



farran

Operational Manual

VNA Frequency Extension Modules (FEV)





2.1 Whats in the box

This sub-section (page 4 & 5), introduces the various components and accessories that comes with the FEV-XX. Be sure to familiarise yourself with them before using the system.

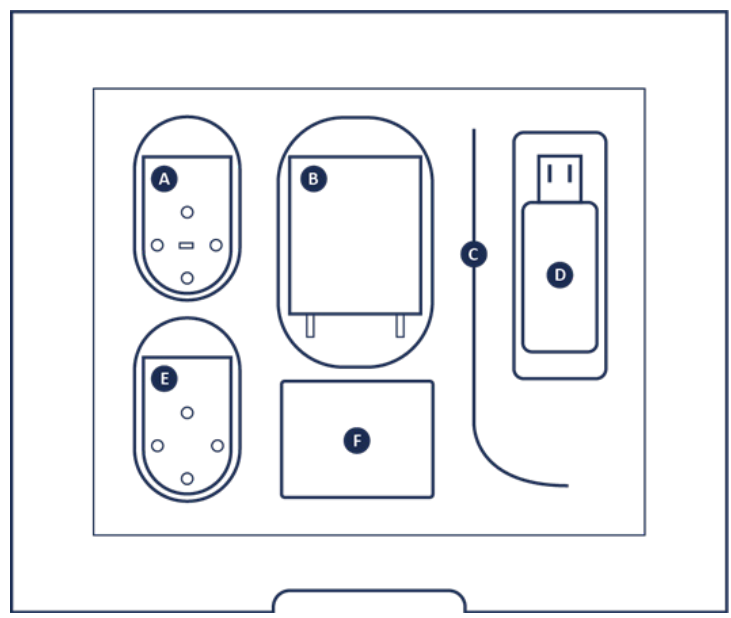




2.1 Whats in the box

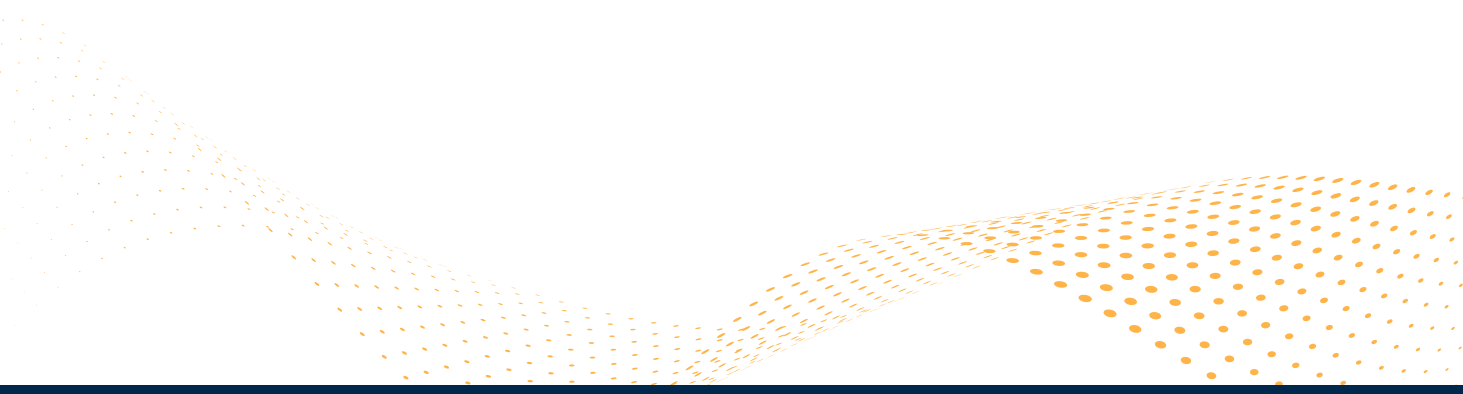


1x



Calibration Kit

- Note:**
- A - Offset Piece x 1
 - B - Broadband Load x 1
 - C - Hex Key x 1
 - D - USB Flash Memory x 1
 - E - Flush Short x 1
 - F - Flange Screws & Alignment Pins (Short screws x 4, Long screws x 4)





7. Technical Specifications

Table 4. FEV-XX Specifications

Model		Parameters																						
		Operating Frequency (GHz)		Test Port Output Power (dBm)		Dynamic Range (dB)		Magnitude Trace Stability (deg.)	Phase Trace Stability (deg.)	Test Port Input 0.1dB CP. (dB)	RF/LO Port Damage Level (dBm)	Raw Coupler Directivity (dB)		RF Test Port VSWR	RF Input VSWR	RF Input Frequency (GHz)		RF xN	LO Input Frequency (GHz)		LO H.N	Wght. (kg)	Dim. (mm)	Test Port Interface (UG-383/U compatible)
		min	max	min	typ	min	typ	typ	typ	nom	nom	min.	typ	typ	typ	min	max	nom	min	max	nom	typ	typ	typ
FEV-19-TR-0001		40	60	+5	+9	100	120	±0.1	±2	+22.5	+15	40	45	<1.4:1	<1.4:1	10	15	4	10	15	4	3.5	290x105x60	WR-19 Precision Style
FEV-15-TR-0001		50	75	+5	+9	100	120	±0.1	±2	+22.5	+15	40	45	<1.4:1	<1.4:1	12.5	18.75	4	8.33	18.75	6	2.5	290x105x60	WR-15, IEEE 1785.2a
FEV-12-TR-0001		60	90	+2	+9	100	120	±0.1	±2	+22.5	+15	40	45	<1.4:1	<1.4:1	10	15	6	10	15	6	2.4	290x105x60	WR-12, IEEE 1785.2a
FEV-10-TR-0005		67	110	-2	+4	100	115	±0.1	±2	+20	+15	38	45	<1.4:1	<1.4:1	11.17	18.33	6	8.37	13.75	8	2.25	230x105x60	WR-10, IEEE 1785.2a
FEV-10-TR-0001		75	110	0	+4	100	110	±0.1	±2	+20	+15	38	45	<1.4:1	<1.4:1	12.5	18.33	6	9.37	13.75	8	2.25	230x105x60	WR-10, IEEE 1785.2a
FEV-10-TR-0008	ST	75	110	+13	+16.5	90	110	±0.4	±4	+30	+15	35	45	<1.4:1	<1.4:1	12.5	18.33	6	9.37	13.75	6	2.75	375x105x60	WR-10, IEEE 1785.2a
	HP	88	96	+20	+22.5	100	110	±0.4	±4	+30	+15	35	45	<1.4:1	<1.4:1	14.66	18.33	6	9.37	13.75	6	2.75	375x105x60	WR-10, IEEE 1785.2a
FEV-08-TR-0001		90	140	-	-10	90	100	±0.2	±4	+15	+15	35	40	<1.4:1	<1.4:1	7.5	11.67	12	11.25	17.5	8	2.4	290x105x60	WR-08, IEEE 1785.2a
FEV-06-TR-0001		110	170	-	-10	90	100	±0.2	±4	+15	+15	34	40	<1.4:1	<1.4:1	9.16	14.17	12	9.16	14.17	12	2.4	290x105x60	WR-06, IEEE 1785.2a
FEV-06-TR-0004		110	170	-	-10	100	120	±0.2	±4	+15	+15	34	40	<1.4:1	<1.4:1	9.16	14.17	12	9.16	14.17	12	2.4	290x105x60	WR-06, IEEE 1785.2a
FEV-05-TR-0001		140	220	-	-15	90	100	±0.3	±6	+15	+15	30	35	<1.5:1	<1.4:1	11.66	18.33	12	11.66	18.33	12	2.4	290x105x60	WR-05, IEEE 1785.2a
FEV-05-TR-0004		140	220	-	-12.5	100	115	±0.2	±4	+15	+15	32	35	<1.5:1	<1.4:1	11.66	18.33	12	11.66	18.33	12	2.4	290x105x60	WR-05, IEEE 1785.2a
FEV-03-TR-0001		220	325	-	-13	80	100	±0.3	±6	+10	+15	25	35	<1.5:1	<1.4:1	12.22	18.06	18	9.16	13.54	24	2.7	290x120x85	WR-03, IEEE 1785.2a
FEV-02-TR-0001		325	500	-	-20	70	100	±0.5	±8	+10	+15	25	30	<2.0:1	<1.4:1	10.83	16.67	30	9.02	13.89	36	2.7	290x120x85	WR-02, IEEE 1785.2a

Specification Definitions

Nominal value (nom.) – ensured by design, not tested. **Measured value (min, max)** – expected and warranted product performance obtained from the actual measurements of product sample. **Non-traceable measured value (n. trc. meas.)** – expected product performance obtained from the actual measurements of a product sample by means of using Farran's own equipment and methods. Traceable only to Farran laboratory equipment. **Typical data (typ.)** – value that represents the product specification met over 90% of bandwidth or a mean value. **Specifications without limits** – represent the warranted product performance; with values of no or a negligible deviation from the given value and as such have a secondary impact on the product performance.





8. Typical Performance

Typical system dynamic range and test port power plots can be found in this section. Test results were obtained after 2 hour warm-up time under standard temperature and pressure.

8.1 Dynamic Range

The system dynamic range (DR) is defined as the difference between the nominal input power level available at the test port and the minimum input power that the system can measure, set by the receiver noise floor. The receiver noise floor is defined as the RMS value of the data trace of the transmission magnitude, with both test ports terminated with flush shorts. Typical system DR for FEV-XX models are presented in this section:

- i To obtain the most accurate results, when using a full dynamic range of the instrument, the user is advised to use averaging scheme. The dynamic range could be increased by using measurement bandwidth of 1 Hz.

Measuring Dynamic Range

The system dynamic range is measured by:

- . Firstly, connecting the two FEV-XX modules together and normalizing the un-calibrated S21 & S12
- . Then disconnecting the FEV-XX modules and both terminated with a waveguide short
- . Averaging the sweeps of the measured S21 & S12 gives the system dynamic range

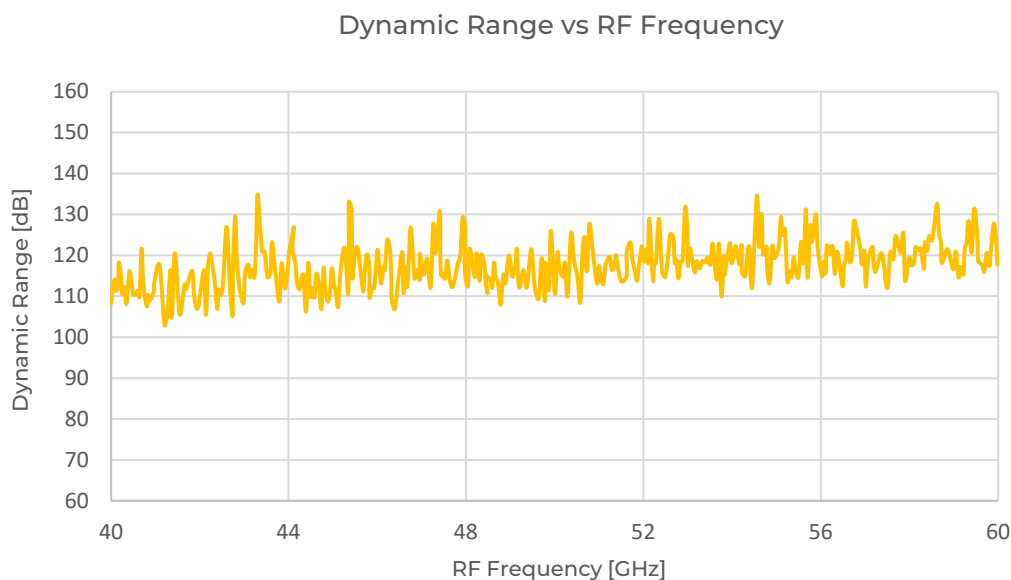


Figure 10.1: Typical system DR for FEV-19-TR-0001



8. Typical Performance

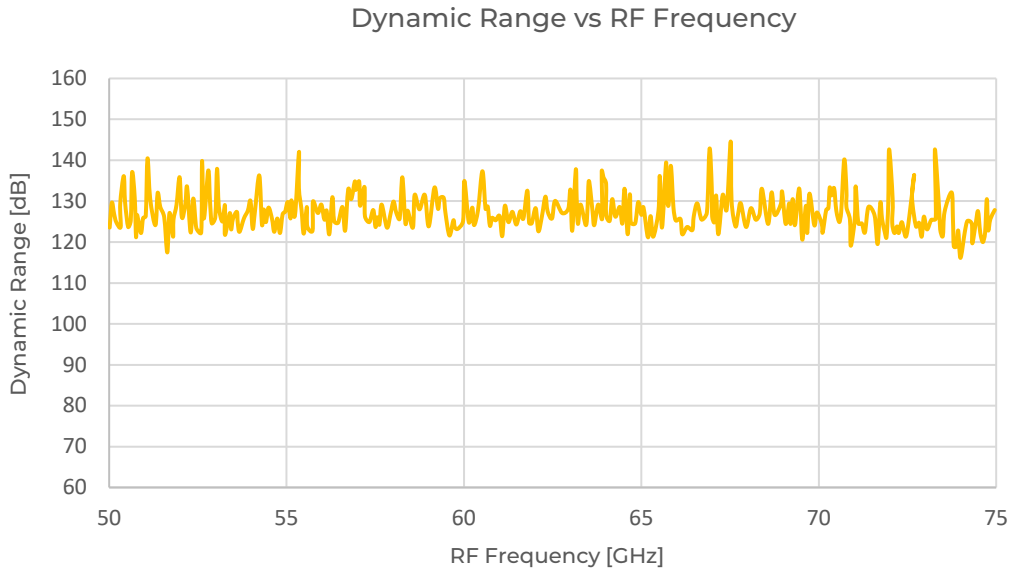


Figure 10.2: Typical system DR for FEV-15-TR-0001

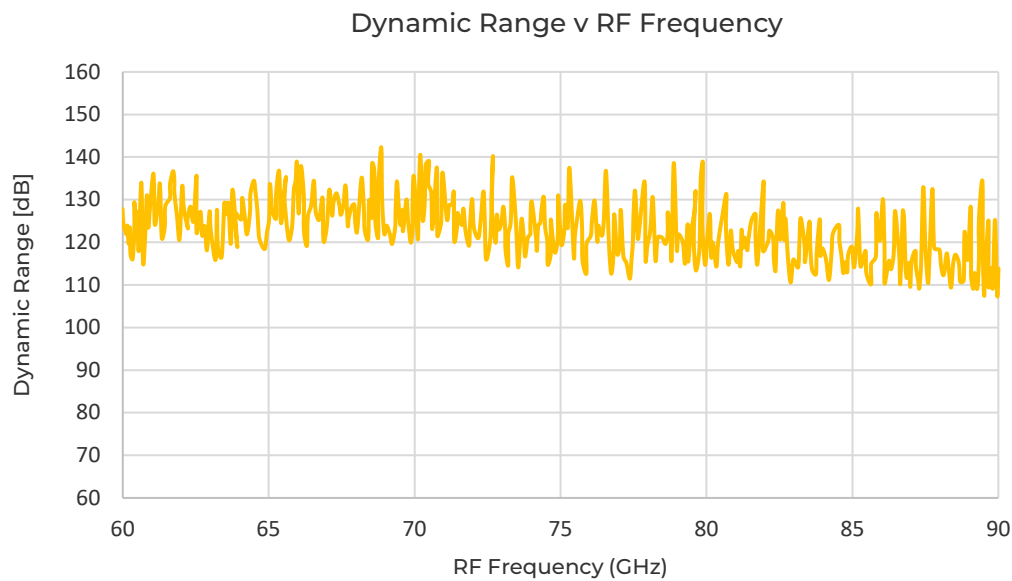


Figure 10.3: Typical system DR for FEV-12-TR-0001



8. Typical Performance

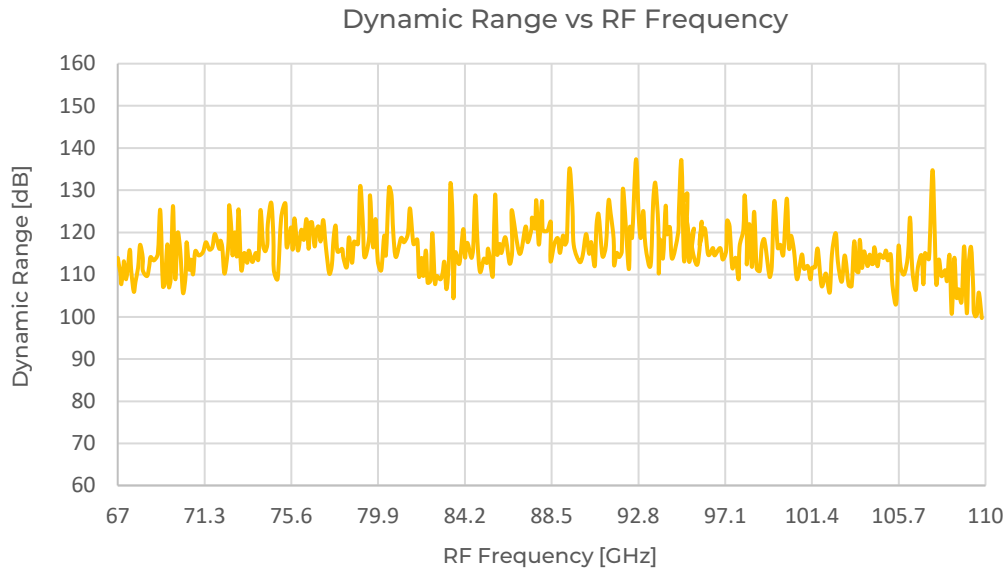


Figure 10.4: Typical system DR for FEV-10-TR-0005

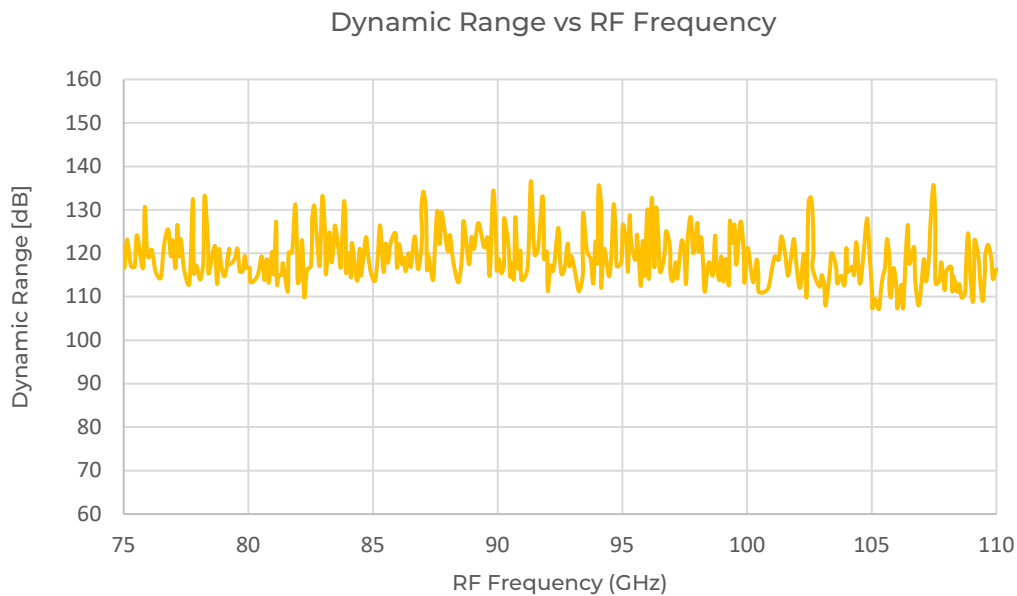


Figure 10.5: Typical system DR for FEV-10-TR-0001



8. Typical Performance

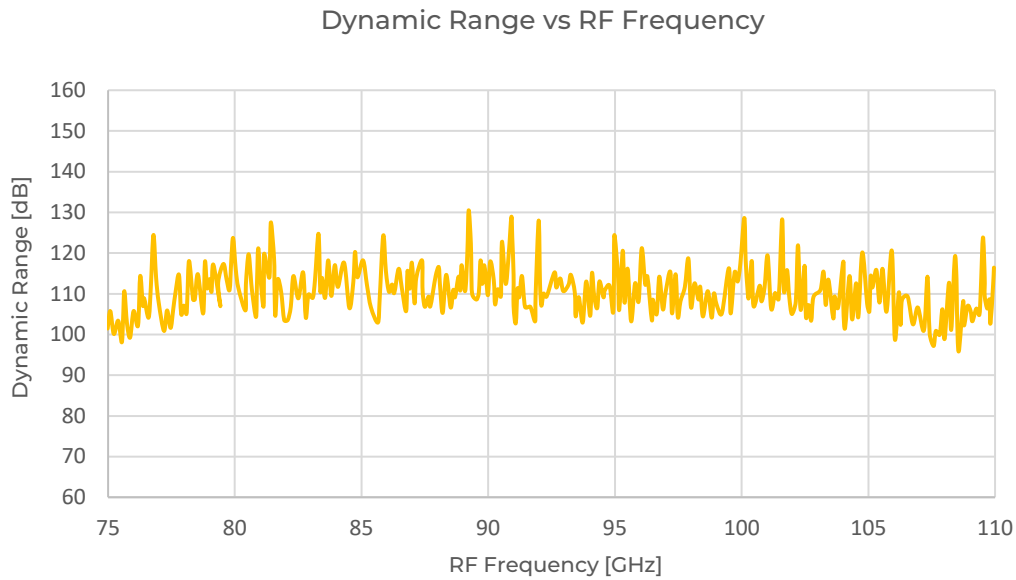


Figure 10.6: Typical system DR for FEV-10-TR-0008 (ST)

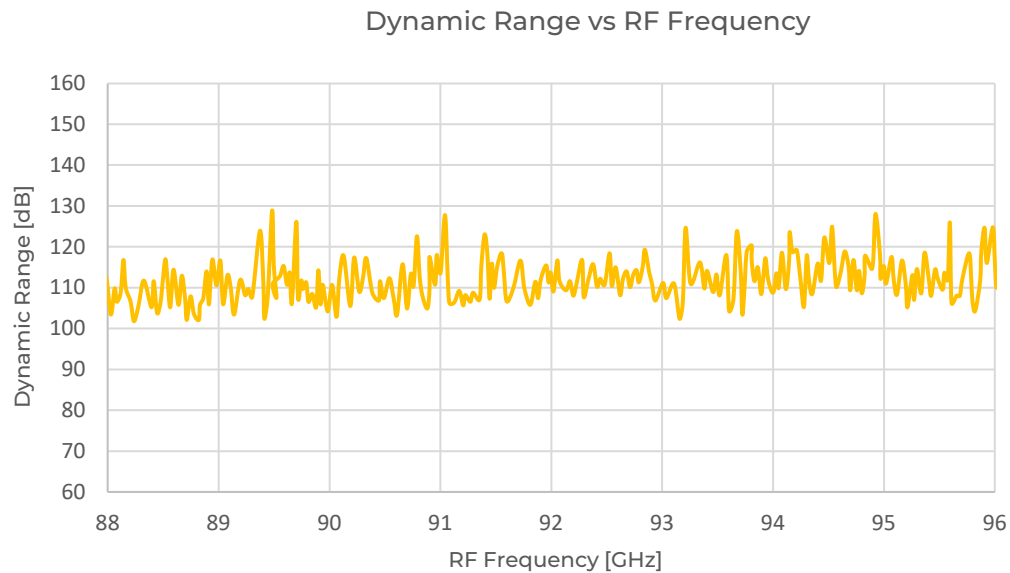


Figure 10.7: Typical system DR for FEV-10-TR-0008(HP)



8. Typical Performance

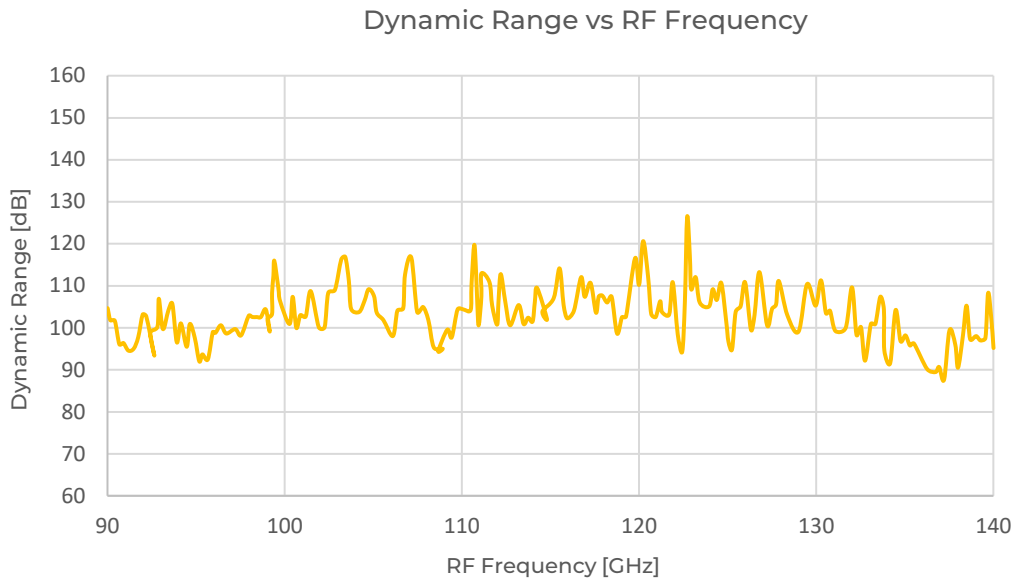


Figure 10.8: Typical system DR for FEV-08-TR-0001

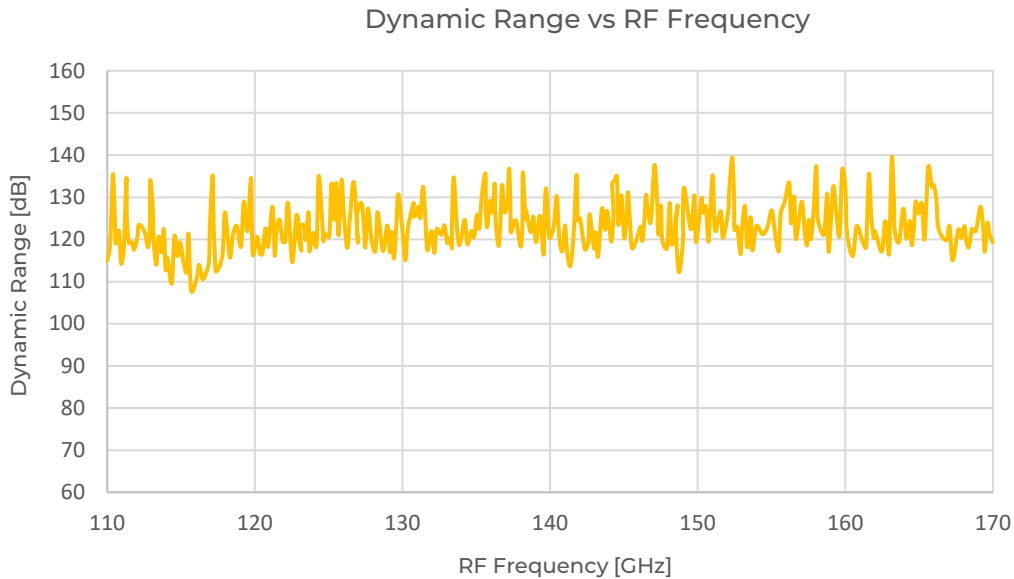


Figure 10.9: Typical system DR for FEV-06-TR-0004



8. Typical Performance

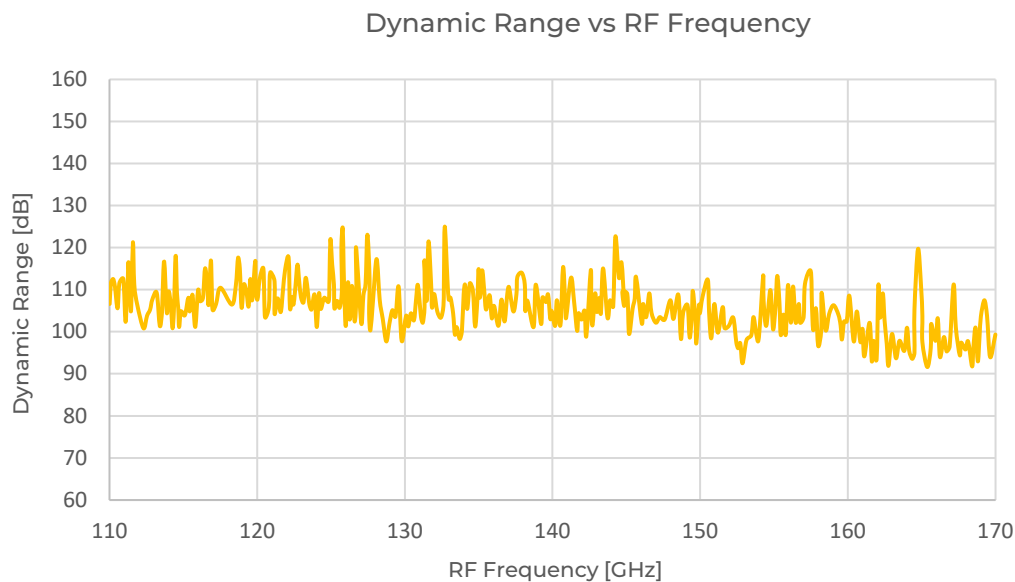


Figure 10.11: Typical system DR for FEV-06-TR-0001

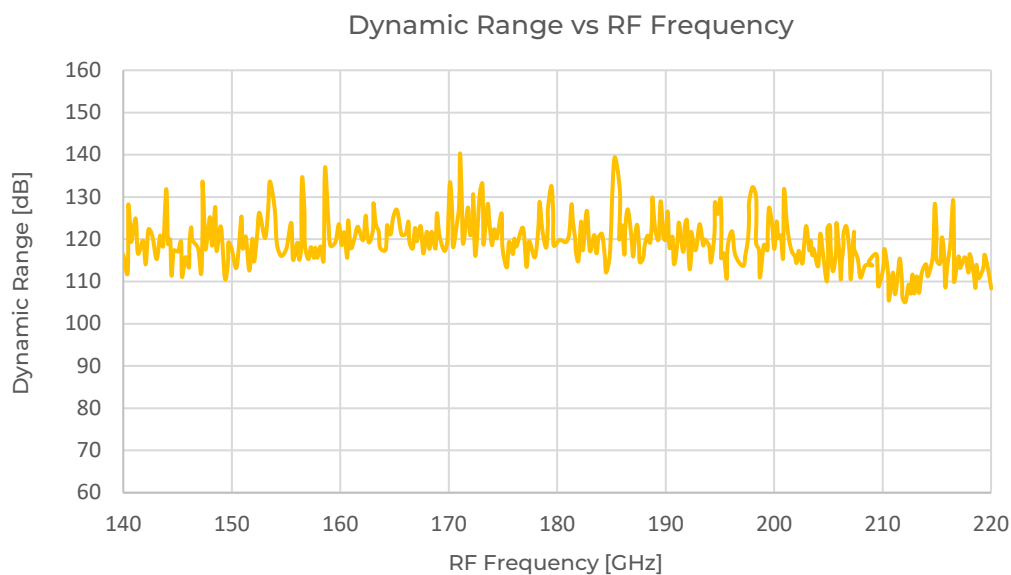


Figure 10.12: Typical system DR for FEV-05-TR-0004



8. Typical Performance

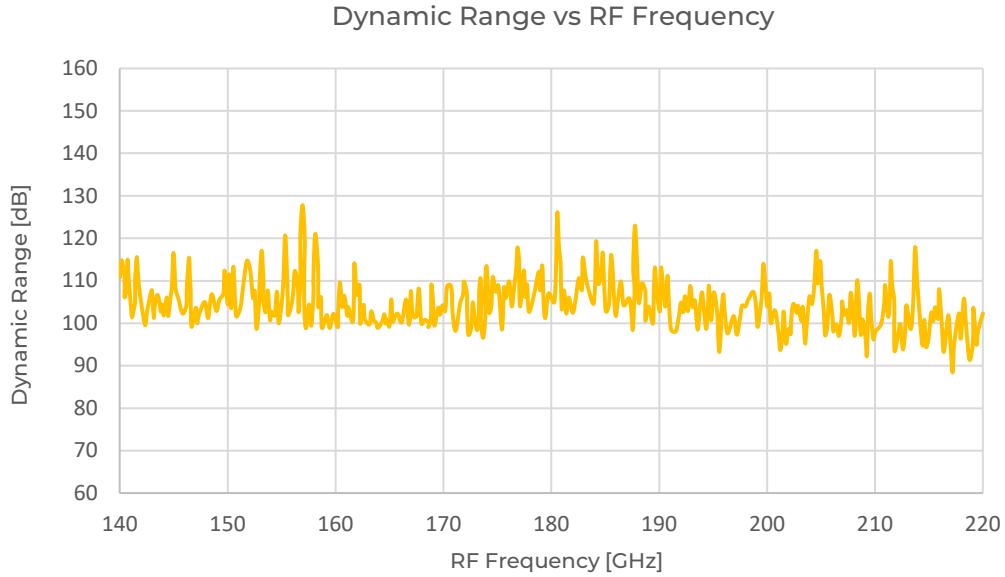


Figure 10.13: Typical system DR for FEV-05-TR-0001

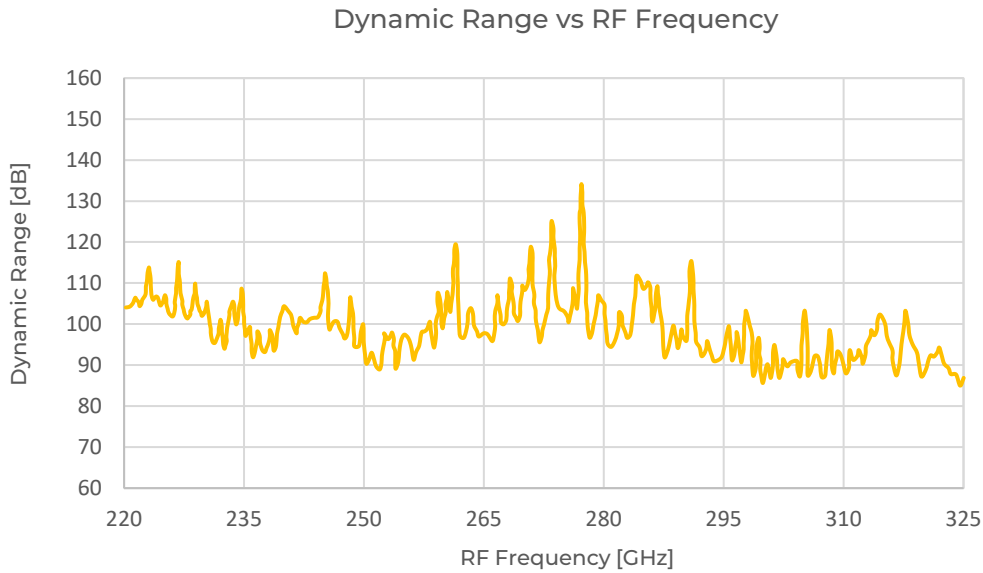


Figure 10.14: Typical system DR for FEV-03-TR-0001



8. Typical Performance

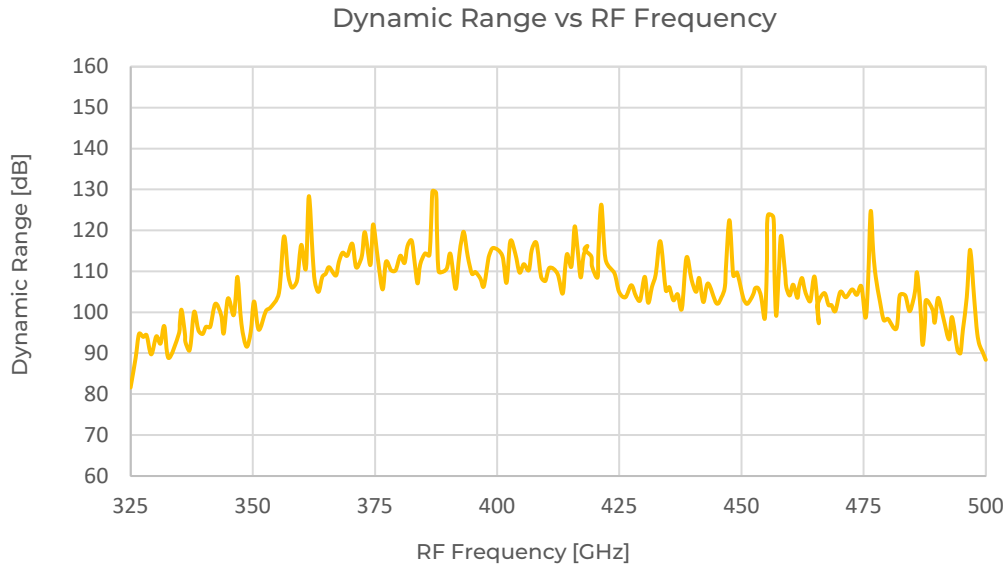


Figure 10.15: Typical system DR for FEV-02-TR-0001



8. Typical Performance

FEV-XX output power vs frequency performance plots are provided in this section. Unless otherwise stated, all performance data furnished here has been obtained from in-house measurements at standard temperature and pressure. The power measurement uncertainty is ± 0.5 dB.

8.2 Test Port Power

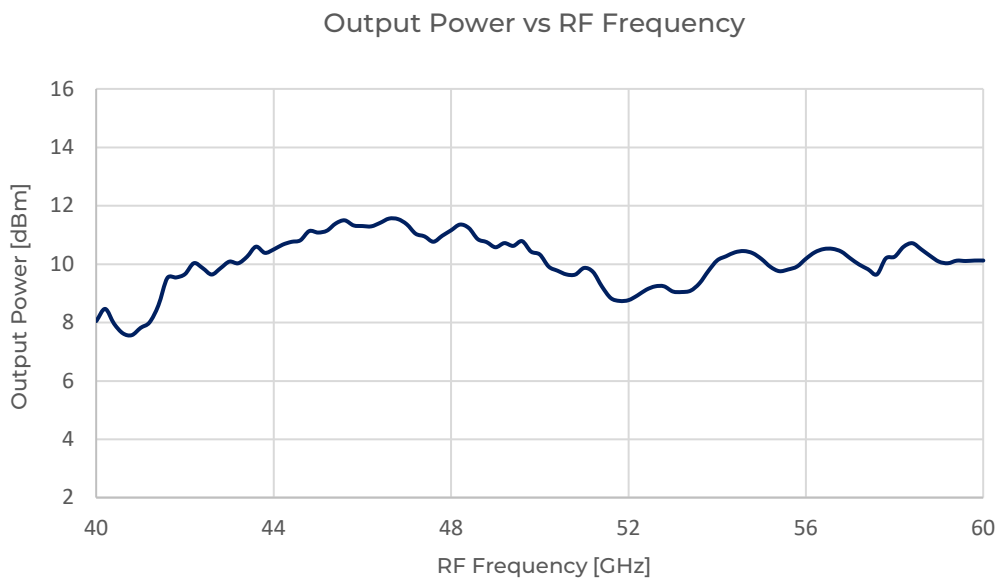


Figure 11.1: Typical test port output power for FEV-19-TR

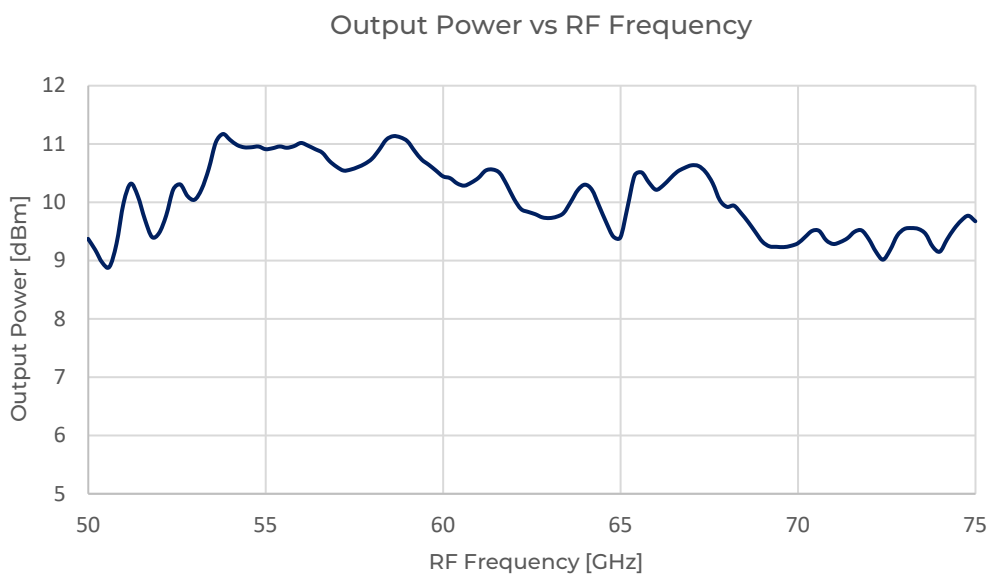


Figure 11.2: Typical test port output power for FEV-15-TR-0001



8. Typical Performance

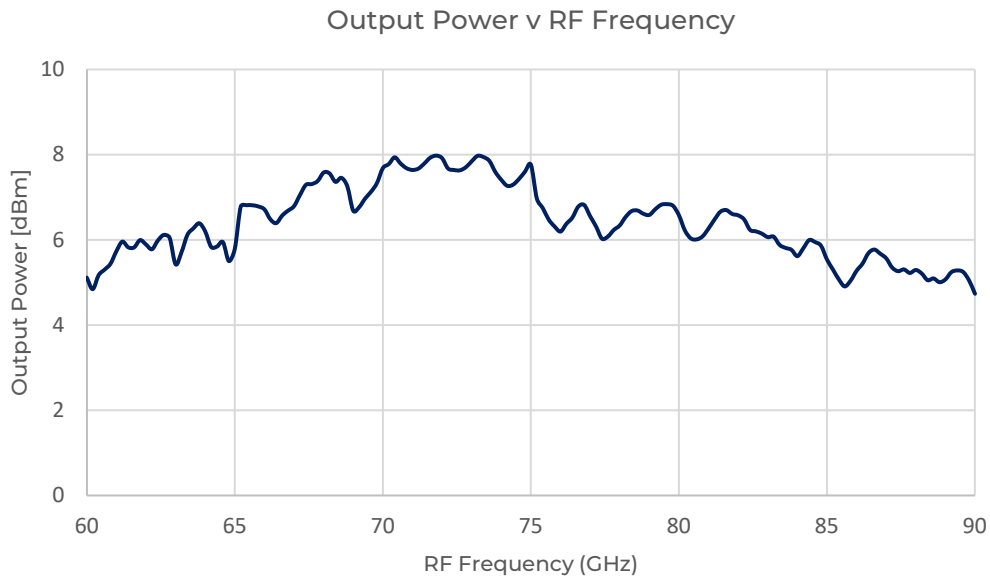


Figure 11.3: Typical test port output power for FEV-12-TR-0001

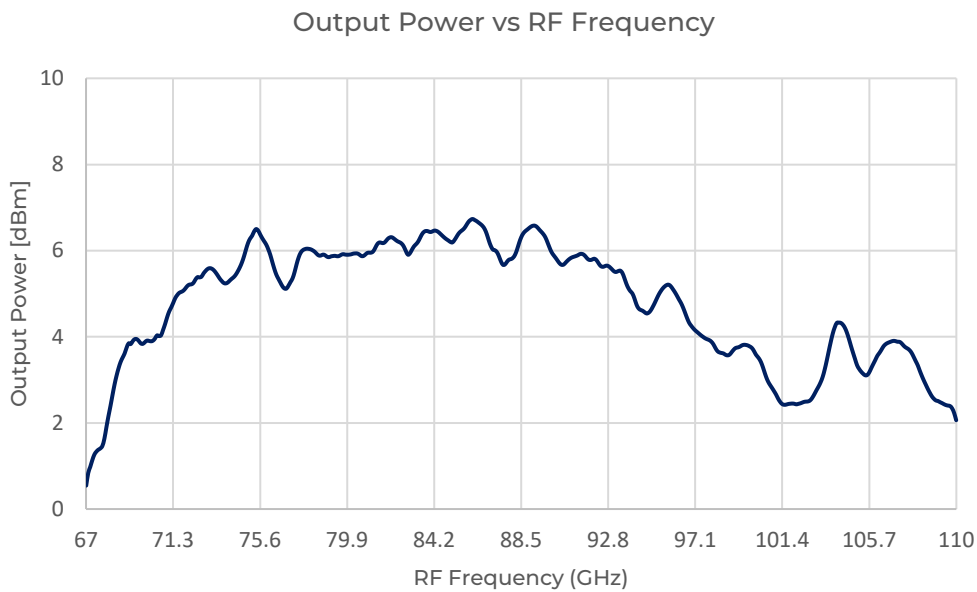


Figure 11.4: Typical test port output power for FEV-10-TR-0005



8. Typical Performance

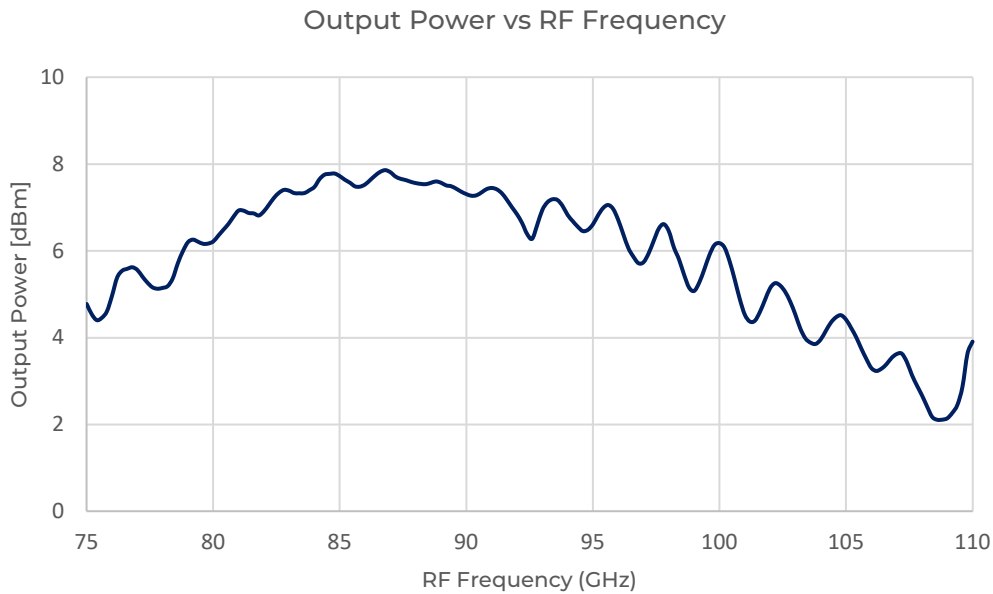


Figure 11.5: Typical test port output power for FEV-10-TR-0001

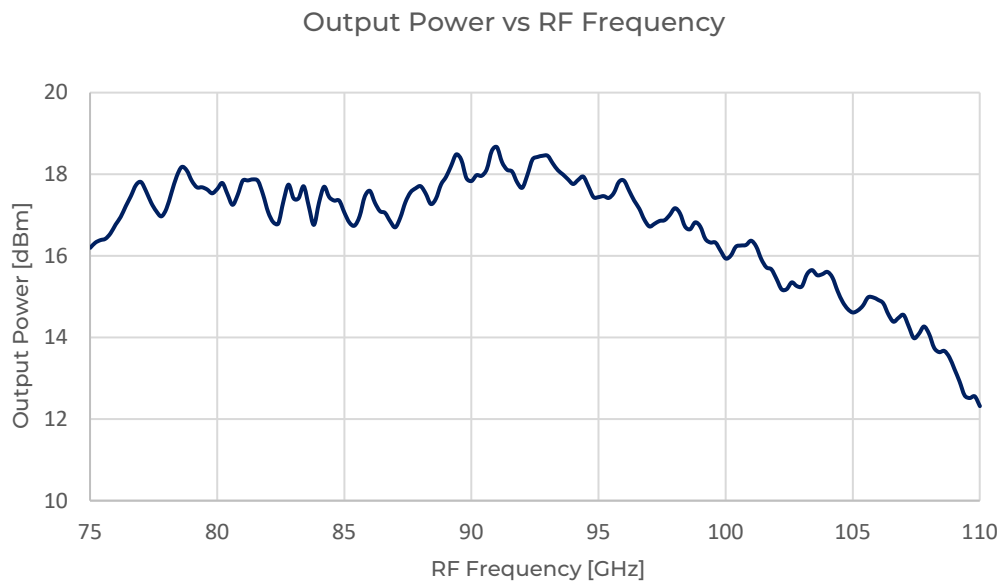


Figure 11.6: Typical test port output power for FEV-10-TR-0008 (ST)



8. Typical Performance

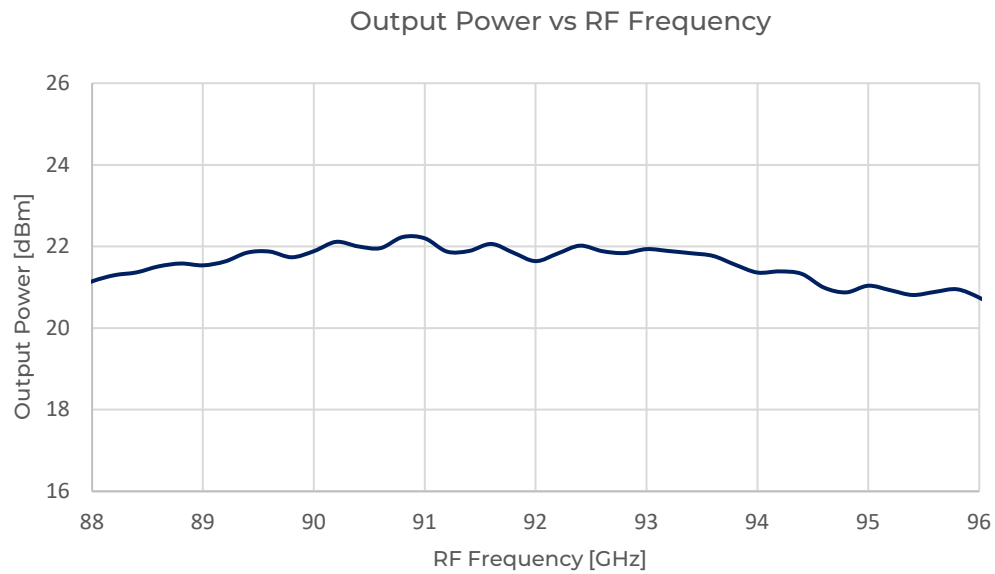


Figure 11.7: Typical test port output power for FEV-10-TR-0008 (HP)

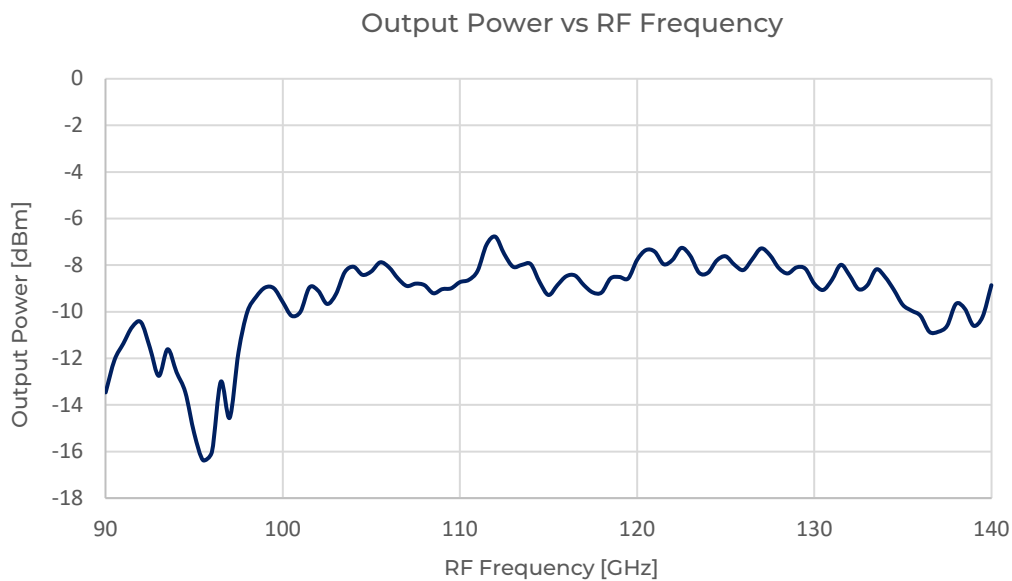


Figure 11.8: Typical test port output power for FEV-08-TR-0001



8. Typical Performance

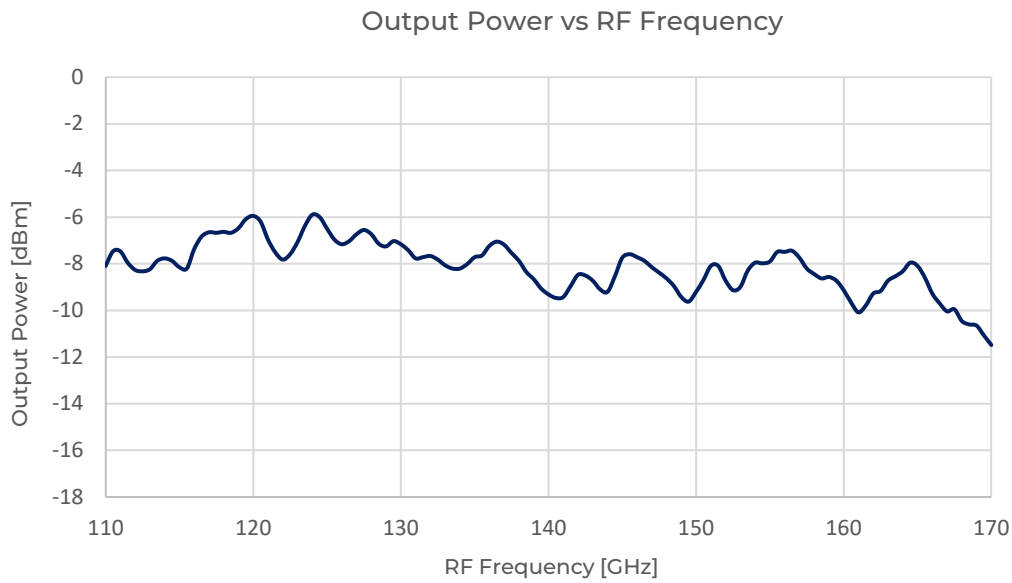


Figure 11.9: Typical test port output power for FEV-06-TR-0001

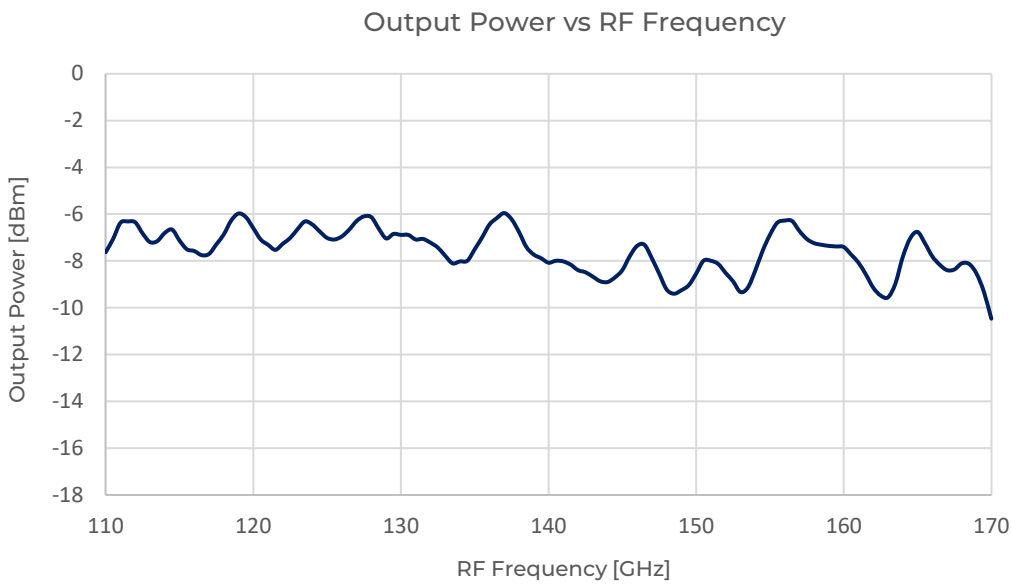


Figure 11.10: Typical test port output power for FEV-06-TR-0004



8. Typical Performance

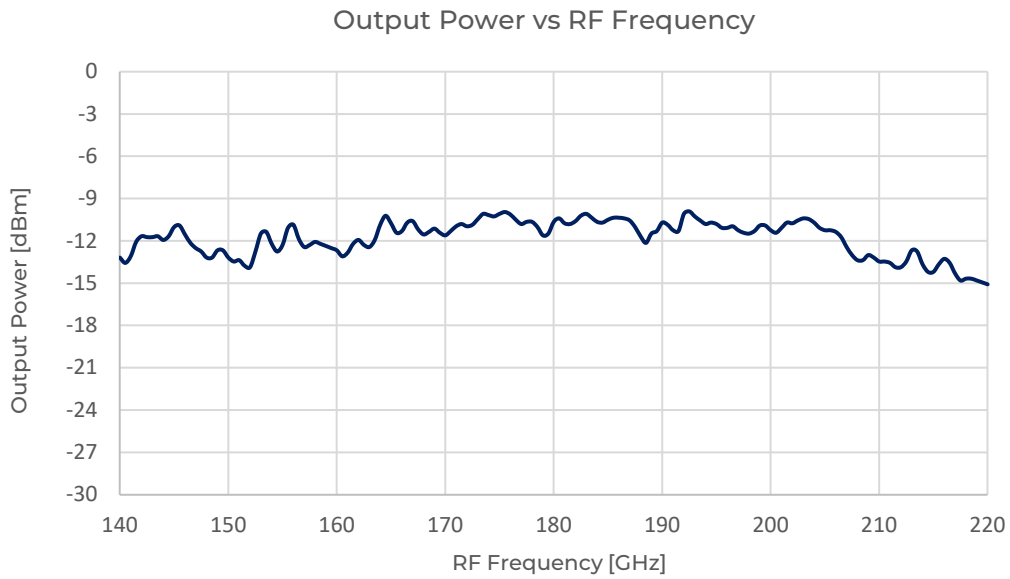


Figure 11.11: Typical test port output power for FEV-05-TR-0001

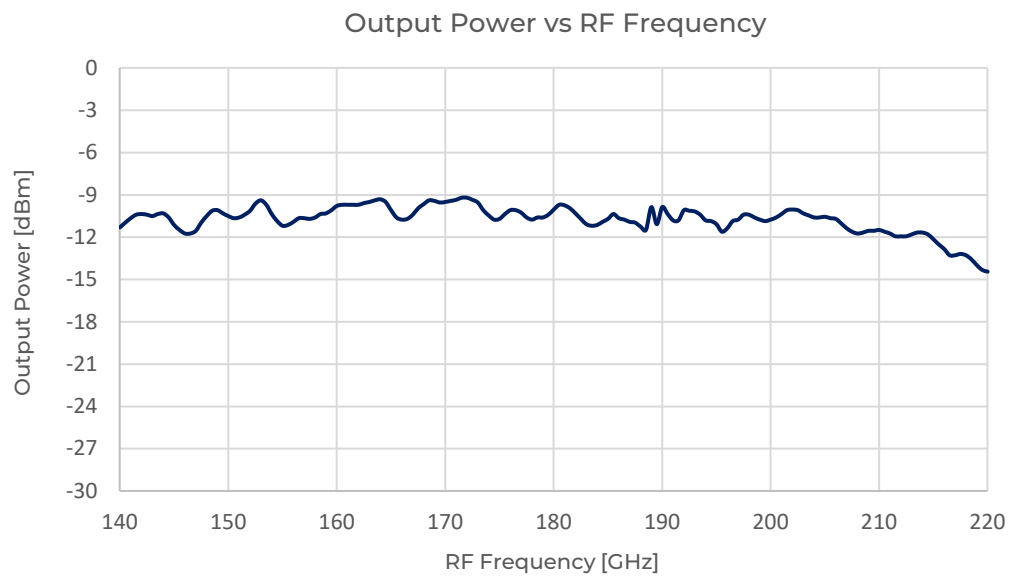


Figure 11.12: Typical test port output power for FEV-05-TR-0004



8. Typical Performance

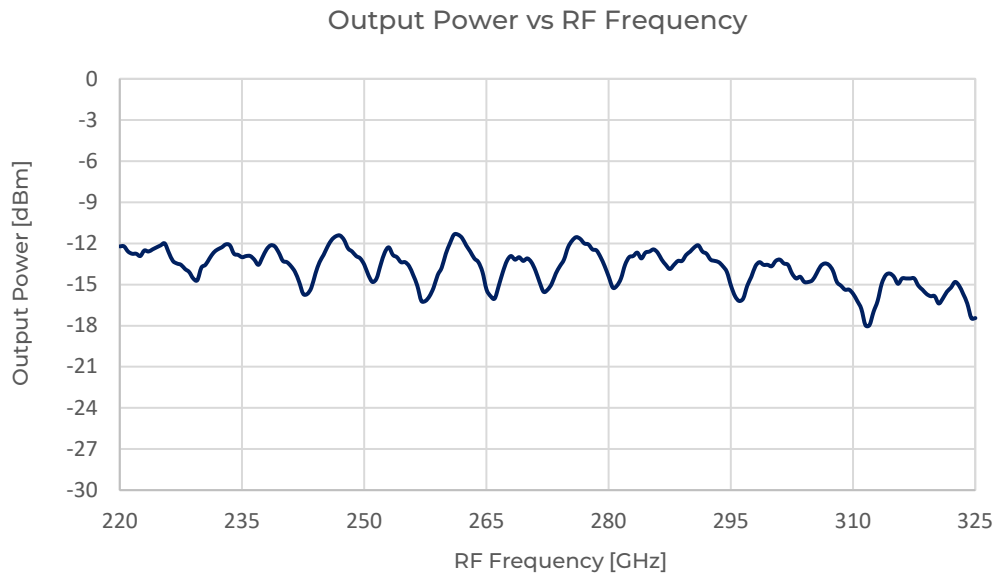


Figure 11.13: Typical test port output power for FEV-03-TR-0001

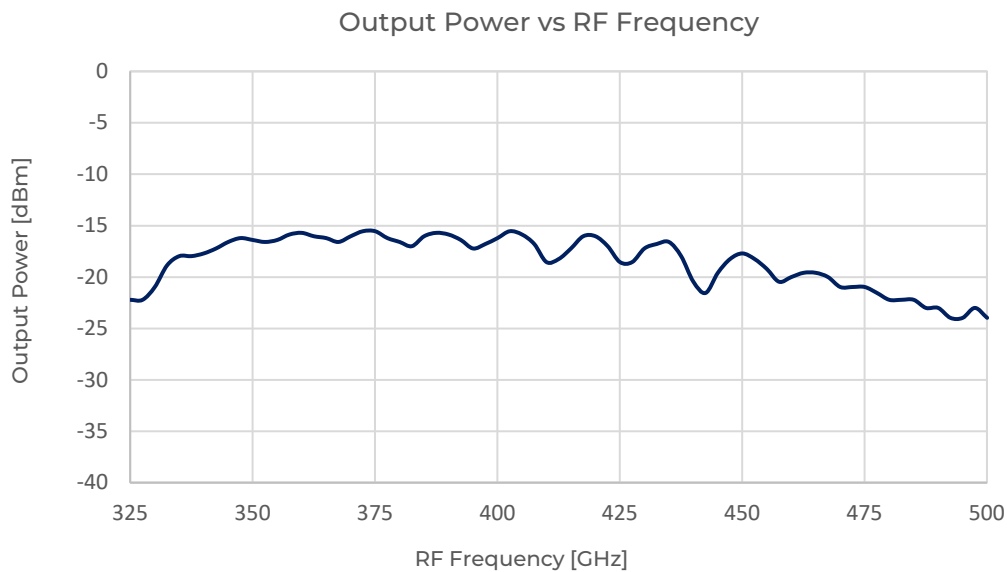
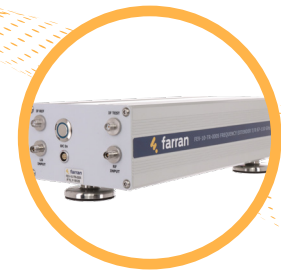


Figure 11.14: Typical test port output power for FEV-02-TR-0001

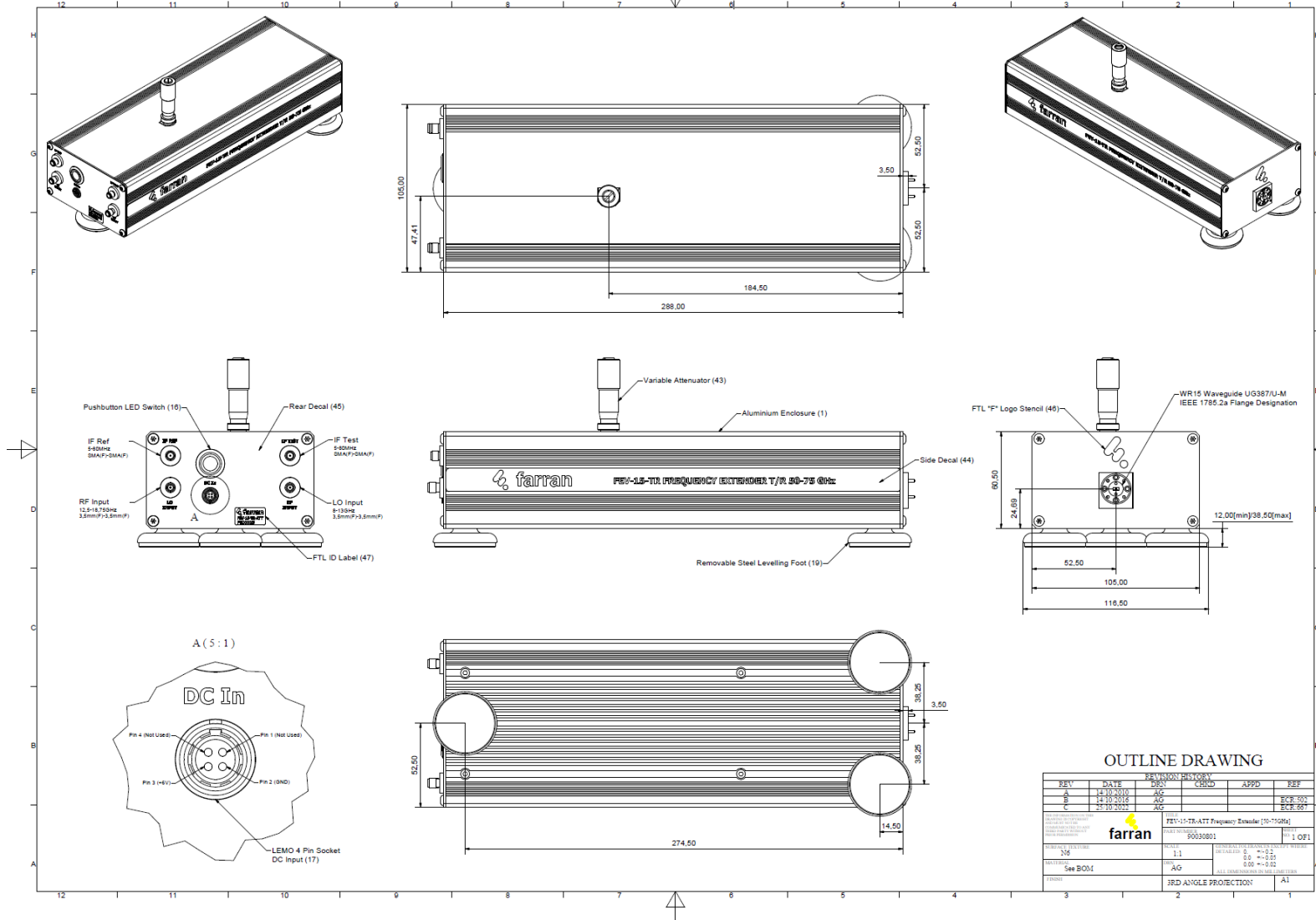


12. Appendices

12.1 Drawings



FEV-15-TR-0001



OUTLINE DRAWING

REV	DATE	BY	CHKD	APPD	REF
A	14-10-2010	AG			ECF:501
B	12-10-2016	AG			ECF:502
C	25-10-2023	AG			ECF:565

PART NO: 90030801 REV: 1.1 SEE BOM	FEV-15-TR-ATT Frequency Extender [50-750GHz] 90030801 1 OF 1
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