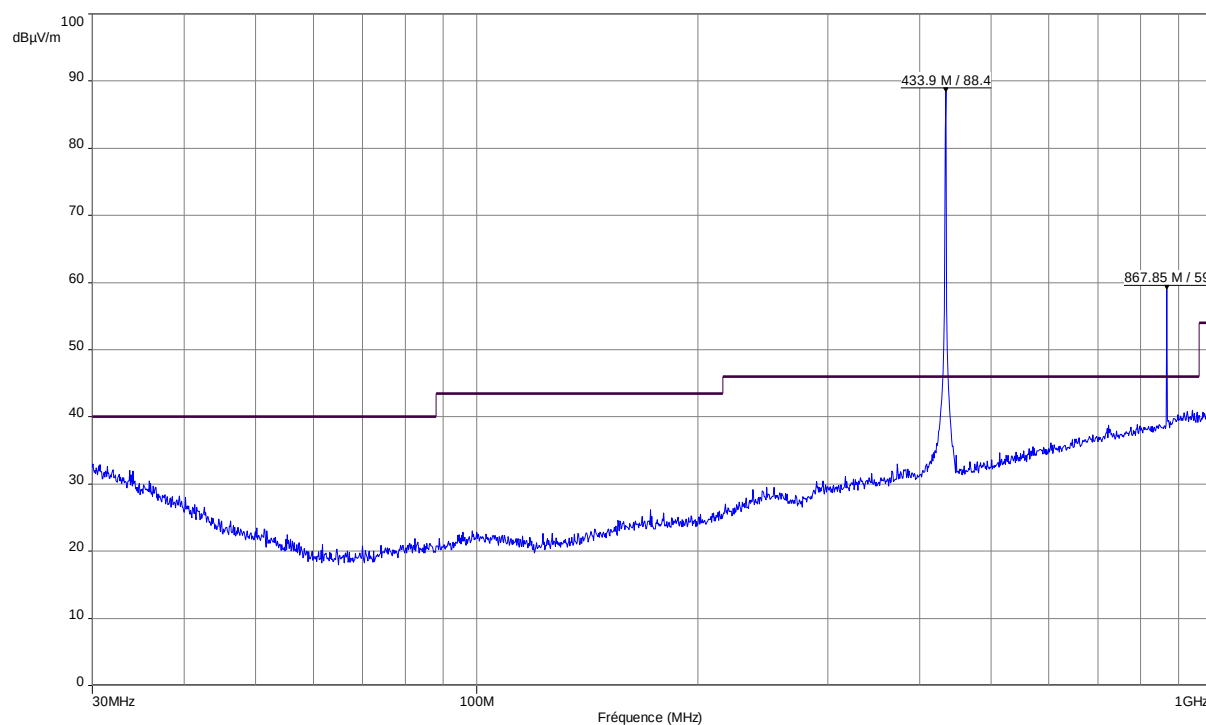
Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Horizontal / Transmit mode)



Note: Pre-scan graph only for identification purpose. 433,92MHz frequency observed is the carrier frequency.

Frequency band investigated:	30MHz-1GHz
Unit :	dBμV/m
RBW :	100kHz
Antenna polarization :	Horizontal
Voltage:	3V DC
Limit:	15.205 - 15.209
Measurement detector:	Peak
Wide Measurement Uncertainty:	± 5dB (k=2)

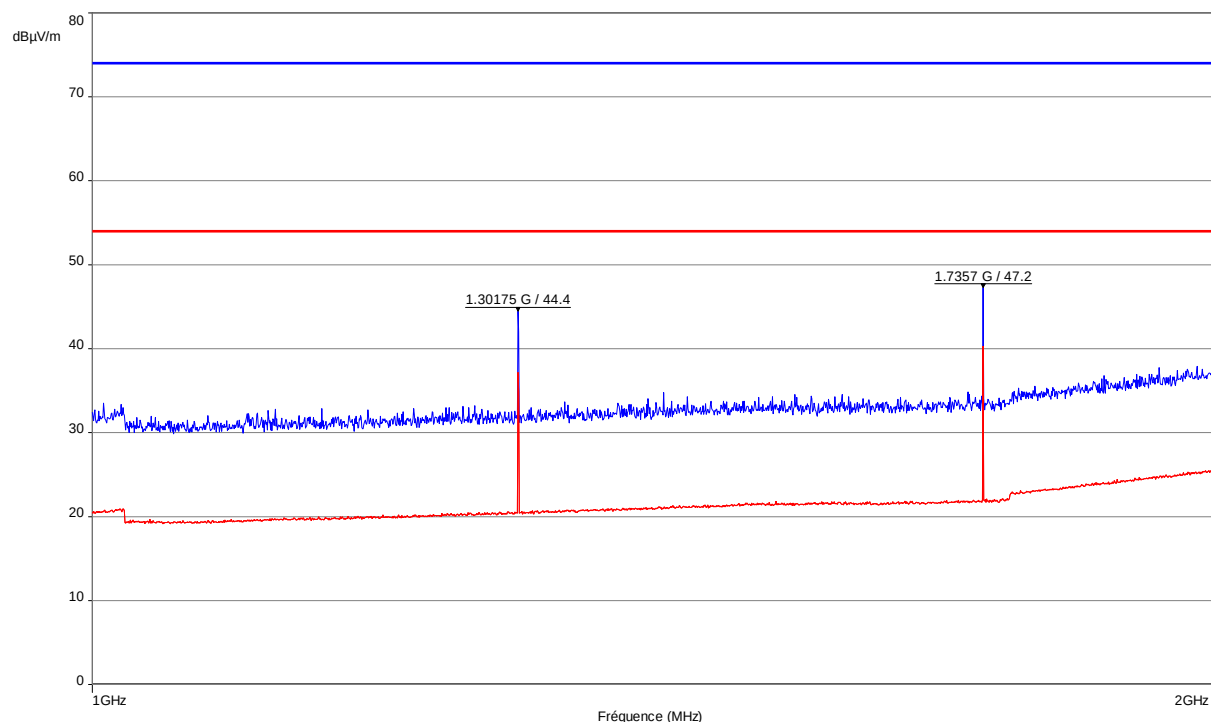
Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 30MHz-1GHz / 3m / Vertical / Transmit mode)



Note: Pre-scan graph only for identification purpose. 433,92MHz frequency observed is the carrier frequency.

Frequency band investigated:	30MHz-1GHz
Unit :	dBμV/m
RBW :	100kHz
Antenna polarization :	Vertical
Voltage:	3V DC
Limit:	15.205 - 15.209
Measurement detector:	Peak
Wide Measurement Uncertainty:	± 5dB (k=2)

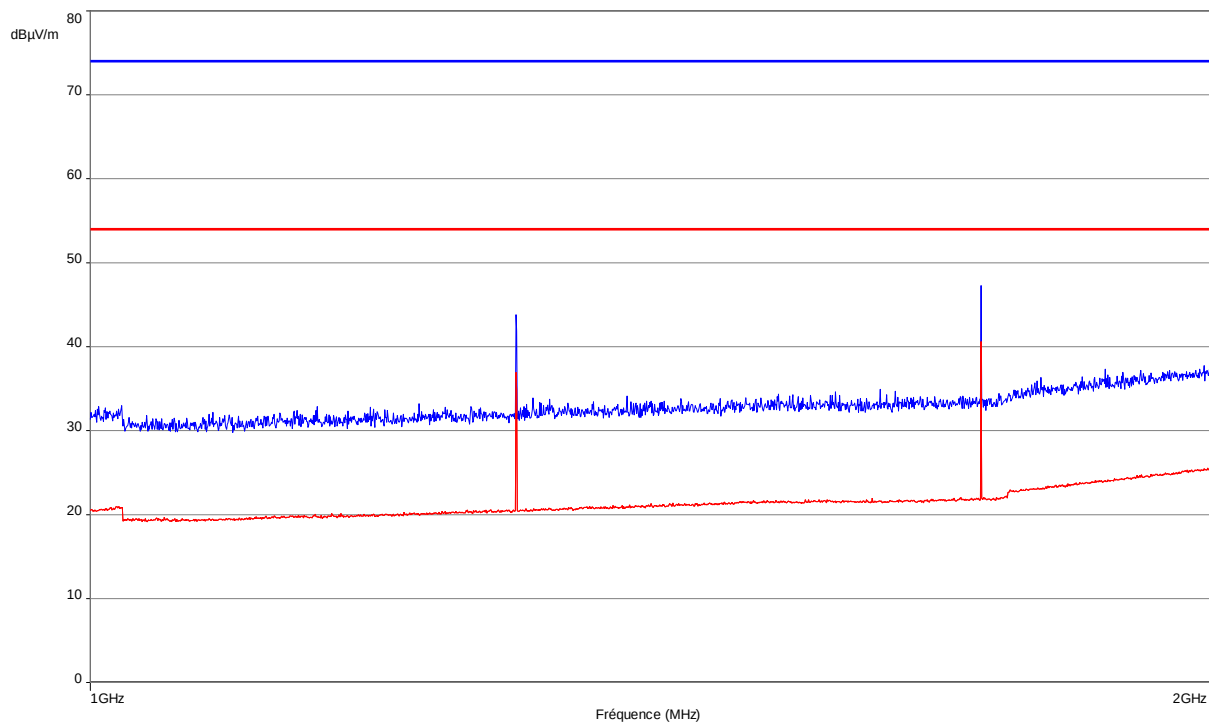
Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 1GHz-2GHz / 3m / Horizontal / Transmit mode)



Note: Pre-scan graph only for identification purpose.

----- : Peak measure	----- : Average measure
Frequency band investigated:	1GHz-2GHz
Unit :	dBμV/m
RBW :	1MHz
Antenna polarization :	Horizontal
Voltage:	3V DC
Limit:	15.205 - 15.209
Measurement detector:	Peak
Wide Measurement Uncertainty:	± 5dB (k=2)

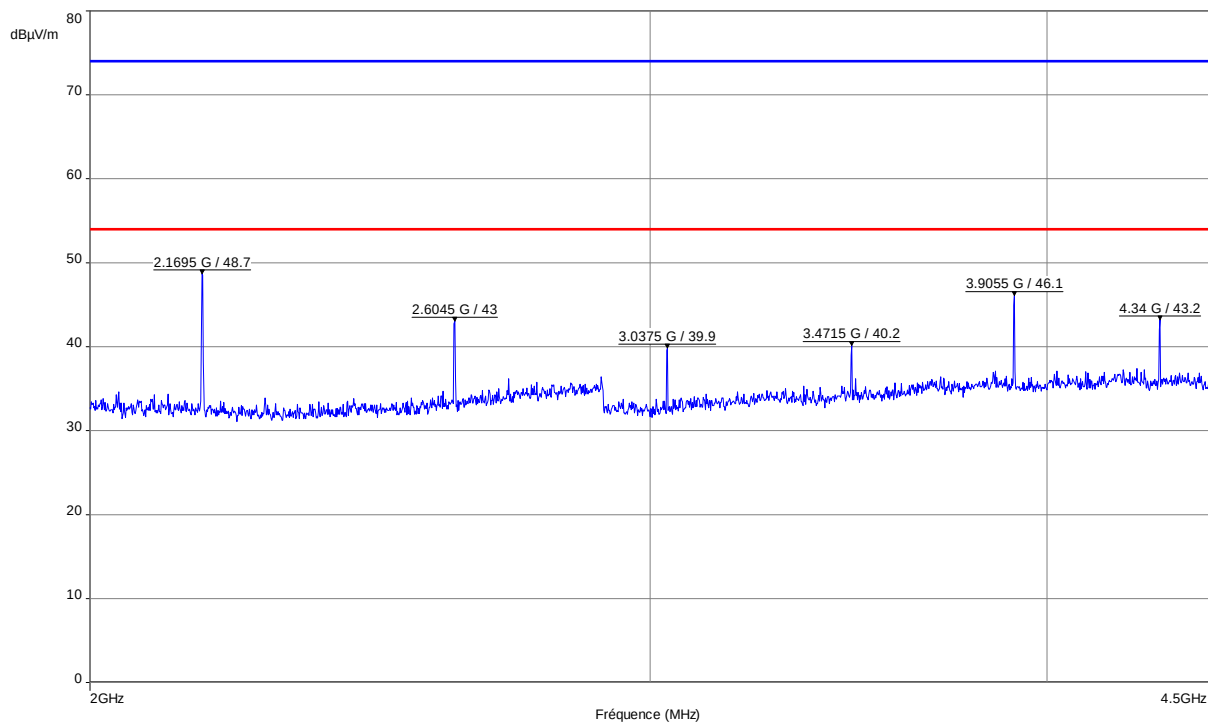
Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 1GHz-2GHz / 3m / Vertical / Transmit mode)



Note: Pre-scan graph only for identification purpose.

----- : Peak measure	----- : Average measure
Frequency band investigated:	1GHz-2GHz
Unit :	dBμV/m
RBW :	1MHz
Antenna polarization :	Vertical
Voltage:	3V DC
Limit:	15.205 - 15.209
Measurement detector:	Peak
Wide Measurement Uncertainty:	± 5dB (k=2)

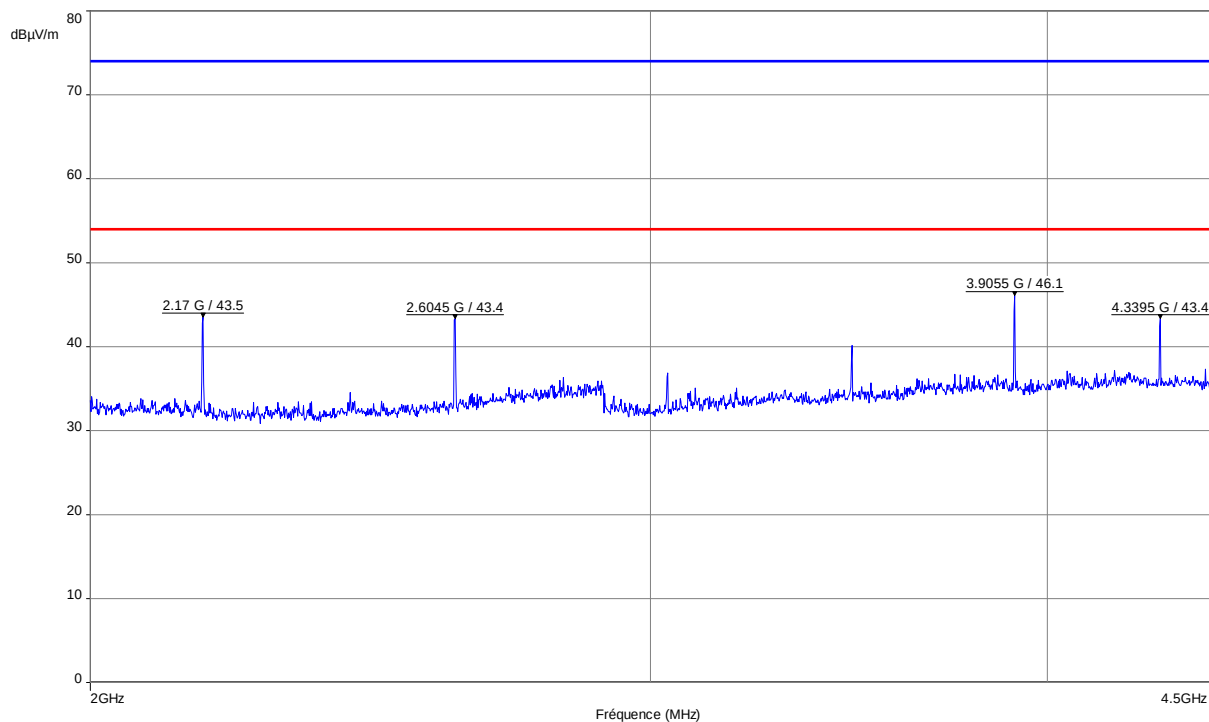
Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 2GHz-4.5GHz / 3m / Horizontal / Transmit mode)



Note: Pre-scan graph only for identification purpose.

----- : Peak measure	
Frequency band investigated:	2GHz-4.5GHz
Unit :	dBμV/m
RBW :	1MHz
Antenna polarization :	Horizontal
Voltage:	3V DC
Limit:	15.205 - 15.209
Measurement detector:	Peak
Wide Measurement Uncertainty:	± 5dB (k=2)

Graphical representation of Radiated Disturbance Measurement (Peak detection, Anechoic chamber pre-scan, 2GHz-4.5GHz / 3m / Vertical / Transmit mode)



Note: Pre-scan graph only for identification purpose.

----- : Peak measure	
Frequency band investigated:	2GHz-4.5GHz
Unit :	dBμV/m
RBW :	1MHz
Antenna polarization :	Vertical
Voltage:	3V DC
Limit:	15.205 - 15.209
Measurement detector:	Peak
Wide Measurement Uncertainty:	± 5dB (k=2)

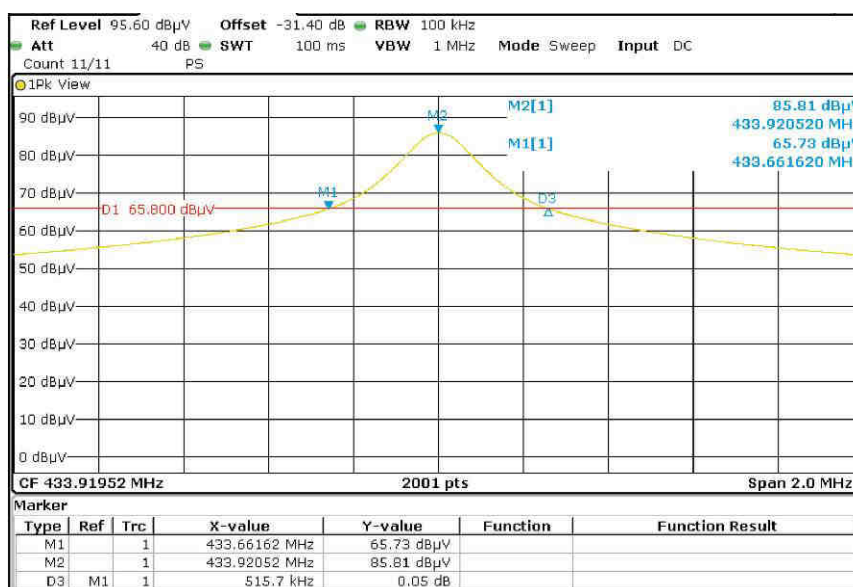
10. 20dB Bandwidth

TEST: 20dB Bandwidth / FCC part 15.231			Verdict
<u>Method:</u> The setup is in an anechoic chamber. The spectrum analyser is connected to the measuring antenna. Peak value is adjusted to Radiated Maximum Peak Output Power (See §7.). The tested equipment is set to transmit operation with modulations on its nominal fundamental frequency.			Pass
Laboratory Parameters:	Required prior to the test	During the test	
Ambient Temperature	10 to 40 °C	20°C	
Relative Humidity	10 to 90 %	55%	
Limits – FCC Part 15.231 (c)			
Frequency (MHz)	Level for Bandwidth	Limit	
433.92	20dB below the modulated carrier	0.25% of center frequency	
Supplementary information: Test location: SMEE – CE Mesures / Test date: December 18 th , 2015 Power supply voltage: 3V from battery			

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Measuring Rec.	Rohde&Schwarz	ESRP	REC-151-002	2015/7	2016/7
BiConiLog antenna	EMCO	3142B	ANT-101-010	2015/8	2016/8
Anechoic chamber	COMTEST	214263	CAG-141-001	-	-
Turntable	Innco- Systems	CT0800	PLA-141-001	-	-

Tabulated Results for Occupied Bandwidth			
Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Result
433.92	0.5157	1.0825	PASS

Graphical representation of 20dB Bandwidth



Frequency :	433.92 MHz
RBW :	100kHz
Measurement detector:	Peak
Wide Measurement Uncertainty:	± 5 dB (k=2)
Note :	Test performed with modulation. Worst case measurement