NST.11 – Variable Annuity Stress Tests

04 March 2016

1. General Guidance & Requirements

1.1 Objective & Scope

The Central Bank of Ireland ('Central Bank') has specified a National Specific Template ('NST') for periodic reporting under Solvency II of stress and scenario testing results for variable annuity ('VA') type risks. The NST is titled 'NST.11 – Variable Annuity Stress Tests'.

This paper provides guidance on the completion and submission requirements for NST.11, as well as a detailed specification of the stress and scenario tests which are to be applied.

Sections 1.2 and 2 of this document set out general requirements and guidance on reporting under NST.11. Section 3 prescribes the full list of stress and scenario tests which should be performed by all companies falling within the scope of NST.11. In reviewing these sections, the reader should consult the accompanying NST business template which includes corresponding cell references.

Other documents related to NSTs are published and maintained on the Central Bank's website. These include:

- Annotated templates containing information specific to the XBRL reporting framework
- Validation rules which are implicit in NST submission requirements.

1.2 General Requirements

This section specifies the general requirements which apply to the completion and submission NST.11.

No.	Topic	Requirement
1.2.1	**Companies in Scope**	Unless otherwise advised by the Central Bank, NST.11 must be submitted by the following: - All insurance and reinsurance undertakings which have acquired and retained variable annuity type risks on their balance sheet. - High impact undertakings, as classified by the Central Bank's PRISM framework, which have acquired variable annuity type risks and reinsured them outwards.
1.2.2	**Balance Sheet Coverage**	NST.11 should be completed for a company's variable annuity business only. The following elements of the balance sheet are considered: - The best estimate liability for the portfolio of VA risks. - The hedge assets used to manage the risks associated with the VA business. - The account value of policyholders' VA assets under management. Companies are not required to re-calculate or report solvency capital requirements or risk margins post-stress.
1.2.3	**Reinsured Risks**	Where reinsured VA risks are being reported, this should be on a 'look-through' basis. That is, the P&L attributions should look through to the reinsurer's balance sheet for reporting the VA risks in scope.
1.2.4	**Submission Frequency**	NST.11 should be submitted annually as part of the Q2 submission of Solvency II Quantitative Reporting Templates and subject to the same deadline as that submission.

NO.	TOPIC	REQUIREMENT
1.2.5	**Submission Format**	The template should be submitted in the XBRL format. Please refer to the technical details and XBRL taxonomy for NSTs which has been published separately on the Central Bank's website..
1.2.6	**Reporting Date**	The prescribed stress and scenario tests should be applied to the 30 June financial position each year.
1.2.7	**Reporting Basis**	Companies should use the Solvency II basis for applying the prescribed stress and scenario tests and for reporting their impacts in NST.11. For interest rates, the prescribed stresses should be applied to the market consistent yield curve before overlaying the usual convergence methodology from the last liquid point to the (unstressed) ultimate forward rate.
1.2.8	**Reporting Convention**	The reporting convention is at the discretion of companies, but should be consistent with the convention used for NSTs 08-10. As per 1.2.10 of the technical specification accompanying NSTs 08-10, the following convention is suggested: - Impacts causing an increase in the best estimate liability (loss for the company) should be reported as negative values (and vice-versa). - Impacts causing an increase in hedge assets or the reinsurance asset (gain for the company), as well as the underlying account value, should be reported as positive values (and vice-versa). - Accordingly, a net impact which represents a gain for the company should be reported as a positive value. In all cases, the reported value should be the change in the underlying variable due to the applied shock.
1.2.9	**Currency**	The reporting currency for all monetary values is the same as that used by the company for reporting the Quantitative Reporting Templates. Where a company has VA exposures in multiple currencies, a single currency translation rate should be used for converting the daily P&L attribution of each foreign currency to the reporting currency. (Note that a foreign currency here means a currency other than the reporting currency.) The single translation rate should be the translation rate at the close of business on the final trading day of the reporting period. Specific guidance in relation to exposures in foreign currencies is provided at point 1.2.17 of the technical specification document accompanying NSTs 08-10. Companies' approaches to translating foreign currency VA exposures to reporting currency should be consistent across all of the VA NSTs.
1.2.10	**Application of stress and scenario tests.**	All stress and scenario tests should be applied instantaneously, with no allowance for rebalancing of the hedging programme.

2. General Reporting Guidance

This section provides general guidance on reporting within NST.11. Section 3 sets out the prescribed stress and scenario tests and also provides more specific guidance on reporting of results.

No.	Row / Column Ref.	Data Item	Requirement
2.1	**C0100**	Stress ID	This column specifies the unique stress identification code for each stress. There is no requirement for companies to complete any information.
2.2	**C0200**	Additional Item Explanation	Text field for disclosure of the variable (equity index or currency) subject to stress.
2.3	**C0300**	Account Value	The impact of the stress/scenario test on the underlying account value.
2.4	**C0400**	Liability	The impact of the stress/scenario test on the best estimate liability of VA risk exposures. (Note that the impacts to be reported in columns C1700 to C2500 are also impacts on best estimate liabilities. See requirement 2.9.)
2.5	**C0500**	Hedge Assets	The impact of the stress/scenario test on the value of hedge assets.
2.6	**C0600**	Reinsurance Asset	The impact of the stress/scenario test on the value of any reinsurance which is in place and relating to the company's VA risks.
2.7	**C0700**	Net Impact	The net impact is defined as the sum of the impacts on the best estimate liability, hedge asset value, and reinsurance asset value. That is; C0700 = C0400 + C0500 + C0600. (Note that the impacts to be reported in columns C0800 to C1600 are also net impacts. See requirement 2.8.)
2.8	**C0800 to C1600**	Impacts by Duration	The net impact of each stress when applied to up to 9 key durations. At a minimum, the following durations should be specified for each stress: **Rho (by Currency):** 1Year, 2Y, 5Y, 10Y, 20Y, 30Y. **Vega (Equity, Interest Rate, FX):** 3 Month, 6M, 1 Year, 2Y, 5Y, 10Y. The durations used should be appropriately labelled for rho stresses in **R0100**, and for vega stresses in **R4000**.

No.	Row / Column Ref.	Data Item	Requirement
2.9	**C1700 to C2500**	Impacts by Product	The impact on the best estimate liability of each stress when applied to up to 9 key product groupings. Each product group should be appropriately labelled in **R0100**. The split by product grouping is at the discretion of the company, but should be consistent between reporting periods and in line with that used for internal management reporting. For each product group, the main currency of the product liabilities should be disclosed in **R0200**, and the main guarantee type underlying the product should be disclosed in **R0300**.

3. PRESCRIBED STRESS & SCENARIO TESTS

This section sets out the prescribed stress and scenario tests, the results of which should be reported annually via NST.11.

The stress and scenario tests cover a range of market risk factors:

- Equity risk
- Interest rate risk
- Currency risk
- Volatility risk
- Basis risk

3.1 EQUITY RISK STRESS TESTS

NO.	ROW / COLUMN REF.	STRESS (NAME / ID)	REQUIREMENT
3.1.1	**R0400**	**Equity Delta:** EQ.GK.01	The impact of a 1% change in equity values (applied to all indices simultaneously).
3.1.2	**R0500 to R1300**	**Equity Delta by Index:** EQ.GK.02.01 to EQ.GK.02.09	The impact of a 1% change in equity values by up to 9 separate equity indices. At a minimum, companies must apply the stress to a particular index where: - The index accounts for 25% or more of the underlying assets under management. - The hedge instrument used for risk mitigation differs from the index which is used to value the VA liabilities. In this case, only the best estimate liability values should be stressed, while the hedge assets should be assumed to be unchanged. Each stressed index should be appropriately disclosed in **C0200**.
3.1.3	**R1400**	**Equity Delta by Product:** EQ.GK.03	The impact on the best estimate liability of a 1% change in equity values for each listed product group. (See requirement 2.9 regarding product groupings).
3.1.4	**R1500**	**Equity Level Stress 1:** EQ.ST.01	The impact of a 10% decrease in equity values (applied to all indices simultaneously).
3.1.5	**R1600**	**Equity Level Stress 2:** EQ.ST.02	The impact of a 10% increase in equity values (applied to all indices simultaneously).
3.1.6	**R1700**	**Equity Level Stress 3:** EQ.ST.03	The impact of the equity risk sub-model stress tests, as set out in the Commission Delegated Regulation which establishes the Solvency Capital Requirement Standard Formula under Solvency II.
3.1.7	**R1800**	**Equity Level Stress 4:** EQ.ST.04	The impact of the equity risk sub-module stress test quoted at 3.1.6, above, but with each stress in equity values applied in the **opposite direction**.

3.2 INTEREST RATE RISK STRESS TESTS

NO.	ROW / COLUMN REF.	STRESS (NAME / ID)	REQUIREMENT
3.2.1	**R1900**	**Rho:** IR.GK.01	The impact of a 1 bps change in interest rates (applied to all durations, interest rates and currencies simultaneously).
3.2.2	**R2000 to R2300**	**Rho by Currency:** IR.GK.02.01 to IR.GK.02.04	**C0400 to C0700:** The impact of a 1 bps change in interest rates, applied individually for each currency for which 25% or more of the total best estimate liability is denominated in that currency. The stressed currencies should be appropriately labelled in **C0200**. **C0800 to C1600:** For each currency listed in C0200, the impact on the best estimate liability of a 1 bps change in interest rates for a range of up to 9 key durational buckets. (See requirement 2.8 regarding the selection of durational buckets).
3.2.3	**R2400**	**Rho by Product:** IR.GK.03	The impact on the best estimate liability of a 1 bps change in interest rates for each listed product group. (See requirement 2.9 regarding product groupings).
3.2.4	**R2500**	**Interest Rate Stress 1:** IR.ST.01	The impact of the interest rate risk sub-model stress test specifying a **decrease** in the term structure of interest rates, as set out in the Commission Delegated Regulation which establishes the Solvency Capital Requirement Standard Formula under Solvency II.
3.2.5	**R2600**	**Interest Rate Stress 2:** IR.ST.02	The impact of the interest rate risk sub-model stress test specifying an **increase** in the term structure of interest rates, as set out in the Commission Delegated Regulation which establishes the Solvency Capital Requirement Standard Formula under Solvency II.
3.2.6	**R2700 & R2800**	**Interest Rate Stresses 3 & 4:** IR.ST.03 & IR.ST.04	The impact of the prescribed shape changes in the interest rate curve, as set out in Table 3.2.6, below. Where the prescribed change in the interest rate curve causes a negative interest rate, this may be floored at zero. Where the interest rate curve is already negative at a particular duration, no further downwards stress need be applied and the unstressed rate should be maintained. As per requirement 1.2.7, above, each stress should be applied to market consistent interest rate curves, with the Solvency II yield curve applied afterwards as usual. That is, the Solvency II ultimate forward rate should not be stressed, and the usual convergence methodology from the last liquid point should apply.

Table 3.2.6 - Interest Rate Stresses (IR.ST.03 & IR.ST.04):

DURATION (YEARS)	IR.ST.03	IR.ST.04
≤5	-50 bps	+50 bps
6	-40 bps	+40 bps
7	-30 bps	+30 bps
8	-20 bps	+20 bps
9	-10 bps	+10 bps
10	0 bps	0 bps
11	+10 bps	-10 bps
12	+20 bps	-20 bps
13	+30 bps	-30 bps
14	+40 bps	-40 bps
≥ 15	+50 bps	-50 bps

3.3 CURRENCY RISK STRESS TESTS

In accordance with requirement 1.2.9, above, firms should consider their exposure to the currency risk stress tests relative to Euro. If it is believed that consideration of currency risk exposure relative to a different currency better reflects the firm's risk profile, then a firm may seek approval from the Central Bank to adopt this alternative.

NO.	ROW / COLUMN REF.	STRESS (NAME / ID)	REQUIREMENT
3.3.1	**R2900**	**FX Delta:** FXD.GK.01	The impact of a 1% movement applied simultaneously to all foreign currency exchange rates.
3.3.2	**R3000 to R3300**	**FX Delta by Currency:** FXD.GK.02.01 to FXD.GK.02.04	The impact of a 1% movement in foreign currency exchange rates, applied individually for each currency for which 25% or more of the total best estimate liability is in that currency. The stressed currencies should be appropriately labelled in **C0200** and should match those listed in R2000 to R2300.
3.3.3	**R3400**	**FX Delta by Product:** FXD.GK.03	The impact on the best estimate liability of a 1% movement in all foreign currency exchange rates for each listed product group. (See requirement 2.9 regarding product groupings).
3.3.4	**R3500**	**FX Stress 1:** FX.ST.01	The impact of a 5% decrease in the value of all foreign currencies versus the reporting currency.
3.3.5	**R3600**	**FX Stress 2:** FX.ST.02	The impact of a 5% increase in the value of all foreign currencies versus the reporting currency.
3.3.6	**R3700**	**FX Stress 3:** FX.ST.03	The impact of the currency risk sub-model stress test specifying a **decrease** in the values of foreign currencies against the local currency, as set out in the Commission Delegated Regulation which establishes the Solvency Capital Requirement Standard Formula under Solvency II.

No.	Row / Column Ref.	Stress (Name / ID)	Requirement
3.3.7	**R3800**	**FX Stress 4:** FX.ST.04	The impact of the currency risk sub-model stress test specifying an **increase** in the values of foreign currencies against the local currency, as set out in the Commission Delegated Regulation which establishes the Solvency Capital Requirement Standard Formula under Solvency II.

3.4 Volatility Risk Stress Tests

No.	Row / Column Ref.	Stress (Name / ID)	Requirement
3.4.1	**R3900**	**Vega:** VG.GK.01	The impact of a 1% increase in implied volatility (applied to all underlying exposures).
3.4.2	**R4000**	**Vega Bucket Explanation**	Text field for disclosure of up to 9 key durational buckets for use in applying stress tests VG.GK.02 to VG.GK.04. Selection of the durational buckets is constrained by requirement 2.8, above.
3.4.3	**R4100**	**Equity Vega by Duration:** VG.GK.02	The net impact of a 1% increase in equity implied volatility for the range of key durational buckets disclosed in R4000.
3.4.4	**R4200**	**Interest Rate Vega by Duration:** VG.GK.03	The net impact of a 1% increase in interest rate implied volatility for the range of key durational buckets disclosed in R4000.
3.4.5	**R4300**	**FX Vega by Duration:** VG.GK.04	The net impact of a 1% increase in foreign exchange implied volatility for the range of key durational buckets disclosed in R4000.
3.4.6	**R4400**	**Volatility Stress Test 1:** VG.ST.01	The impact of a 10% relative increase in equity implied volatility.
3.4.7	**R4500**	**Volatility Stress Test 2:** VG.ST.02	The impact of a 10% relative decrease in equity implied volatility.
3.4.8	**R4600**	**Volatility Stress Test 3:** VG.ST.03	The impact of a 10% relative increase in interest rate implied volatility.
3.4.9	**R4700**	**Volatility Stress Test 4:** VG.ST.04	The impact of a 10% relative decrease in interest rate implied volatility.
3.4.10	**R4800**	**Volatility Stress Test 5:** VG.ST.05	The impact of a 10% relative increase in foreign exchange implied volatility.
3.4.11	**R4900**	**Volatility Stress Test 6:** VG.ST.06	The impact of a 10% relative decrease in foreign exchange implied volatility.

3.5 BASIS RISK STRESS TESTS

Basis risk can arise from a number of sources. The prescribed basis risk stress tests seek to assess the potential sensitivity to basis risk due to tracking error and credit spreads.

NO.	ROW / COLUMN REF.	STRESS (NAME / ID)	REQUIREMENT
3.5.1	**R5000**	**Basis Risk Stress 1:** BS.ST.01	The net impact of a 2% increase in tracking error.
3.5.2	**R5100**	**Basis Risk Stress 2:** BS.ST.02	The net impact of a 6% increase in tracking error.
3.5.3	**R5200**	**Basis Risk Stress 3:** BS.ST.03	The impact of a 50 bps decrease in credit spreads.
3.5.4	**R5300**	**Basis Risk Stress 4:** BS.ST.04	The impact of a 20 bps decrease in credit spreads.
3.5.5	**R5400**	**Basis Risk Stress 5:** BS.ST.05	The impact of a 20 bps increase in credit spreads.
3.5.6	**R5500**	**Basis Risk Stress 6:** BS.ST.06	The impact of a 50 bps increase in credit spreads.

3.6 SCENARIO TESTS

NO.	ROW / COLUMN REF.	STRESS (NAME / ID)	REQUIREMENT
3.6.1	**R5600**	**Scenario Test 1:** SCT.01	The impact of the following stress tests applied simultaneously: - Equities: 30% decrease - Volatility: 25% increase (relative, all exposures) - Interest rates: 50 bps parallel increase
3.6.2	**R5700**	**Scenario Test 2:** SCT.02	The impact of the following stress tests applied simultaneously: - Equities: 30% decrease - Volatility: 25% increase (relative, all exposures) - Interest rates: 50 bps parallel decrease
3.6.3	**R5800**	**Scenario Test 3:** SCT.03	The impact of the following stress tests applied simultaneously: - Equities: 10% decrease - Volatility: 25% increase (relative, all exposures) - Interest rates: 50 bps parallel decrease
3.6.4	**R5900**	**Scenario Test 4:** SCT.04	The impact of the following stress tests applied simultaneously: - Equities: 10% increase - Volatility: 25% increase (relative, all exposures) - Interest rates: 50 bps parallel increase

No.	Row / Column Ref.	Stress (Name / ID)	Requirement
3.6.5	**R6000**	**Scenario Test 5:** SCT.05	The impact of the following stress tests applied simultaneously: - Equities: 10% decrease - Volatility: 25% increase (relative, all exposures) - Interest rates: 50 bps parallel decrease - Foreign currencies: 25% decrease
3.6.6	**R6100**	**Scenario Test 6:** SCT.06	The impact of the following stress tests applied simultaneously: - Equities: 10% increase - Volatility: 25% increase (relative, all exposures) - Interest rates: 50 bps parallel increase - Foreign currencies: 25% increase