7.3 BODY LIQUID MEASUREMENT

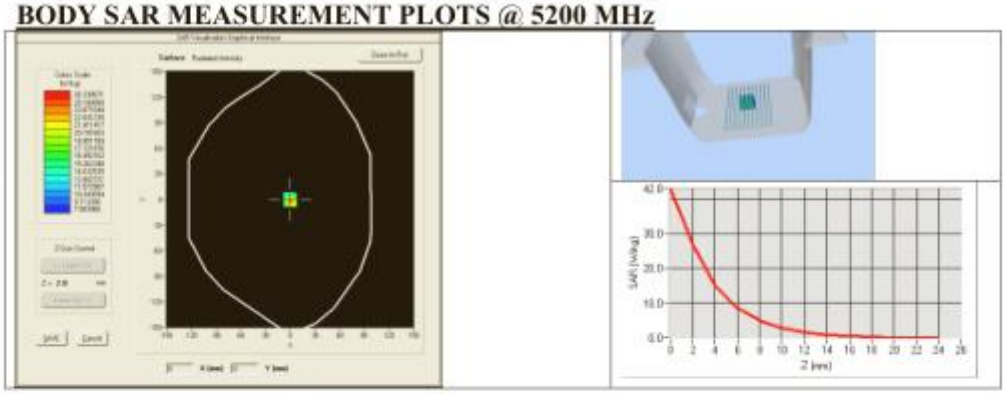
Frequency MHz	Relative permittivity (ε,')		Conductivity (σ) S/m	
	required	measured	required	measured
5200	49.0 ±10 %	PASS	5.30 ±10 %	PASS
5400	48.7 ±10 %	PASS	5.53 ±10 %	PASS
5600	48.5 ±10 %	PASS	5.77 ±10 %	PASS
5800	48.2 ±10 %	PASS	6.00 ±10 %	PASS

7.4 SAR MEASUREMENT RESULT WITH BODY LIQUID

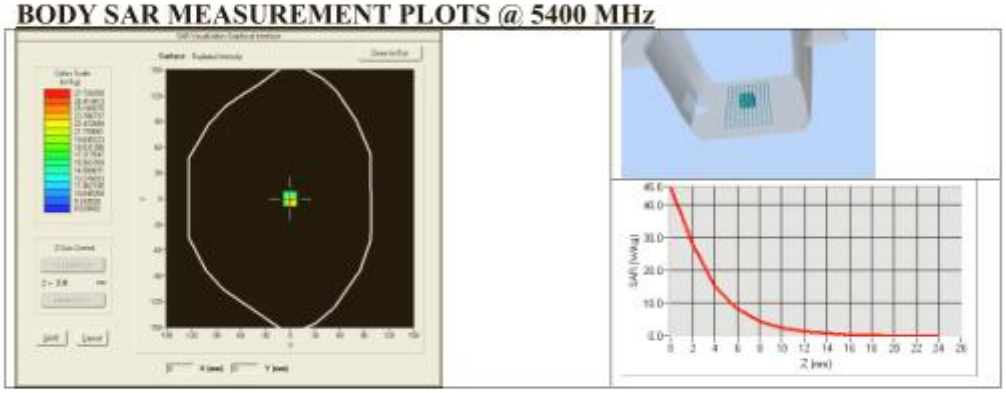
Software	OPENSAR V4
Phantom	SN 20/09 SAM71
Probe	SN 18/11 EPG122
Liquid	Body Liquid Values 5200 MHz: eps' :49.01 sigma : 5.27 Body Liquid Values 5400 MHz: eps' :49.67 sigma : 5.45 Body Liquid Values 5600 MHz: eps' :47.57 sigma : 5.69 Body Liquid Values 5800 MHz: eps' :49.82 sigma : 5.94
Distance between dipole waveguide and liquid	0 mm
Area scan resolution	dx=8mm/dy=8mm
Zoon Scan Resolution	dx=4mm/dy=4m/dz=2mm
Frequency	5200 MHz 5400 MHz 5600 MHz 5800 MHz
Input power	20 dBm
Liquid Temperature	21 °C
Lab Temperature	21 °C
Lab Humidity	45 %

Frequency (MHz)	1 g SAR (W/kg)	10 g SAR (W/kg)
	measured	measured
5200	155.78 (15.58)	54.48 (5.45)
5400	160.24 (16.02)	55.34 (5.53)
5600	167.61 (16.76)	56.92 (5.69)
5800	170.49 (17.05)	57.26 (5.73)

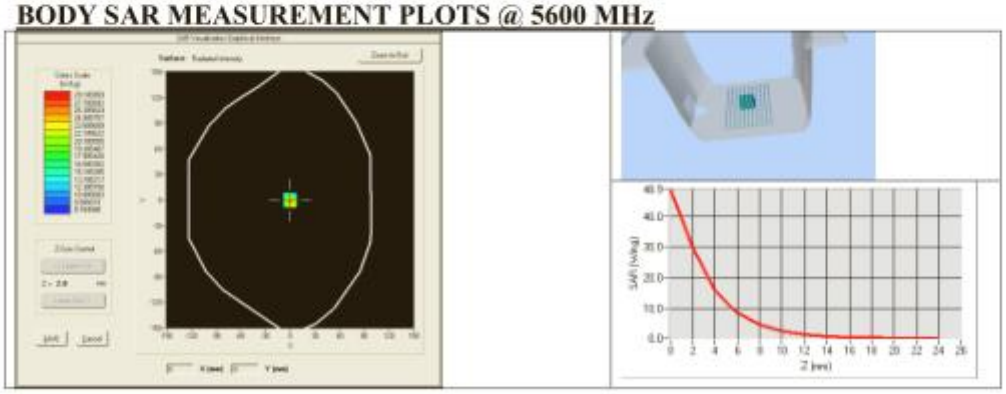
BODY SAR MEASUREMENT PLOTS @ 5200 MHz



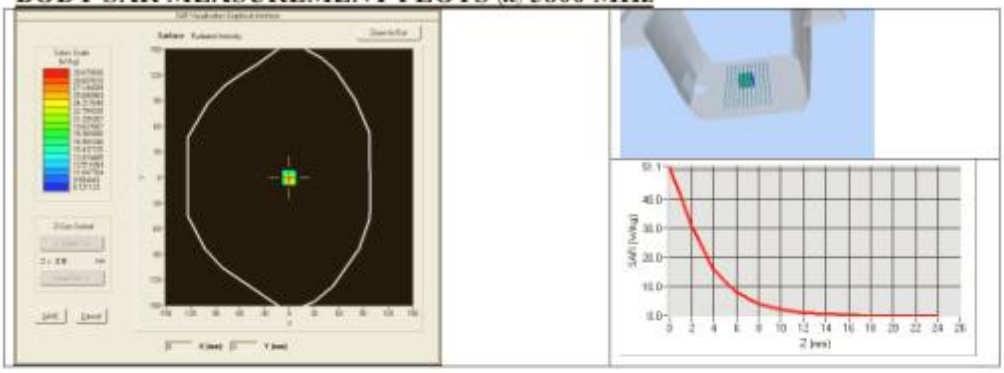
BODY SAR MEASUREMENT PLOTS @ 5400 MHz



BODY SAR MEASUREMENT PLOTS @ 5600 MHz



BODY SAR MEASUREMENT PLOTS @ 5800 MHz



8 LIST OF EQUIPMENT

Equipment Summary Sheet				
Equipment Description	**Manufacturer / Model**	**Identification No.**	**Current Calibration Date**	**Next Calibration Date**
Flat Phantom	MVG	SN-20/09-SAM71	Validated. No cal required.	Validated. No cal required.
COMOSAR Test Bench	Version 3	NA	Validated. No cal required.	Validated. No cal required.
Network Analyzer	Rhode & Schwarz ZVA	SN100132	02/2016	02/2019
Calipers	Carrera	CALIPER-01	01/2017	01/2020
Reference Probe	MVG	EPG122 SN 18/11	10/2017	10/2018
Multimeter	Keithley 2000	1188656	01/2017	01/2020
Signal Generator	Agilent E4438C	MY49070581	01/2017	01/2020
Amplifier	Aethercomm	SN 046	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Power Meter	HP E4418A	US38261498	01/2017	01/2020
Power Sensor	HP ECP-E26A	US37181460	01/2017	01/2020
Directional Coupler	Narda 4216-20	01386	Characterized prior to test. No cal required.	Characterized prior to test. No cal required.
Temperature and Humidity Sensor	Control Company	150798832	11/2017	11/2020

<Justification of the extended calibration>

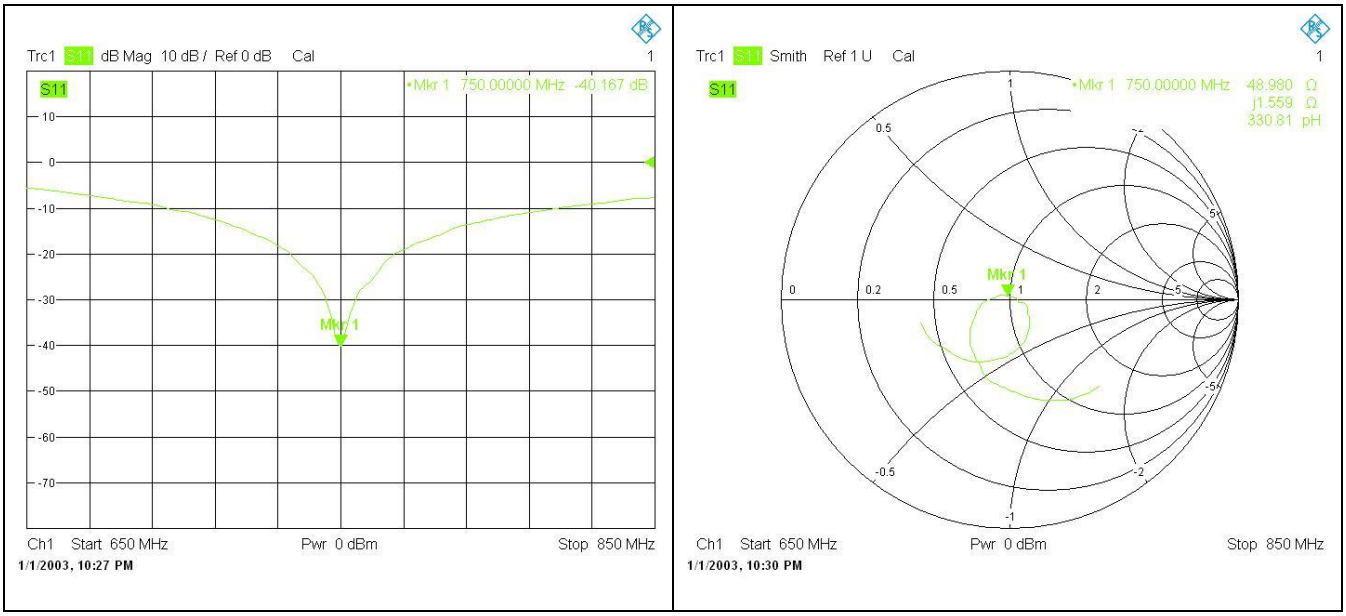
If dipoles are verified in return loss(<-20dB, within 20% of prior calibration),and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

Head 750MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-40.35	-	49.1	-
2019.11.26	-40.17	4.23	48.98	-0.12

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Head 750MHz

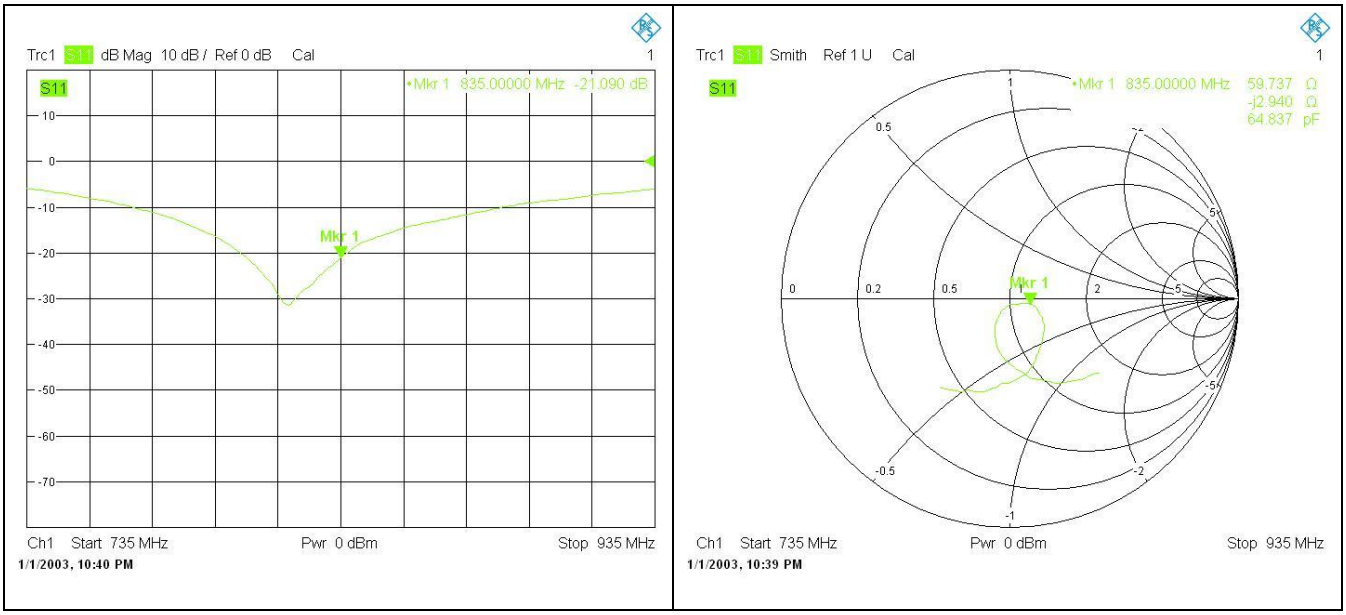


Head 835MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-21.05	-	59.7	-
2019.11.26	-21.09	-0.93	59.74	0.04

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Head 835MHz

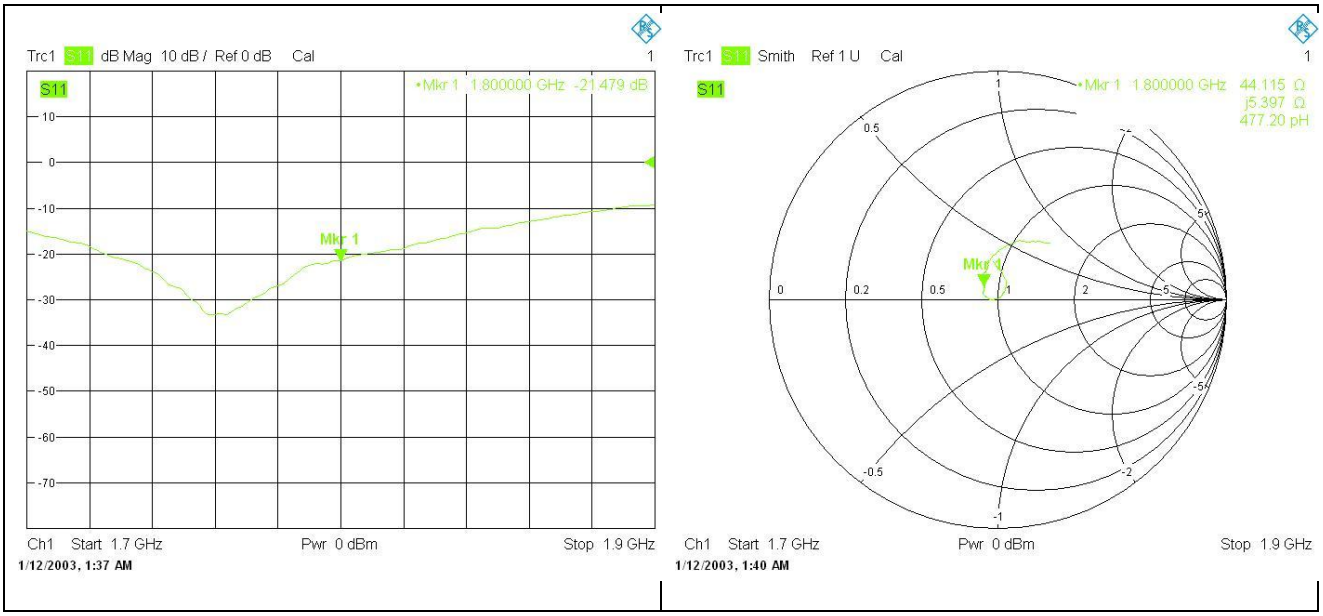


Head 1800MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-21.94	-	44.7	-
2019.11.26	-21.48	11.17	44.12	-0.58

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Head 1800MHz

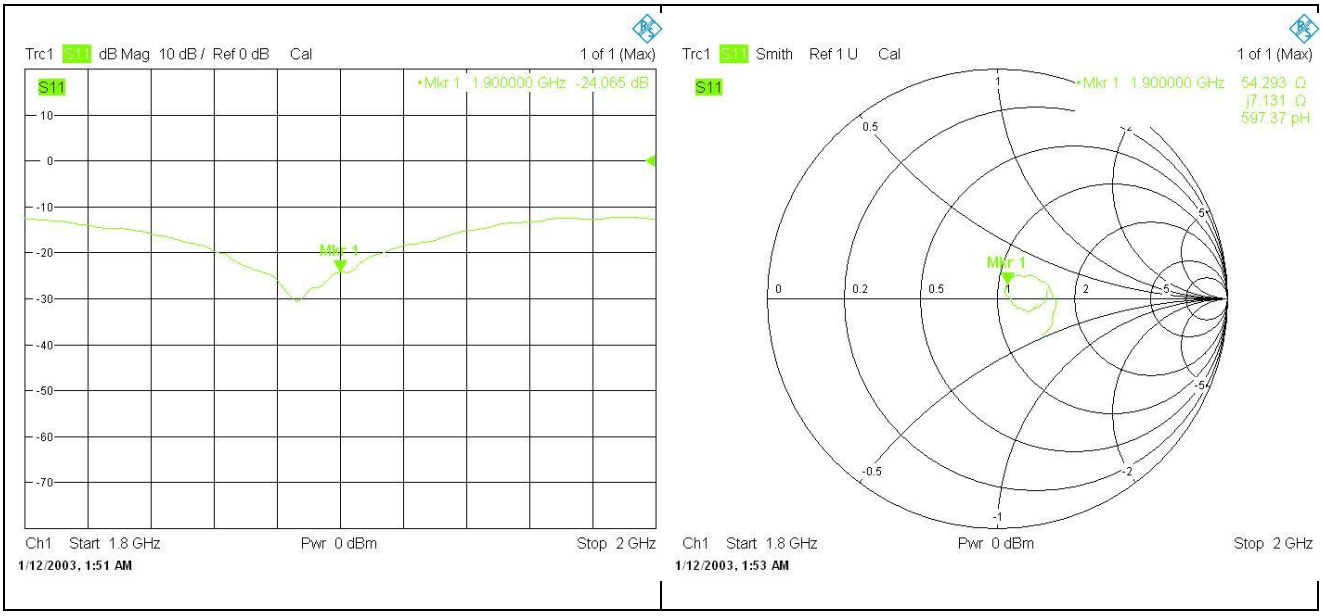


Head 1900MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-24.08	-	51.2	-
2019.11.26	-24.07	0.23	54.29	3.09

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Head 1900MHz

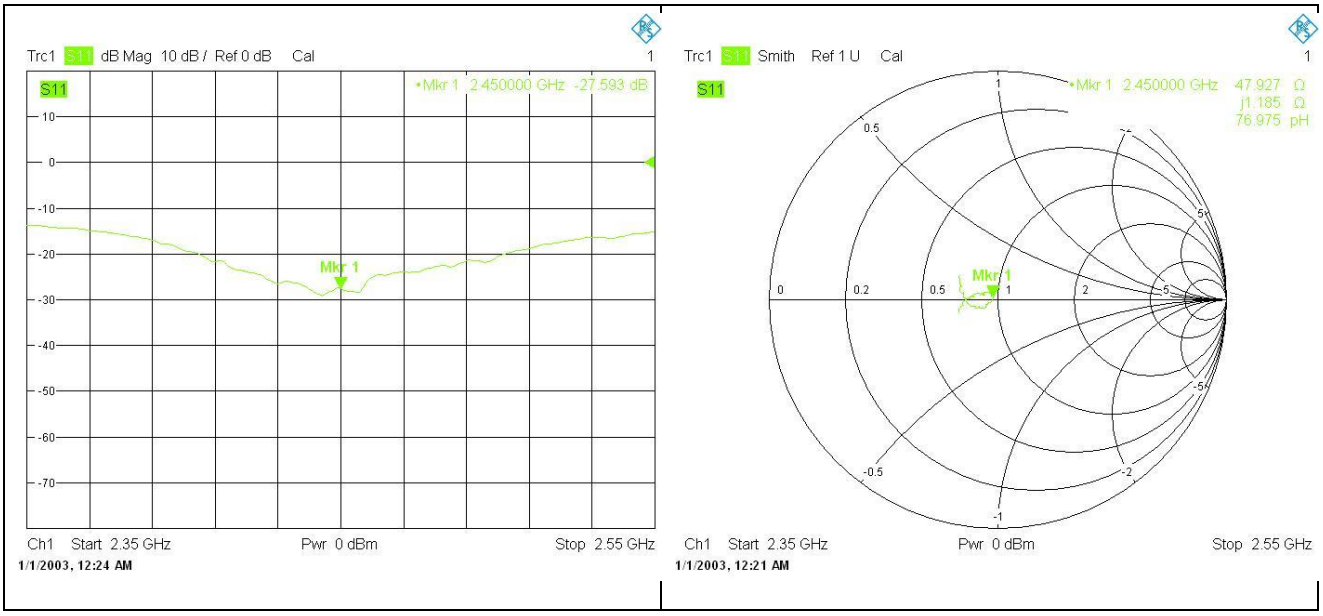


Head 2450MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-27.94	-	49.5	-
2019.11.26	-27.59	8.39	47.93	-1.57

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Head 2450MHz

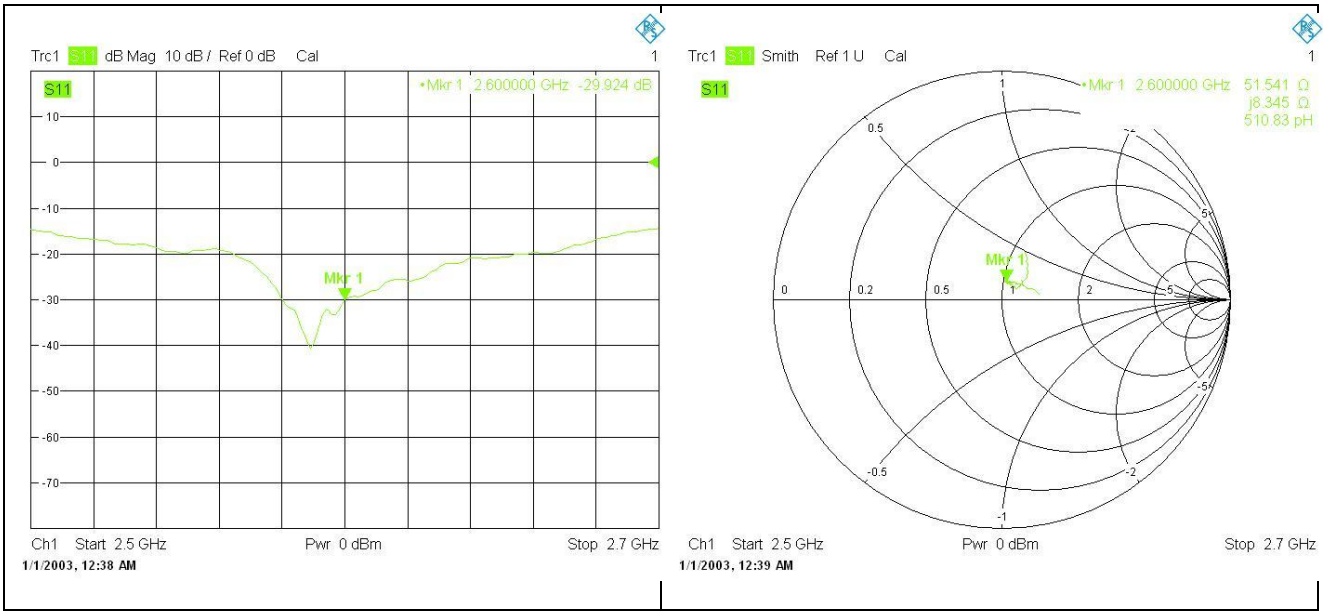


Head 2600MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-30.33	-	53.1	-
2019.11.26	-29.92	9.90	51.54	-1.56

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Head 2600MHz

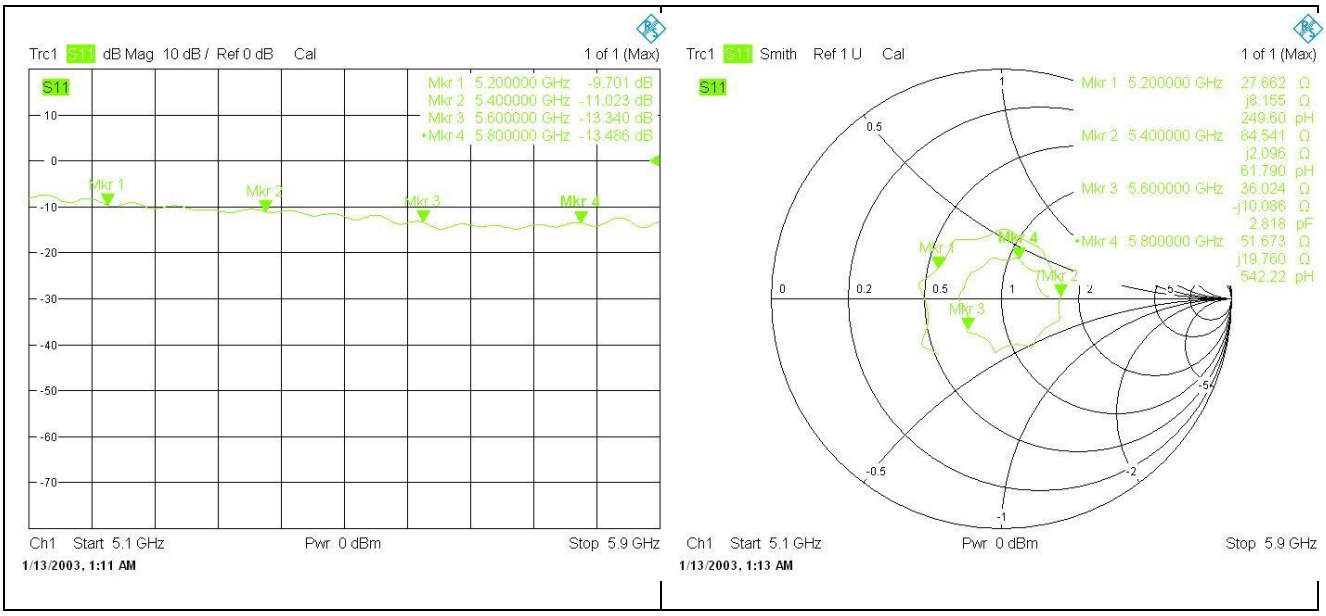


Head 5-6GHz					
Date of Measurement	**Frequency (MHz)**	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	5200	-9.69	-	25.64	-
2017.11.27	5400	-10.98	-	84.04	-
2017.11.27	5600	-13.52	-	36.63	-
2017.11.27	5800	-13.34	-	47.82	-
2019.11.26	5200	-9.70	-0.23	27.66	2.02
2019.11.26	5400	-11.02	-0.93	84.54	0.50
2019.11.26	5600	-13.34	4.23	36.02	-0.61
2019.11.26	5800	-13.49	0.69	51.67	3.85

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Head 5-6GHz

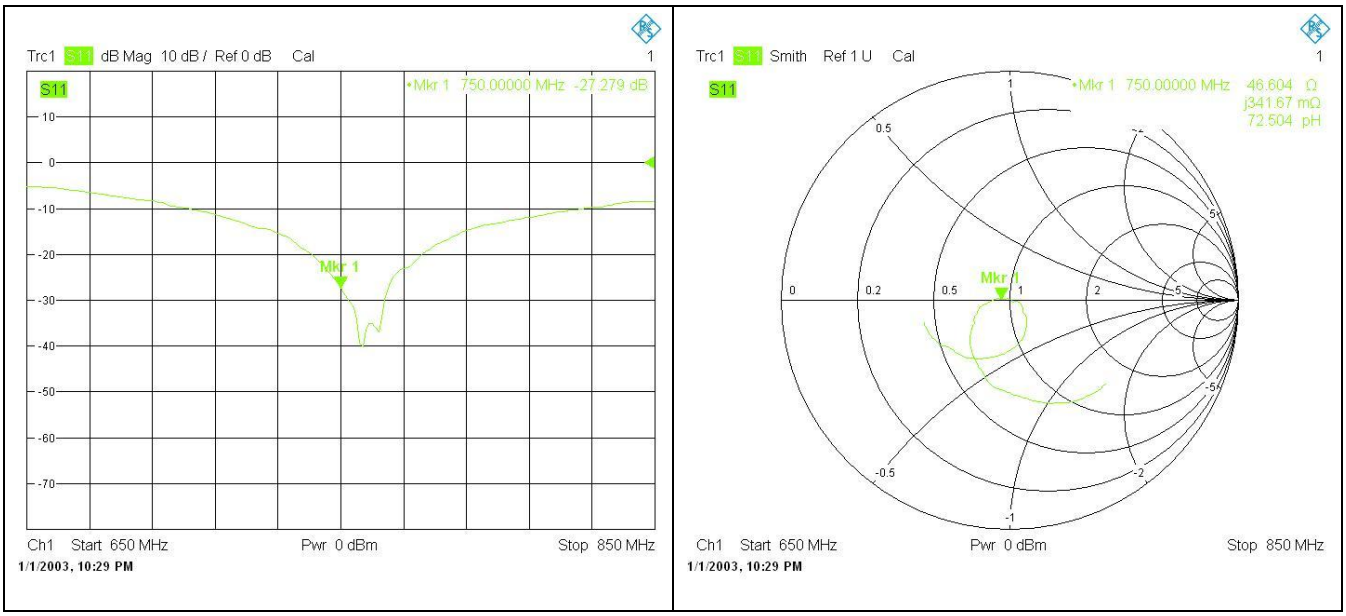


Body 750MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-27.32	-	46.8	-
2019.11.26	-27.28	0.93	46.60	-0.20

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Body 750MHz

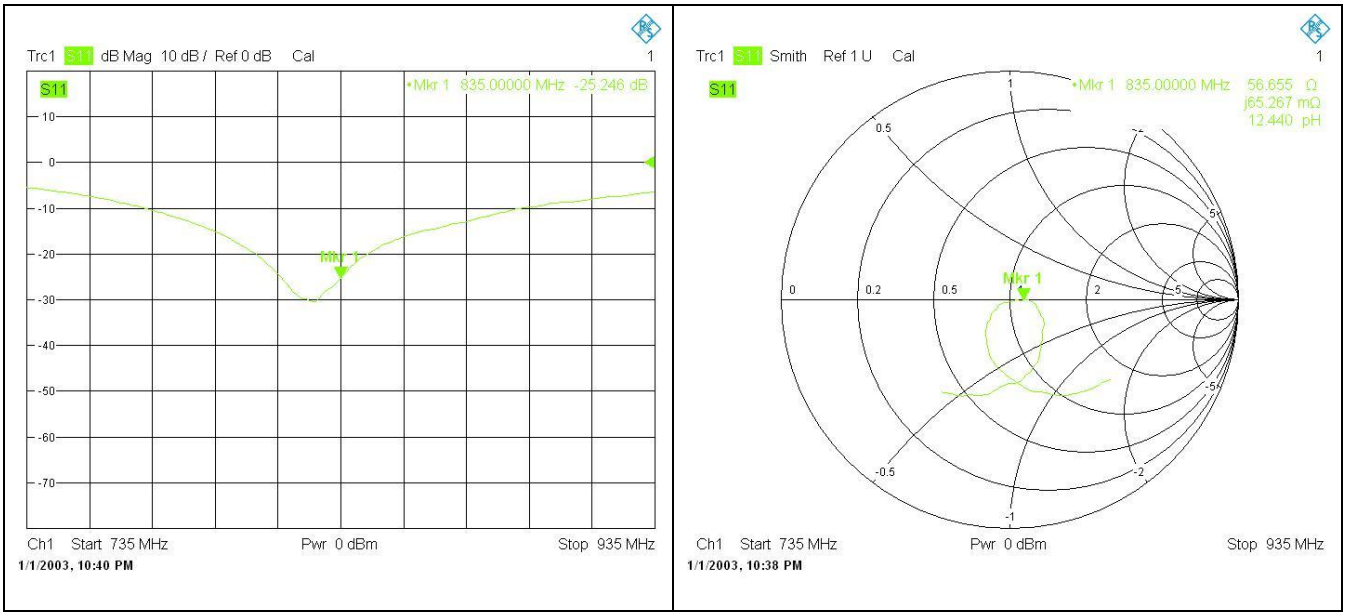


Body 835MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-25.17	-	55.1	-
2019.11.26	-25.25	-1.86	56.65	1.55

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Body 835MHz

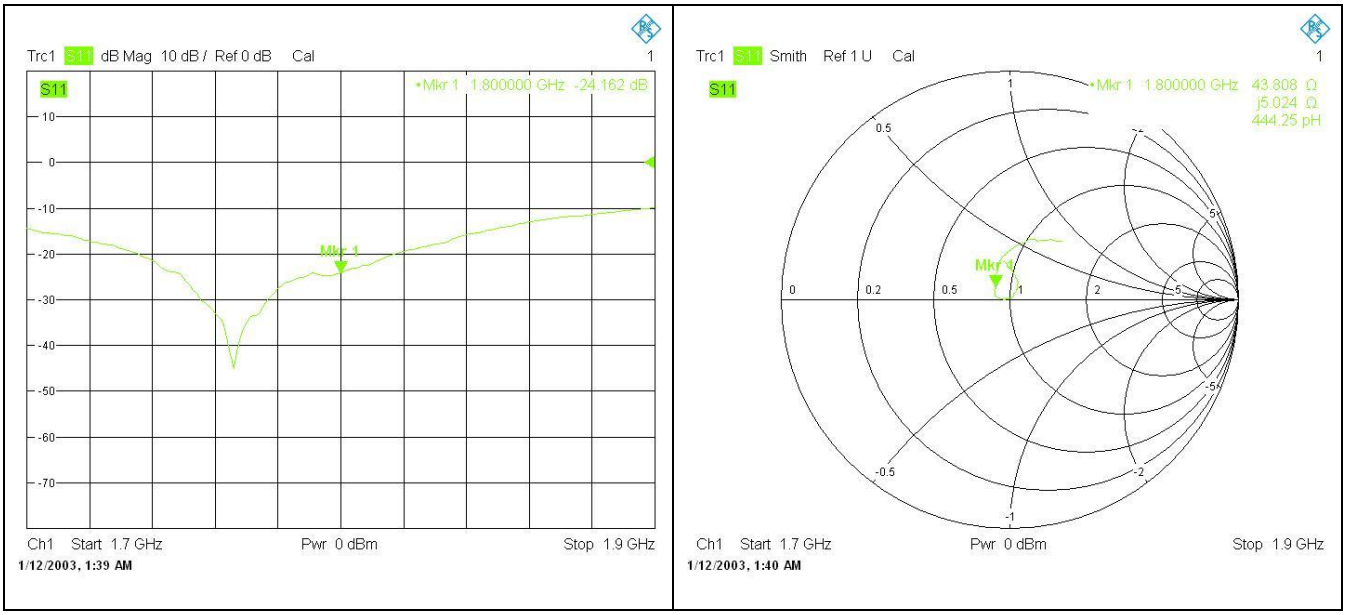


Body 1800MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-24.11	-	44.3	-
2019.11.26	-24.16	-1.15	43.81	-0.49

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Body 1800MHz

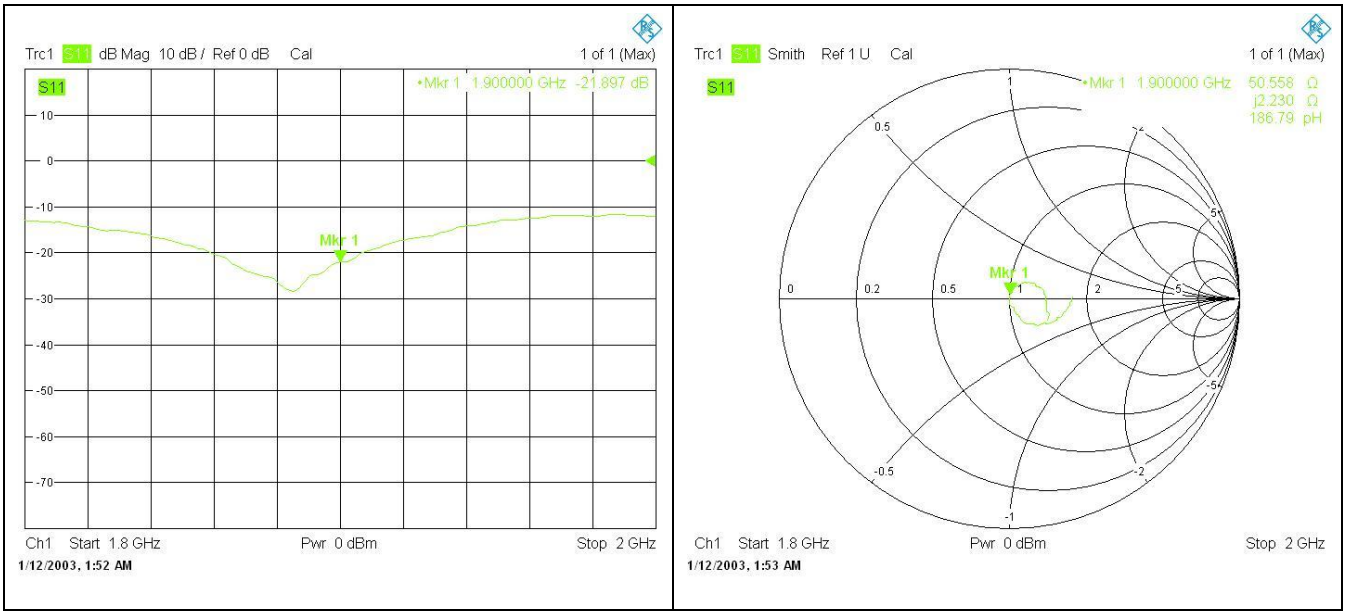


Body 1900MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-22.17	-	46.8	-
2019.11.26	-21.90	6.41	50.56	3.76

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Body 1900MHz

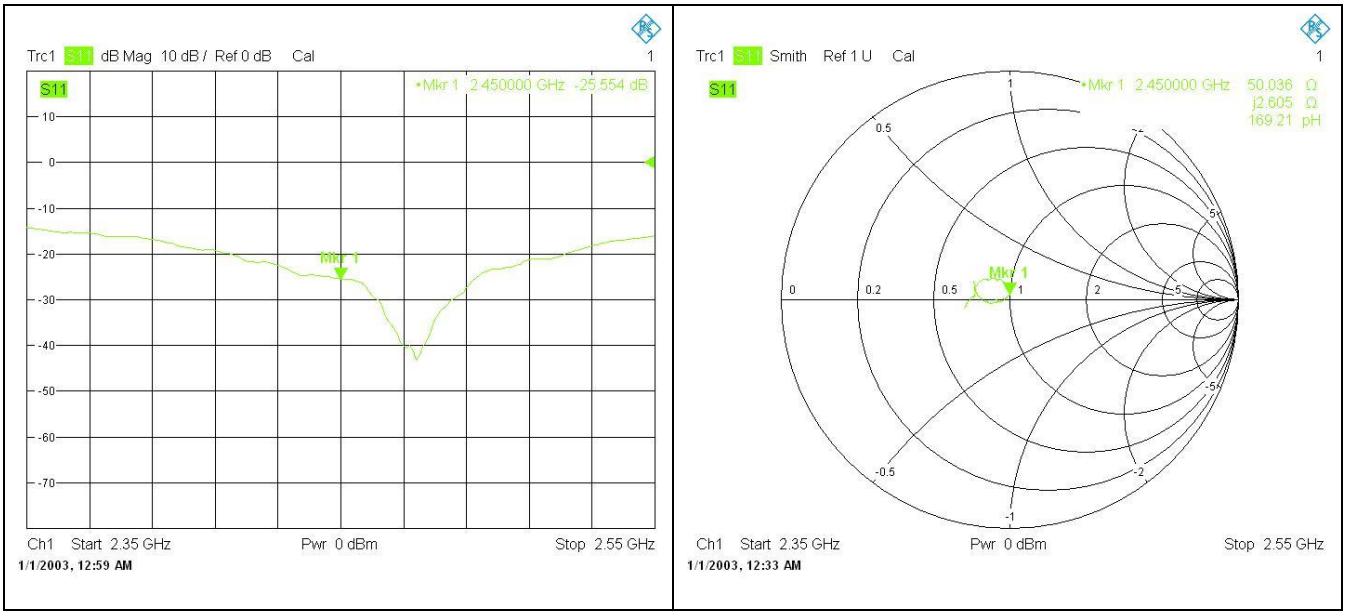


Body 2450MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-26.02	-	53.2	-
2019.11.26	-25.55	11.43	50.04	-3.16

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Body 2450MHz

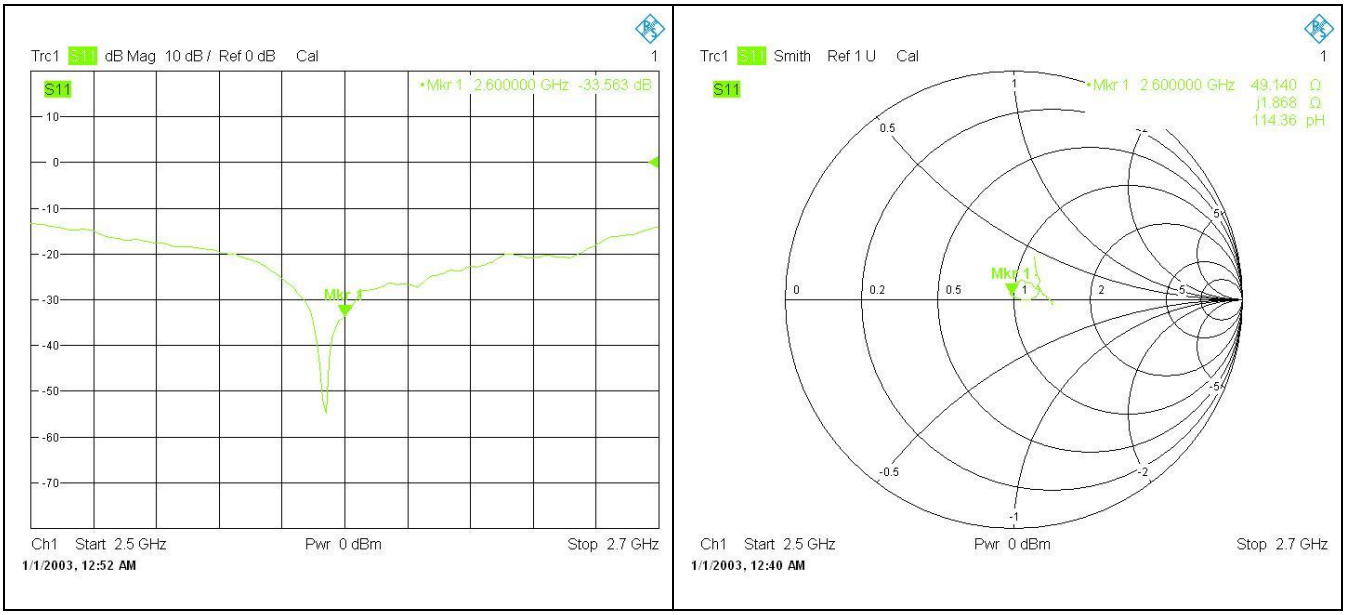


Body 2600MHz				
Date of Measurement	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	-33.55	-	49.4	-
2019.11.26	-33.56	-0.23	49.14	-0.26

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Body 2600MHz

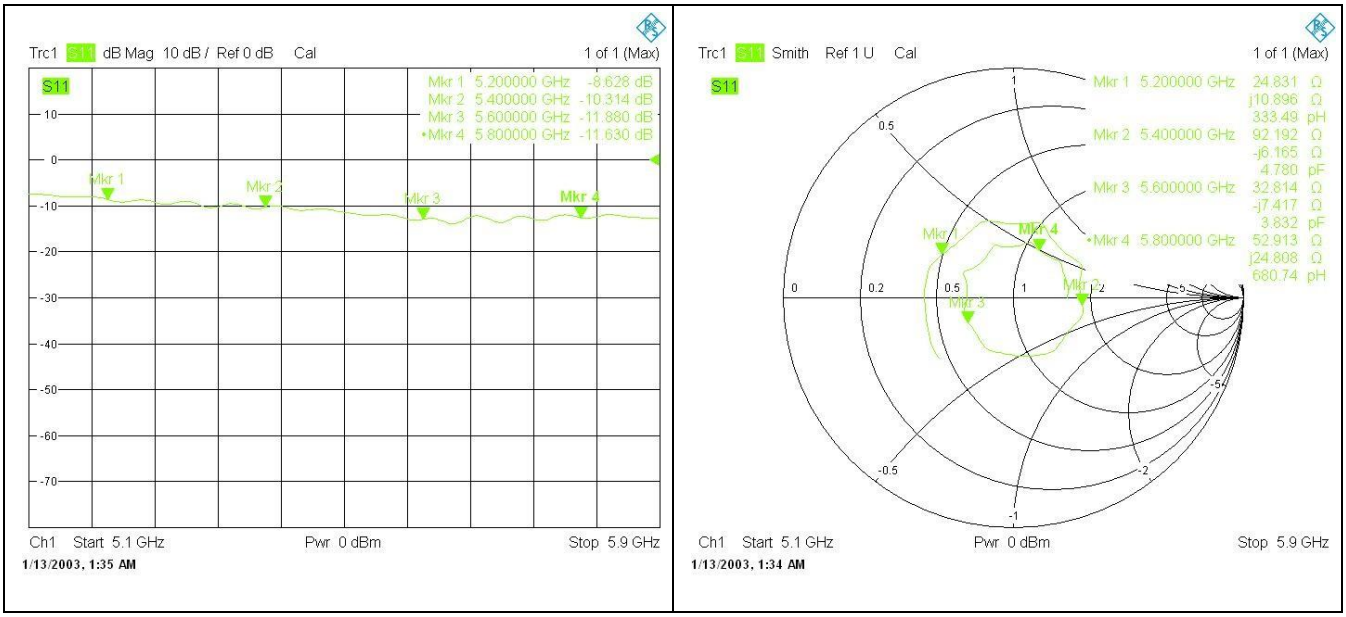


Body 5-6GHz					
Date of Measurement	**Frequency (MHz)**	**Return Loss (dB)**	**Delta (%)**	**Impedance**	**Delta(ohm)**
2017.11.27	5200	-8.86	-	23.97	-
2017.11.27	5400	-9.91	-	92.64	-
2017.11.27	5600	-11.72	-	32.59	-
2017.11.27	5800	-11.90	-	48.49	-
2019.11.26	5200	-8.63	5.44	24.83	0.86
2019.11.26	5400	-10.31	-9.65	92.19	-0.45
2019.11.26	5600	-11.88	-3.75	32.81	0.22
2019.11.26	5800	-11.63	6.41	52.91	4.42

The return loss is <-20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

<Dipole Verification Data>

Body 5-6GHz



—End of the Report—