

**TEST REPORT**  
**IC/FCC**  
**IC RSS-Gen Issue 3 and RSS-210 Issue8**  
**FCC 47CFR Part 15/C Section 15.249**

**Transmitter Intentional Radiator**

**Report Reference No.** ..... : E10456-1202 FCC

Date of issue ..... : Release - Revision 2.0 September 17, 2012

Total number of pages..... : 33

**Testing Laboratory**..... : Quality Auditing Institute

Address ..... : 16 – 211 Schoolhouse Street, Coquitlam, BC, V3K 4X9, Canada

**Accreditations (ISO 17025):**



**Standard Council of Canada: Accredited Laboratory No. 743**

**International Accreditation Service Inc: Accredited Laboratory: No. TL-239**

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**Applicant's name** ..... : Nyce Control Inc.

Address ..... : 103-8525 Baxter Place, Burnaby, BC, V5A 4V7, Canada

Contact ..... : Matthew Battistel

[mbattistel@nycecontrol.com](mailto:mbattistel@nycecontrol.com)

Phone: ..... : (604) 473-9800 x250

Industry Canada Registration : **9488A-Z32011**

FCC Registration: **Y8R-Z32011**

**Test specification:**

Standard..... : RSS-Gen; RSS-210; FCC Part 15.249  
Test procedure..... : RSS-Gen; FCC Part15/C; ANSI C63.4-2009  
Non-standard test method..... : N/A

**Test item description**..... : Wireless key fob

Trade Mark..... : N/A  
Manufacturer..... : Nyce Control Inc.  
Model/Type reference ..... : NCZ-3201  
Ratings..... : +3Vdc 2032 Coin Cell Lithium Battery





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Testing procedure and testing location:

**Testing Laboratory:** Quality Auditing Institute

Testing location/ address .....: 16 – 211 Schoolhouse Street, Coquitlam, BC, 3K 4X9, Canada

**Associated Laboratory:** Quality Auditing Institute (Remote location)

Testing location/ address .....: 19473 Fraser Way, Pitt Meadows, BC, V3Y 2V4, Canada

FCC Test Site Registration Number (OATS 10m and SAC-3m): 226383

Industry Canada Site Registration Number (SAC-3m).....: 9543B-1

Industry Canada Test Site Registration Number (OATS-10m)..: 9543C-1

Testing procedure:

Tested by (name + signature).....: David Johanson

Approved by (+ signature) .....: Aman Jathaul

Testing location/ address .....: 19473 Fraser Way, Pitt Meadows, BC, V3Y 2V4, Canada

Sample Information:

Model Number.....: NCZ-3201

Company:.....: Nyce Control Inc.

Received Date:.....: 09 March 2012

Received By.....: David Johanson

Sample Log.....: QAI Product Control Log (QM 1301 - Sample Inventory)

Environmental Conditions:

Day 1: 09Mar-2012 Indoor Temperature: 23°C R.H.: 35%

Day 2: 12Mar-2012 Indoor Temperature: 23°C R.H.: 30%

Day 3: 13Mar-2012 Indoor Temperature: 22°C R.H.: 25%

Day 4: 14Mar-2012 Indoor Temperature: 21°C R.H.: 30%

Day 5: 19Mar-2012 Indoor Temperature: 21°C R.H.: 30%



The following tests demonstrate the testimony to FCC and IC Electromagnetic compatibility testing for this product.

## EMISSIONS

North America Regions:

- CFR 47 Part 15 Subpart B and Subpart C, Section 15.249
- Industry Canada ICES-003, RSS-Gen and RSS-210

Tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Industry Canada and FCC Regulations for an un-licensed Intentional Radiator. The manufacturer is responsible for the tested product configuration, continued product compliance with these standards listed, and for the appropriate auditing of subsequent products, as required.

**X**

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Tested By  
David Johanson RF/EMC Test Engineer

**X**

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Reviewed By  
Aman Jathaul RF/ EMC Engineer



## Measurement Uncertainty

Radio Frequency .....:  $\pm 1.5 \times 10^{-5}$   
Total RF power, conducted.....:  $\pm 1$  dB  
RF power density, conducted.....:  $\pm 2.75$  dB  
Spurious emissions, conducted.....:  $\pm 3$  dB  
All emissions, radiated.....:  $\pm 3.5$  dB  
Temperature.....:  $\pm 1^\circ\text{C}$   
Humidity.....:  $\pm 5$  %  
DC and low frequency voltages.....:  $\pm 3$  %

## Test Equipment List

### Emissions

Manufacturer	Model	Description	Serial No.	Cal Due Date
ETS Lindgren	S201	3M Chamber 40GHz	1030	N/R
ETS Lindgren	Custom	Mast with Motor	N/R	N/R
ETS Lindgren	Custom	Turntable	N/R	N/R
AH Systems	SAS-562B	Loop Antenna 9kHz-30MHz	252	02-Feb-2013
Sunol Sciences	JB3	Biconilog Antenna 20MHz-3GHz	A120106	28-Oct-2013
Com-Power	AHA-118	Horn Antenna 1-18GHz	711041	11-Mar-2014
Com-Power	LI-115	LISN	241036	11-Feb-2013
Rohde & Schwarz	ESU	EMI Receiver	100011	29-Mar-2013



## Product Description

The NYCE Control Wireless key fob combines a home alarm panel and a ZigBee® (802.15.4) radio into a single small device. Packed with intelligent security features, the Remote Control key fob enables the convenient control of your home security network.

## Operational Description

The NCZ-3201 is a wireless key fob that is used as part of a home automation or security system that is manufactured by NYCE Control Inc. It's designed to produce a momentary transmission which causes a change of state for another device in the Zigbee network. The transmitter is installed with a 3V DC cylindrical lithium battery.

## EUT Testing Configuration

For the purpose of compliance testing, the EUT was powered using an auxiliary +3Vdc power supply since the battery would not have enough power to complete the testing. The Remote was programmed to transmit the maximum output power at the low, mid and high channels of the ZigBee band (2405, 2440 and 2480 MHz respectively) in a continuous transmission mode, with or without modulation. Programming was done by using an Ember programming module that was connected to a PC via POE Ethernet. The programming module was disconnected after programming.

Manufacturer	Nyce Controls Inc.
Product Name	ZigBee NCZ key fob
Model No.	NCZ-3201
Serial No.	R0-007
Product Software/Firmware Revision	NCZ3041-FCC20110914 (Test FW)

## Auxiliary Equipment

Description	+3Vdc Adjustable DC Power Supply
Manufacturer	Xantrex
Model No.	LX60-1
Input	110-130Vac 60Hz 0.2A
Output	+3Vdc
Plug	NEMA 5-15 Grounded Polarized 3 prong blade Type A
Description	Netbook PC
Manufacturer	Compaq
Model No.	Mini
Input	+19Vdc for AC adapter 100-240Vac 50-60Hz
Plug	NEMA 5-15 Grounded Polarized 3 prong blade Type A
Description	Ethernet switch
Manufacturer	Netgear
Model No.	FS-108P
Input	+9Vdc for AC adapter 100-240Vac 50-60Hz
Plug	NEMA 5-15 Grounded Polarized 3 prong blade Type A
Description	Programming Module
Manufacturer	Ember
Model No.	ISA3
Plug	RJ-45 Ethernet POE

## Cables

Description	Length	Connector A	Connector B	Shielded	Ferrites
Temporary power leads (for testing purposes only)	1m	solder	terminal	no	yes



## Section I: Requirements for the Canadian Market- IC (Exigences pour le marché Canadien)

### Summary for RSS-Gen issue 3 and RSS-210 Issue 8

Testing was performed pursuant to Industry Canada standards

Test	Standard	Description	Result
Digital Circuits AC Mains Conducted Emissions	RSS-Gen (7.1.4) ICES-003	The AC mains Conducted emissions are measured in the 0.15 to 30MHz range	Not Applicable
Digital Circuits Radiated Emissions	RSS-Gen (7.1.4) ICES-003	The radiated emissions are measured in the 30-1000MHz range	Complies
Antenna Requirement	RSS-GEN(7.1.2)	Replaceable Antenna must use a unique connector	Complies Soldered non-replaceable antenna
Radiated Peak Power and Harmonics	RSS-210 (A2.9)(a)	Peak Power and Harmonics shall be measured at 3meters	Complies
Spurious Emissions outside of the band	RSS-210 (A2.9)(b)	Radiated Spurious emissions shall be 50dBc or 54dBuV in accordance with table 2, whichever is less stringent 30-18000MHz	Complies
Occupied Bandwidth	RSS-GEN (4.6.1)	When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, is measured.	Complies
Transmitter Frequency Stability	RSS-GEN (4.7) and (7.2.6)	Measure the Frequency Stability over Voltage and temperature ranges	Complies



## Part 1 - Digital Circuits Radiated Emission Testing

DATE: March 9, 2012

TEST STANDARD: ICES-003 Issue 4

TEST METHOD: RSS-Gen (7.1.4); CAN/CSA – CEI/IEC CISPR 22: 02

TEST VOLTAGE: 3Vdc

MINIMUM STANDARD: Class B Limit:

Frequency (MHz)	Maximum Field Strength (calculated) dB $\mu$ V/m at 3 m	Maximum Field Strength dB $\mu$ V/m at 10 m
30 - 230	40.45	30.0
230 - 1000	47.45	37.0

Note 1. The lower limit shall apply at the transition frequency  
Note 2. Additional provisions may be required for cases where interference occurs  
Note 3. The 3meter calculation is done for measurements performed at 3meters.

METHOD OF MEASUREMENT: The equipment was set up in 3m Semi Anechoic Chamber for preliminary and final measurements; Radiated Emissions were performed at 3 meters for this unit. A typical application was tested.

Emissions in both horizontal and vertical polarizations were measured while rotating the EUT on a turntable to maximize the emissions signal strength.

This product may to be worn on the body. The EUT was investigated in 3 orthogonal planes and the worst case data and plots were taken.

The transmitter was OFF and set for Receive mode for this test.

MODIFICATIONS: The EUT did not require any modifications.

MEASUREMENT DATA: The plots and data are contained in Appendix A.

PERFORMANCE: Complies with Standard



## Part 2 - Antenna Requirements

DATE: March 9, 2012

TEST STANDARD: IC RSS-Gen Section 7.1.2

APPLICABLE REGULATIONS : - "An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited."... "the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded."

RESULT : This unit meets this requirement. The antenna is soldered to the circuit board and is not accessible to the end-user.

Zigbee transceiver – Johanson Technology Inc. p/n:2450AT18A100E



## Part 3 - Radiated Peak Power of the Fundamental and Harmonics

DATE: March 12, 2012

TEST STANDARD: IC RSS-210 Annex 2 Section (A2.9)(a)

TEST VOLTAGE: 3Vdc

MINIMUM STANDARD:

(a) The field strengths measured at 3 meters shall not exceed the following:

Fundamental Frequencies (MHz)	Field Strength (millivolts/m)	
	Fundamental	Harmonics
902-928	50 (94dBuV)	0.5 (54dBuV)
2400-2483.5	50 (94dBuV)	0.5 (54dBuV)
5725-5875	50 (94dBuV)	0.5 (54dBuV)

TEST SETUP: The EUT was tested in our 3meter SAC and was positioned on the center of the Turntable and connected to a 3Vdc power supply. The Transmitter was set for Continuous transmission. The lowest, middle and highest channels in the 2400-2483.5MHz band were measured for all radiated emissions 9kHz to 26GHz.

MEASUREMENT METHOD: Measurements were made using an EMI Receiver with 1MHz RBW, Average detector using the appropriate Antennas, amplifiers and filters.

This product may be worn on the body. The EUT was investigated in 3 orthogonal planes and the worst case data and plots were taken.

DEVICE DESCRIPTIONS: As described in the above EUT description and setup Section.

EMISSIONS DATA: No emissions within 20dB of the limit line were detected below 2.4GHz and above 7.5GHz using the appropriate antennas and amplifiers. See data in Appendix A

OBSERVATIONS: The EUT performed as expected.

PERFORMANCE: Complies.



## Part 4 - Spurious Radiated Emissions Testing

DATE: March 13, 2012

TEST STANDARD: IC RSS-210 Annex 2 Section (A2.9)(b)  
RSS-Gen Section (7.2.5)

TEST VOLTAGE: 3Vdc

MINIMUM STANDARD: (b) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general field strength limits listed in RSS-Gen, whichever is less stringent.

**Table 5: General Field Strength Limits for Transmitters at Frequencies Above 30 MHz**

Frequency (MHz)	Field Strength	
	uV/m @ 3-m	Calculated dB $\mu$ V/m at 3m
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
960 +	500	54.0

TEST SETUP: The EUT was tested in our 3meter SAC and was positioned on the center of the Turntable and connected to a 3Vdc power supply. The Transmitter was set for Continuous transmission. The lowest, middle and highest channels in the 2400-2483.5MHz band were measured for all radiated emissions 30MHz to 26GHz.

MEASUREMENT METHOD: Measurements were made using an EMI Receiver with 120kHz RBW Quasi-Peak or 1MHz RBW Average detector as required using the appropriate Antennas, amplifiers and filters.

This product may be worn on the body. The EUT was investigated in 3 orthogonal planes and the worst case data and plots were taken.

DEVICE DESCRIPTIONS: As described in the above EUT description and setup Section.

EMISSIONS DATA: No emissions within 20dB of the limit line were detected below 2.4GHz and above 7.5GHz using the appropriate antennas and amplifiers. See data in Appendix A

OBSERVATIONS: The EUT performed as expected.

PERFORMANCE: Complies.



## Part 5 - Occupied Bandwidth Testing

DATE:	March 12, 2012
TEST STANDARD:	RSS-Gen Section (4.6.1)
TEST VOLTAGE:	3Vdc
MINIMUM STANDARD:	When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.
TEST SETUP:	The EUT was tested in our 3meter SAC and was positioned on the center of the Turntable and connected to a 3Vdc power supply. The Transmitter was set for Continuous transmission with the appropriate modulation. The highest power channel was measured.
MEASUREMENT METHOD:	Measurements were made using an EMI Receiver with 100kHz RBW Average Detector set on maximum hold using the appropriate Antennas, amplifiers and filters.  This product may be worn on the body. The EUT was investigated in 3 orthogonal planes and the worst case data and plots were taken.
DEVICE DESCRIPTIONS:	As described in the above EUT description and setup Section.
EMISSIONS DATA:	See Data and Plots in Appendix B
OBSERVATIONS:	Since this product was tested per the requirements of RSS-210 A2.9, there was no reference to a required Bandwidth. It was decided that the 99% bandwidth was the appropriate measurement.  The EUT performed as expected.
PERFORMANCE:	Complies.



## Part 6 - Transmitter Frequency Stability

DATE:	March 19, 2012
TEST STANDARD:	RSS-Gen Section (4.7) and (7.2.6)
TEST VOLTAGE:	3Vdc from battery
MINIMUM STANDARD:	<p>Not specified.</p> <p>(4.7) With the transmitter installed in an environment test chamber, the unmodulated carrier frequency shall be measured under the conditions specified below:</p> <ul style="list-style-type: none"><li>(a) at temperatures of -30°C, +20°C and +50°C, and at the manufacturer's rated supply voltage; and</li><li>(b) at a temperature of +20°C and at <math>\pm 15</math> percent of the manufacturer's rated supply voltage.</li></ul> <p>(7.2.6) Transmitter frequency stability for licence-exempt radio apparatus shall be measured in accordance with Section 4.7. Also, for licence-exempt radio apparatus, the frequency stability shall be measured at temperatures of -20°C, +20°C and +50°C instead of at the temperatures specified in Section 4.7(a). If the frequency stability of the licence-exempt radio apparatus is not specified in the applicable standards, measurement of the frequency stability is not required provided that the occupied bandwidth of the licence-exempt radio apparatus lies entirely outside the restricted bands and the prohibited TV bands of 54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz.</p>
TEST SETUP:	The EUT was bench tested and in our temperature chamber. Since this is a battery operated device, there was no measurement resulting from the AC voltage variation. The temperature was varied at +50, +20, and -30° Celsius. The transmitter was set for Carrier Wave (CW) mode and the lowest and highest channel Frequency was measured at each Temperature setting, after the Transmitter stabilized at the temperature.
MEASUREMENT METHOD:	Measurements were made using a Spectrum Analyzer with 1kHz RBW Average detector using the appropriate Antennas, amplifiers and filters.
DEVICE DESCRIPTIONS:	As described in the above EUT description and setup Section.
EMISSIONS DATA:	not required. The Occupied bandwidth lies within the 2.4 to 2.4385GHz designated band. See data below in the FCC Transmitter Frequency Stability section.
OBSERVATIONS:	The EUT performed as expected.
PERFORMANCE:	Complies.



## Section II: Requirements for the US Market - FCC

### General

Tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC CFR47 Part 15 subpart B - Unintentional Radiators, Class B and subpart C – Intentional Radiators

### Summary for FCC CFR47, Part 15 Subpart B and Subpart C Section 15.249

Test	Standard	Description	Result
AC Mains Conducted Emissions	15.107	The AC mains Conducted emissions are measured in the 0.15 to 30MHz range	Not Applicable
Digital Circuits Radiated Emissions	15.109	The radiated emissions are measured in the 30-18000MHz range	Complies
Antenna Requirement	15.203	Replaceable Antenna must use a unique connector	Complies
Radiated Fundamental and Harmonics Emissions	15.249(a)	Peak Fundamental and Harmonics shall be measured at 3meters	Complies
Spurious Emissions outside of the band and Bandedge	15.249(d) and (e)	Radiated Spurious emissions shall be 50dBc or the levels in 15.209	Complies
Transmitter Frequency Stability	15.215(c)	The 20dB bandwidth must remain within the designated frequency band over the expected variations in temperature and voltage range	Complies



## Part 1 - Digital Circuits Radiated Emission Testing

DATE: March 09, 2012

TEST STANDARD: FCC Part 15/B

TEST VOLTAGE: 3Vdc

MINIMUM STANDARD: Class B Limit:

+Frequency (MHz)	Field Strength	
	uV/m @ 3-m	dB $\mu$ V/m at 3m
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
960 - 1000	500	54.0

METHOD OF MEASUREMENT: The equipment was set up in 3m Semi Anechoic Chamber (SAC) for preliminary and final measurements; Radiated Emissions were performed at 3 meters for this unit. A typical application was tested.

Emissions in both horizontal and vertical polarizations were measured while rotating the EUT on a turntable to maximize the emissions signal strength.

This product may be worn on the body. The EUT was investigated in 3 orthogonal planes and the worst case data and plots were taken.

The transmitter was OFF and set for Receive mode for this test.

MODIFICATIONS: The EUT did not require any modifications.

MEASUREMENT DATA: See Appendix A for emissions plots and corresponding data

PERFORMANCE: Complies with Standard



## Part 2 - Antenna Requirements

DATE: March 09, 2012

TEST STANDARD: FCC Part 15.203

APPLICABLE REGULATIONS : - "An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited."... "the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded."

RESULT : This unit meets this requirement. The antenna is soldered to the circuit board and is not accessible to the end-user.

ZigBee transceiver – Johanson Technology Inc. p/n: 2450AT18A100E



## Part 3 - Radiated Peak Power of the Fundamental and Harmonics

DATE: March 13, 2012

TEST STANDARD: FCC Part 15.249(a)

TEST VOLTAGE: 3Vdc

TEST CONDITIONS: Indoor, Temperature and Humidity: 25°C, 62%

MINIMUM STANDARD:

(a) The field strengths measured at 3 meters shall not exceed the following:

Fundamental Frequencies (MHz)	Field Strength (millivolts/m)	
	Fundamental	Harmonics
902-928	50 (94dBuV)	0.5 (54dBuV)
2400-2483.5	50 (94dBuV)	0.5 (54dBuV)
5725-5875	50 (94dBuV)	0.5 (54dBuV)

TEST SETUP: The EUT was tested in our 3meter SAC and was positioned on the center of the Turntable and connected to a 3Vdc power supply. The Transmitter was set for Continuous transmission. The lowest, middle and highest channels in the 2400-2483.5MHz band were measured for all radiated emissions 9kHz to 26GHz.

MEASUREMENT METHOD: Measurements were made using an EMI Receiver with 1MHz RBW, Average detector, using the appropriate Antennas, amplifiers and filters.

This product may be worn on the body. The EUT was investigated in 3 orthogonal planes and the worst case data and plots were taken.

DEVICE DESCRIPTIONS: As described in the above EUT description and setup Section.

EMISSIONS DATA: No emissions within 20dB of the limit line were detected below 2.4GHz and above 7.5GHz using the appropriate antennas and amplifiers. See data in Appendix A

OBSERVATIONS: The EUT performed as expected.

PERFORMANCE: Complies.



## Part 4 - Spurious Radiated Emissions and Bandedge Testing

DATE: March 12, 2012

TEST STANDARD: FCC Part 15.249(d) and (e)

TEST VOLTAGE: 3Vdc

MINIMUM STANDARD: (d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.  
(e) As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20dB under any condition of modulation.

### 15.209 General Field Strength Limits

Frequency (MHz)	Field Strength	
	uV/m @ 3-m	Calculated dB $\mu$ V/m at 3m
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
960 +	500	54.0

TEST SETUP: The EUT was tested in our 3meter SAC and was positioned on the center of the Turntable and connected to a 3Vdc power supply. The Transmitter was set for Continuous transmission. The lowest, middle and highest channels in the 2400-2483.5MHz band were measured for all radiated emissions 9kHz to 26GHz.

MEASUREMENT METHOD: Measurements were made using an EMI Receiver with 120kHz RBW Quasi-Peak or 1MHz RBW Average detector using the appropriate Antennas, amplifiers and filters.

This product may be worn on the body. The EUT was investigated in 3 orthogonal planes and the worst case data and plots were taken.

DEVICE DESCRIPTIONS: As described in the above EUT description and setup Section.

EMISSIONS DATA: No emissions within 20dB of the limit line were detected below 2.4GHz and above 7.5GHz using the appropriate antennas and amplifiers. See data in Appendix A

OBSERVATIONS: The EUT performed as expected.

PERFORMANCE: Complies.

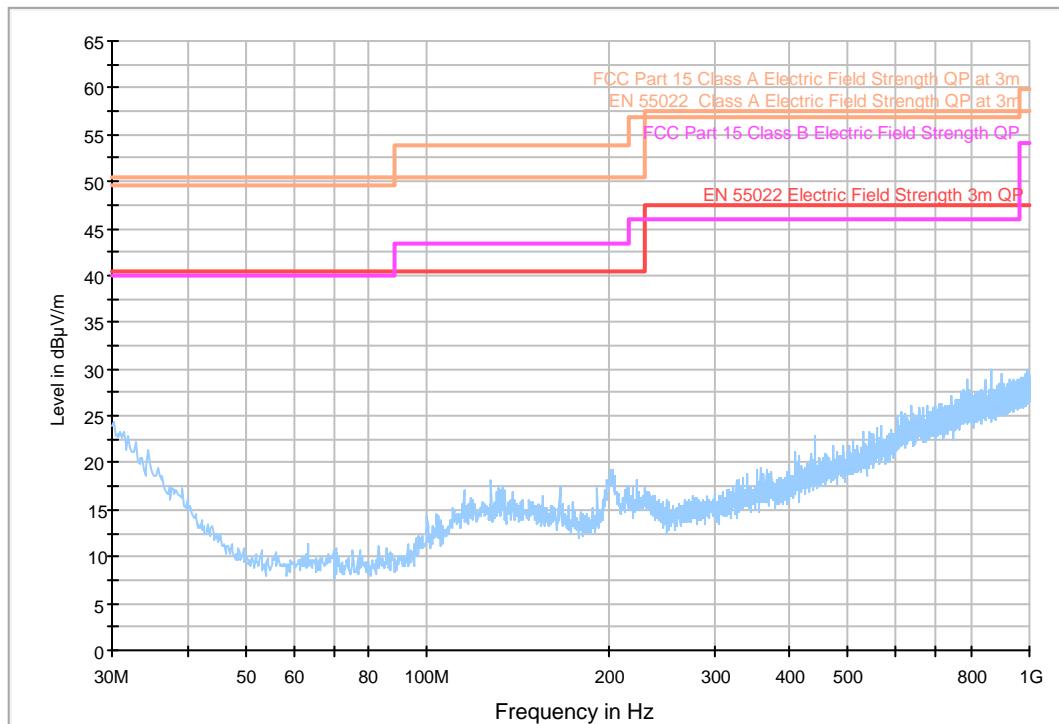


## Part 5 - Transmitter Frequency Stability

DATE:	March 19, 2012																																				
TEST STANDARD:	FCC Part 15.215(c)																																				
TEST VOLTAGE:	3Vdc																																				
MINIMUM STANDARD:	The 20dB bandwidth must remain within the designated frequency band over the expected variations in temperature and voltage range																																				
TEST SETUP:	The EUT was bench tested and in our temperature chamber. Since the supplied Coin cell can not operate long enough for the test, the 3Vdc was supplied by an Auxiliary power supply. The temperature was varied at +30, +20, 0, -20 and -30deg. Celsius as per the manufacturers expected temperature range and the Bandwidth measured at 3Vdc for each temperature level at the bandedge. The Transmitter was set for Continuous transmission using the modulation for this product. The lowest, and highest channel bandwidth was measured at each Voltage and Temperature setting.																																				
MEASUREMENT METHOD:	Measurements were made using a Spectrum Analyzer with 1MHz RBW Average detector using the appropriate Antennas, amplifiers and filters.																																				
DEVICE DESCRIPTIONS:	As described in the above EUT description and setup Section.																																				
EMISSIONS DATA:	<p>Channel 11 – 2.405GHz</p> <table border="1"><thead><tr><th>Temperature (deg. Celsius)</th><th>Voltage (Vdc)</th><th>Frequency at 20dB level from peak emission (GHz)</th></tr></thead><tbody><tr><td>-30</td><td>3</td><td>2.40336</td></tr><tr><td>-20</td><td>3</td><td>2.40336</td></tr><tr><td>0</td><td>3</td><td>2.40328</td></tr><tr><td>20</td><td>3</td><td>2.40336</td></tr><tr><td>30</td><td>3</td><td>2.40320</td></tr></tbody></table> <p>Channel 26 – 2.480GHz</p> <table border="1"><thead><tr><th>Temperature (deg. Celsius)</th><th>Voltage (Vac at 60Hz)</th><th>Frequency at 20dB level from peak emission (GHz)</th></tr></thead><tbody><tr><td>-30</td><td>3</td><td>2.48160</td></tr><tr><td>-20</td><td>3</td><td>2.48168</td></tr><tr><td>0</td><td>3</td><td>2.48168</td></tr><tr><td>20</td><td>3</td><td>2.48172</td></tr><tr><td>30</td><td>3</td><td>2.48176</td></tr></tbody></table>	Temperature (deg. Celsius)	Voltage (Vdc)	Frequency at 20dB level from peak emission (GHz)	-30	3	2.40336	-20	3	2.40336	0	3	2.40328	20	3	2.40336	30	3	2.40320	Temperature (deg. Celsius)	Voltage (Vac at 60Hz)	Frequency at 20dB level from peak emission (GHz)	-30	3	2.48160	-20	3	2.48168	0	3	2.48168	20	3	2.48172	30	3	2.48176
Temperature (deg. Celsius)	Voltage (Vdc)	Frequency at 20dB level from peak emission (GHz)																																			
-30	3	2.40336																																			
-20	3	2.40336																																			
0	3	2.40328																																			
20	3	2.40336																																			
30	3	2.40320																																			
Temperature (deg. Celsius)	Voltage (Vac at 60Hz)	Frequency at 20dB level from peak emission (GHz)																																			
-30	3	2.48160																																			
-20	3	2.48168																																			
0	3	2.48168																																			
20	3	2.48172																																			
30	3	2.48176																																			
OBSERVATIONS:	The EUT performed as expected.																																				
PERFORMANCE:	Complies.																																				

## Appendix A: Report of Measurements Data and Plots

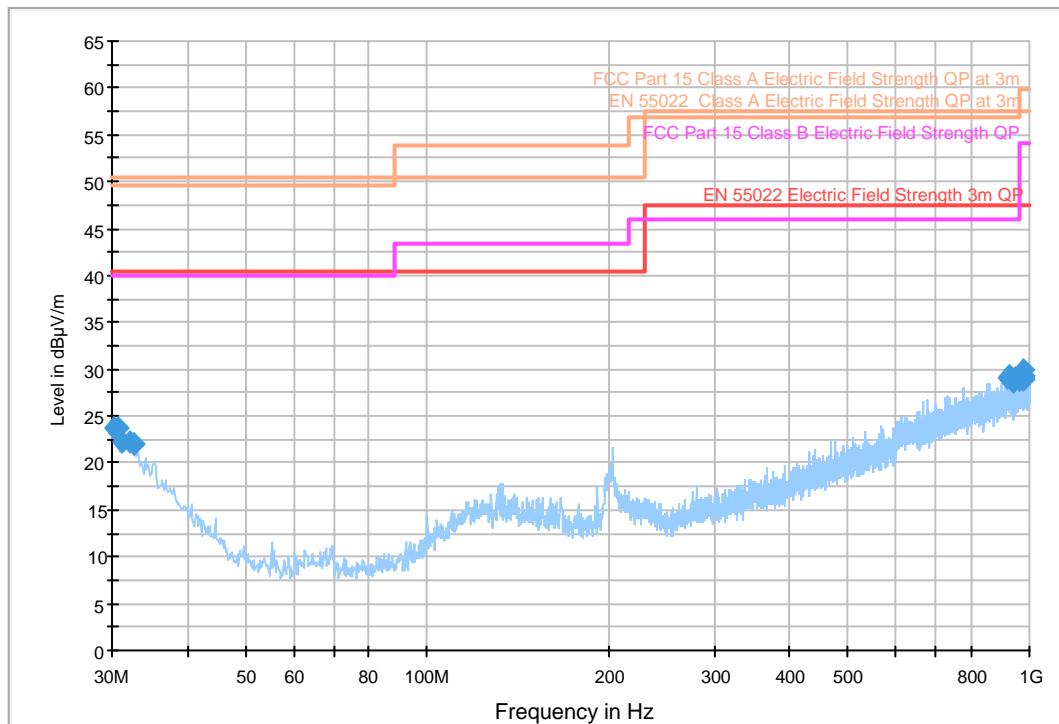
### Quiescent Mode/Transmitter turned off



Plot for reference purposes only

**No Quiescent Emissions detected 9kHz to 2.4GHz**

## Spurious Emissions Transmitter On Channel 11 - 2.405GHz; 18 – 2.440GHz; 26 - 2.480GHz



Plot for Reference purposes only

**No Spurious Emissions detected 9kHz to 2.4GHz for all 3 channels of operations**



### Channel 11 - 2.405GHz Modulated Fundamental and Harmonics 2.4-25GHz Average

Frequency (GHz)	Corrected Average (dB $\mu$ V/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Average Limit (dB $\mu$ V/m)	Margin (dB)
2.40495	92.3	100	V	200	94.0	1.7
4.80993	39.6	100	V	29	54.0	14.4
7.214896	27.8	100	V	18	54.0	26.2
9.61986	11.2	148	V	156	54.0	42.8
12.02487	10.9	143	V	213	54.0	43.1

### Channel 11 - 2.405GHz Modulated Fundamental and Harmonics 2.4-25GHz Peak

Frequency (GHz)	Corrected Peak (dB $\mu$ V/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Peak Limit (dB $\mu$ V/m)	Margin (dB)
2.405482	95.4	100	V	158	114.0	18.6
4.80993	41.4	100	V	29	74.0	32.6
7.214896	30.8	100	V	18	74.0	43.2
9.61986	16.1	148	V	156	74.0	57.9
12.02487	16.9	143	V	213	74.0	57.1

### Channel 18 - 2.440GHz Modulated Fundamental and Harmonics 2.4-25GHz Average

Frequency (GHz)	Corrected Average (dB $\mu$ V/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Average Limit (dB $\mu$ V/m)	Margin (dB)
2.43976	93.5	100	V	154	94.0	0.5
4.8799383	36.1	100	V	97	54.0	17.9
7.3199068	16.6	100	V	271	54.0	37.4
9.7598756	8.4	231	V	58	54.0	45.6
12.1998444	12.1	130	V	222	54.0	41.9

### Channel 18 - 2.440GHz Modulated Fundamental and Harmonics 2.4-25GHz Peak

Frequency (GHz)	Corrected Peak (dB $\mu$ V/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Peak Limit (dB $\mu$ V/m)	Margin (dB)
2.440452	94.9	100	V	202	114.0	19.1
4.8799383	38.0	100	V	97	74.0	36.0
7.3199068	20.6	100	V	271	74.0	53.4
9.7598756	10.4	231	V	58	74.0	63.6
12.1998444	16.9	130	V	222	74.0	57.1



### Channel 26 - 2.480GHz Modulated Fundamental and Harmonics 2.4-25GHz Average

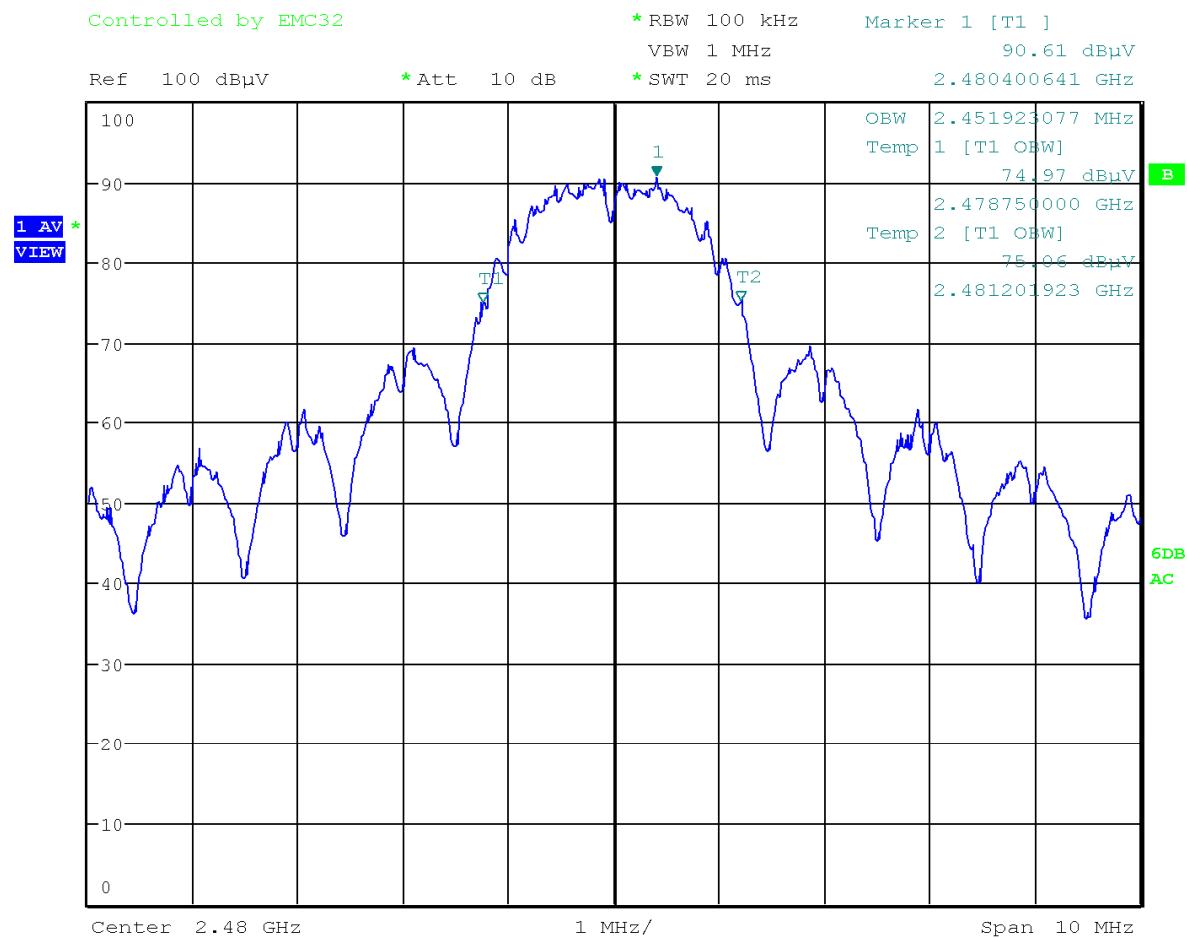
Frequency (GHz)	Corrected Average (dB $\mu$ V/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Average Limit (dB $\mu$ V/m)	Margin (dB)
2.47976	90.6	100	V	160	94.0	3.4
4.95992929	36.5	100	V	97	54.0	17.9
7.43989360	22.0	100	V	272	54.0	32.0
9.91985802	8.7	148	V	155	54.0	45.3
12.3998224	13.9	142	V	207	54.0	40.1

### Channel 26 - 2.480GHz Modulated Fundamental and Harmonics 2.4-25GHz Peak

Frequency (GHz)	Corrected Peak (dB $\mu$ V/m)	Antenna height (cm)	Polarity	Turntable position (deg)	Peak Limit (dB $\mu$ V/m)	Margin (dB)
2.479474	95.4	100	V	152	114.0	18.6
4.95992929	39.8	100	V	97	74.0	34.2
7.43989360	25.0	100	V	272	74.0	49.0
9.91985802	12.2	148	V	155	74.0	61.8
12.3998224	18.3	142	V	207	74.0	55.7

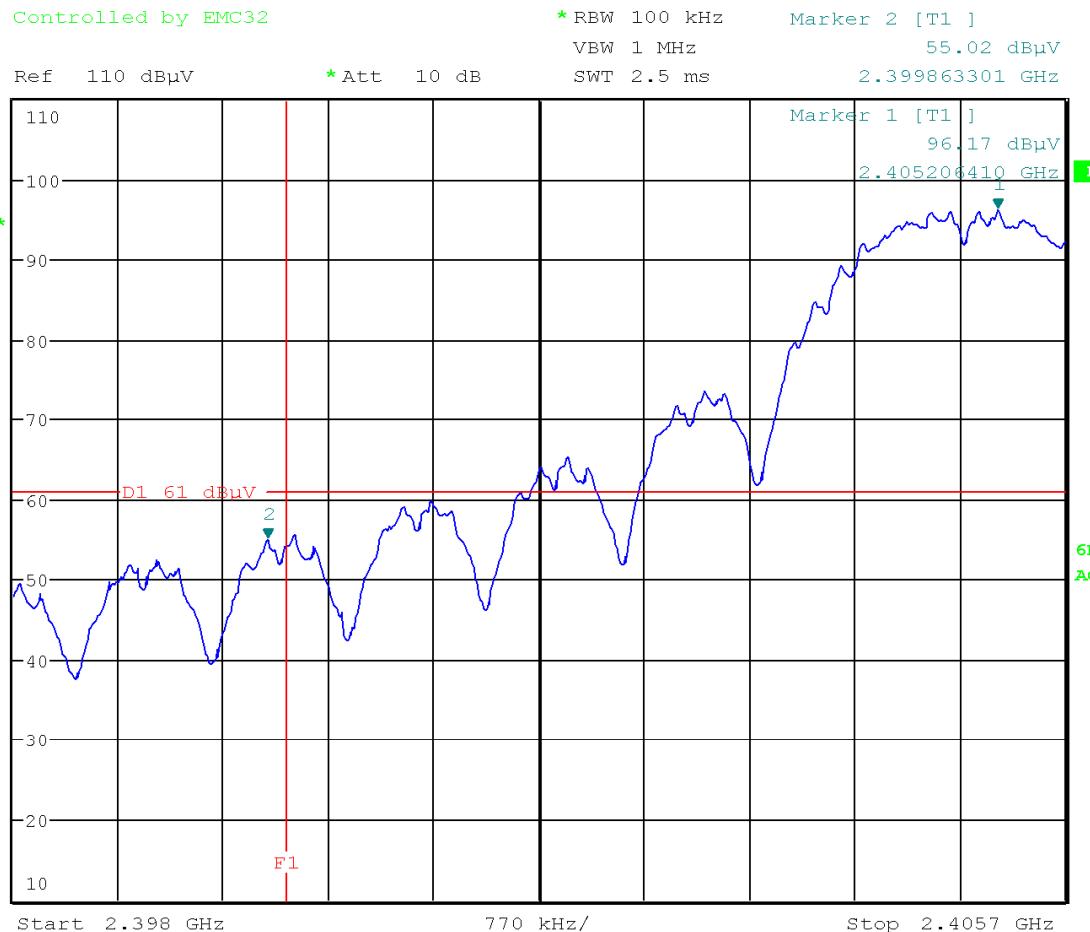
All other emissions and harmonics were undetectable

## Appendix B: Bandwidth and Bandedge Plots



Date: 12.MAR.2012 19:18:00

99% Bandwidth Measurement



Date: 12.MAR.2012 20:02:39

### Low Channel Band Edge

Controlled by EMC32

Ref 110 dB $\mu$ V

\* Att 10 dB

\* RBW 1 MHz

VBW 3 MHz

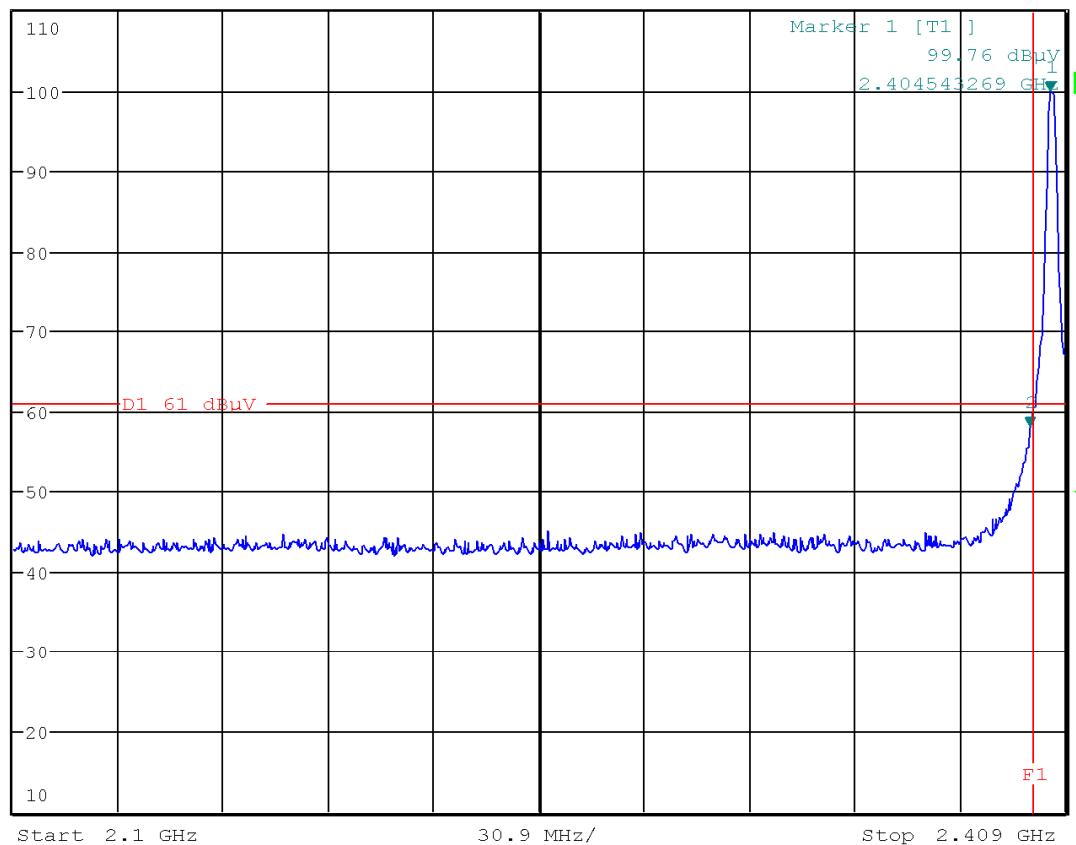
SWT 2.5 ms

Marker 2 [T1 ]

57.91 dB $\mu$ V

2.398472115 GHz

1 PK  
VIEW



Date: 12.MAR.2012 20:36:35

2.1 to 2.409 GHz restricted band plot.



Controlled by EMC32

\* RBW 100 kHz

Marker 2 [T1 ]

Ref 110 dB $\mu$ V

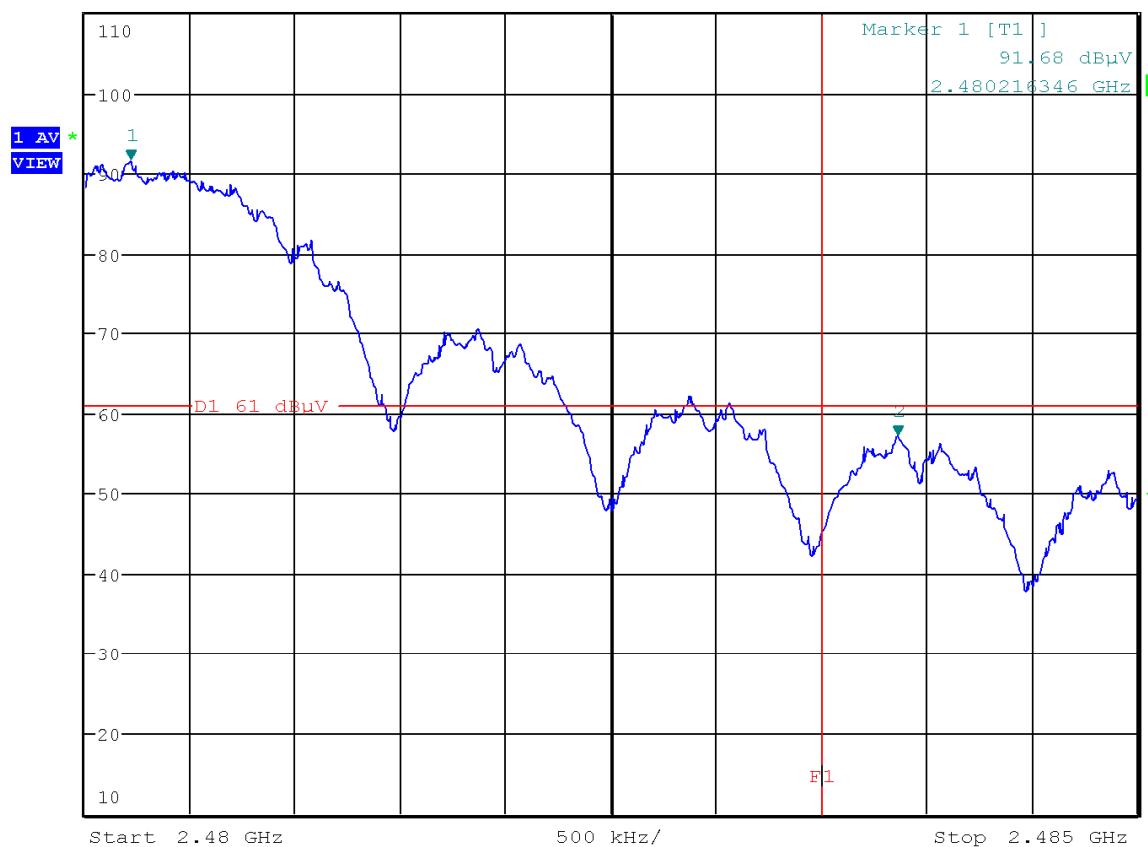
VBW 1 MHz

57.20 dB $\mu$ V

\* Att 10 dB

SWT 2.5 ms

2.483862179 GHz



Date: 12.MAR.2012 20:12:53

### High Channel Band Edge



Controlled by EMC32

\* RBW 1 MHz

Marker 1 [T1 ]

96.64 dB<sub>u</sub>V

Ref 110 dB<sub>u</sub>V

VBW 3 MHz

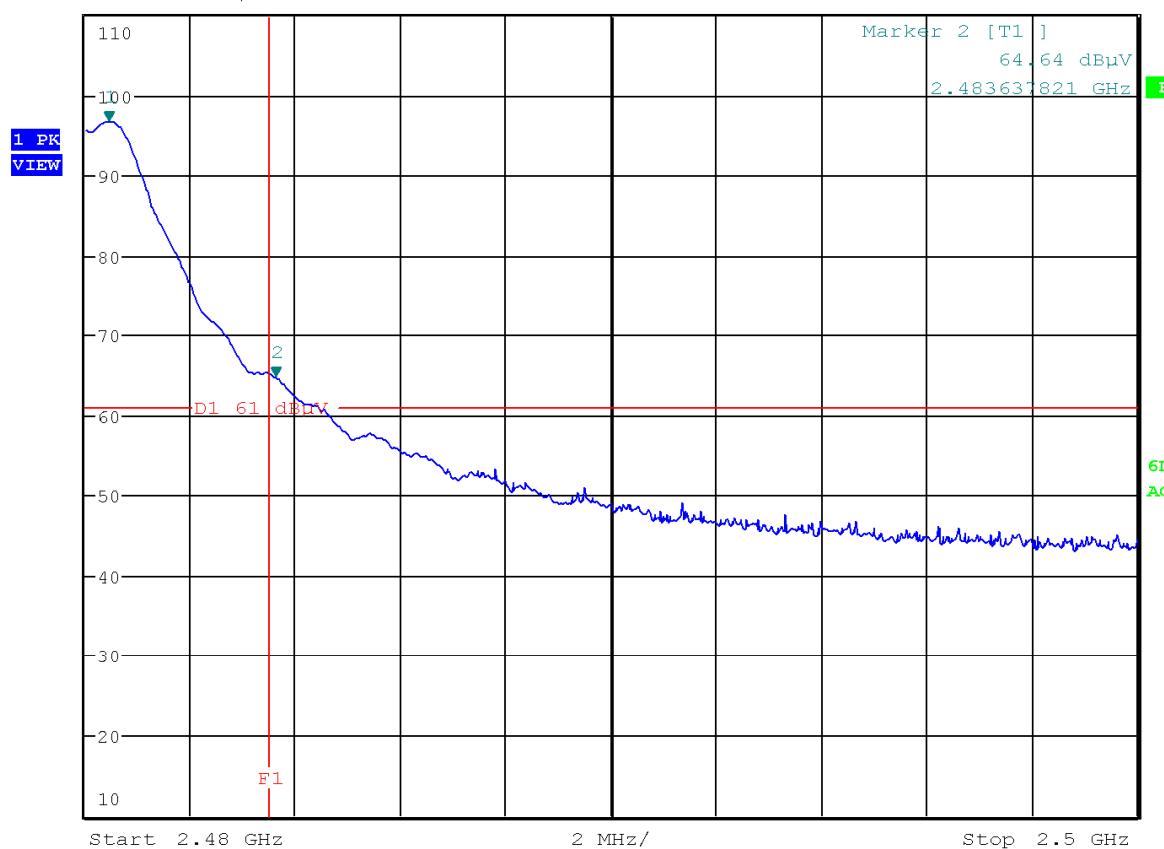
\* Att 10 dB

SWT 2.5 ms

Marker 2 [T1 ]

64.64 dB<sub>u</sub>V

2.480448718 GHz



Date: 12.MAR.2012 20:33:23

2.48 to 2.50 GHz restricted band plot.

## Appendix C: EUT photos during the testing



