



Dongle Antenna Report

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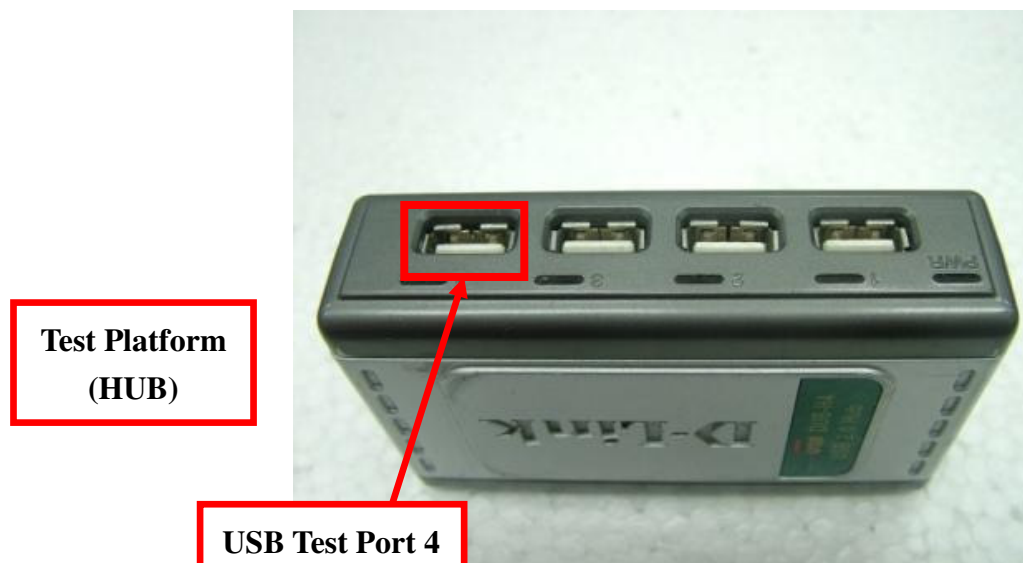
Evaluation History

REV. No.	DATE	CHANGES	Other
1	2012/12/19	Antenna test	
2	2013/3/8	Antenna test	
3	2013/4/17	Antenna test	

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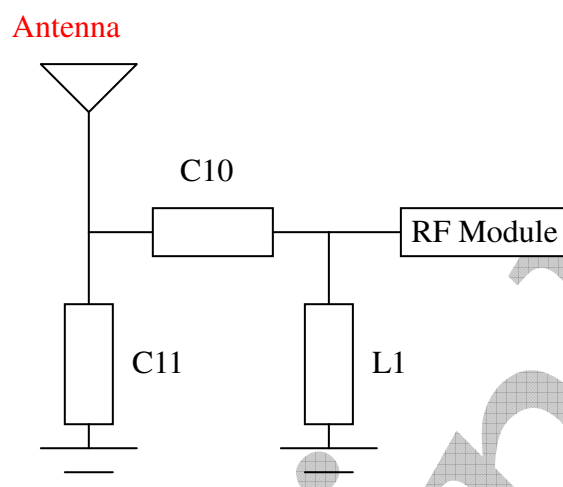


Antenna Placement





Matching Circuit



Component	Sample219	Sample233	Sample406
L1	NA	NA	NA
C10	0Ω	0Ω	0Ω
C11	NA	NA	NA

S11 Test Setup

1. Equipment Setup



2. Test Procedure

- 2.1 Set start and stop frequency and Calibrate the NA with 50 ohm calibration kit
- 2.2 Connect the NA cable to DUT antenna via SMA or I-PAX connector.
- 2.3 Measure the DUT antenna performance in the free space and record the s11.



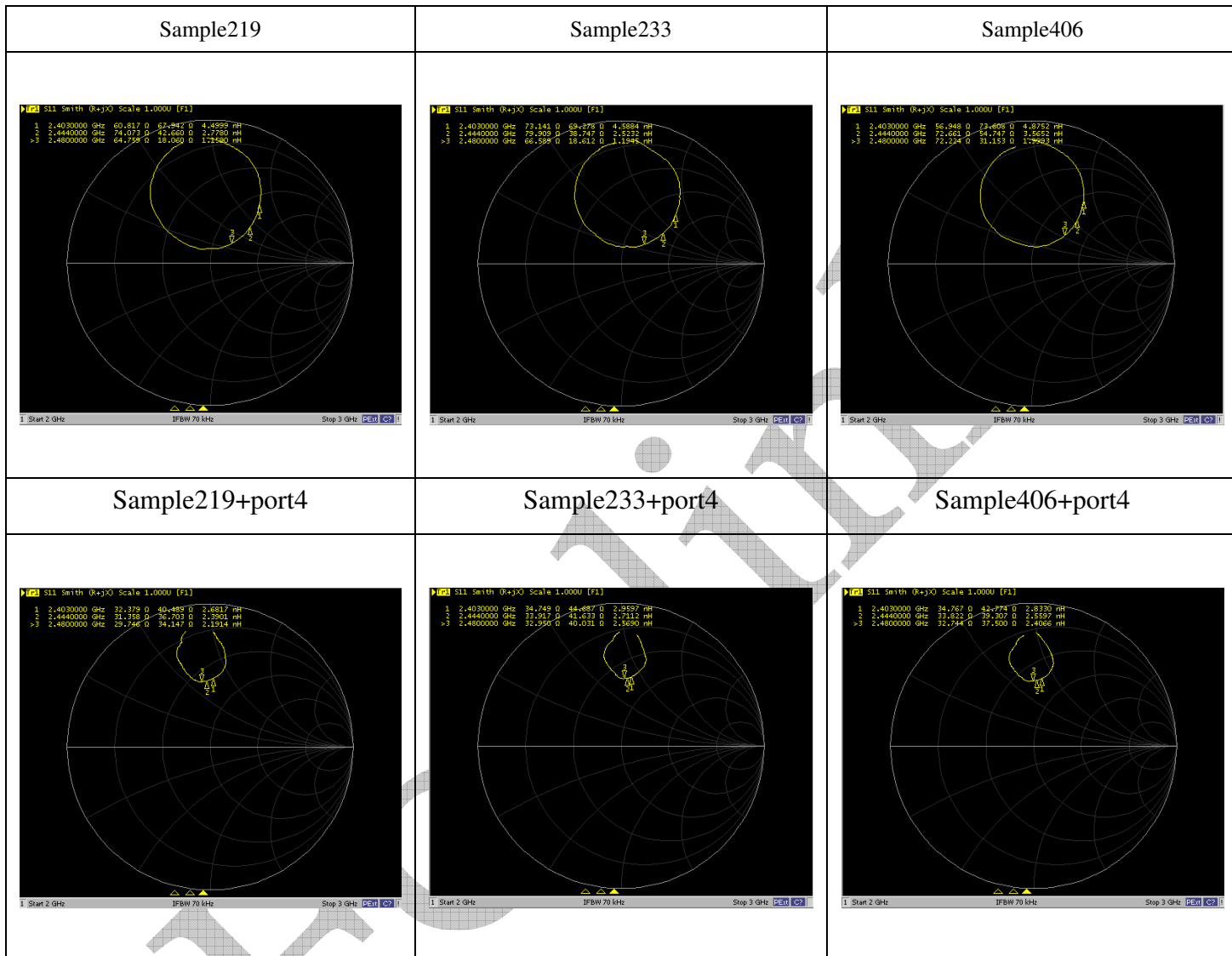
3.Test Result(VSWR, Smith Chart , Return loss)

● VSWR

Sample219		Sample233		Sample406	
2403 MHz	< 4	2403 MHz	< 4	2403 MHz	< 4
2444 MHz	< 3	2444 MHz	< 3	2444 MHz	< 3
2480 MHz	< 2	2480 MHz	< 2	2480 MHz	< 2
Sample219+port4		Sample233+port4		Sample406+port4	
2403 MHz	< 3	2403 MHz	< 3	2403 MHz	< 3
2444 MHz	< 3	2444 MHz	< 3	2444 MHz	< 3
2480 MHz	< 3	2480 MHz	< 3	2480 MHz	< 3

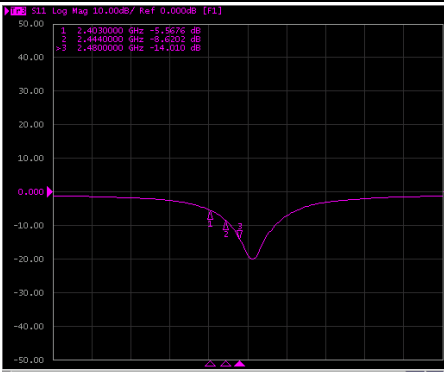
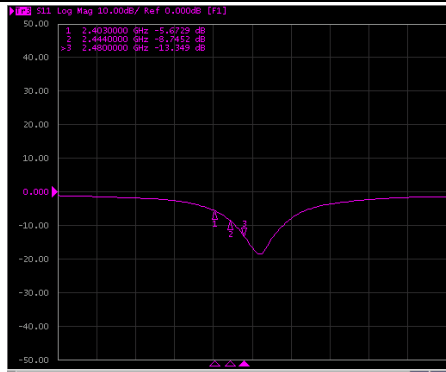
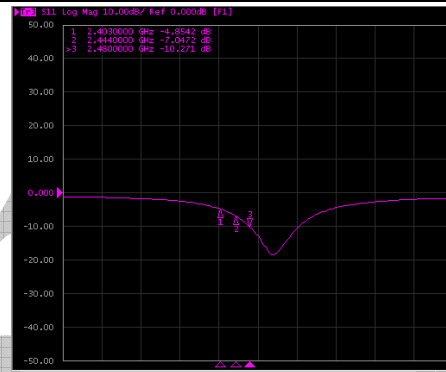
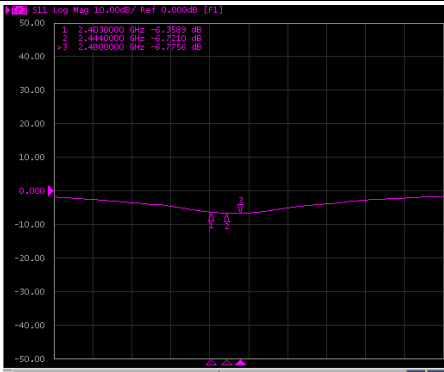
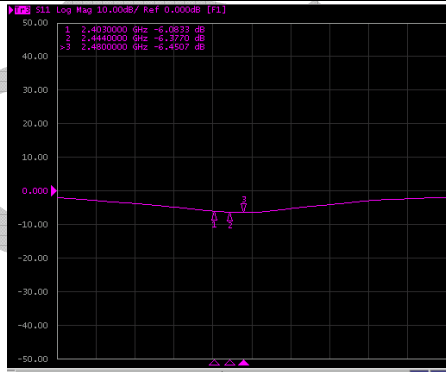
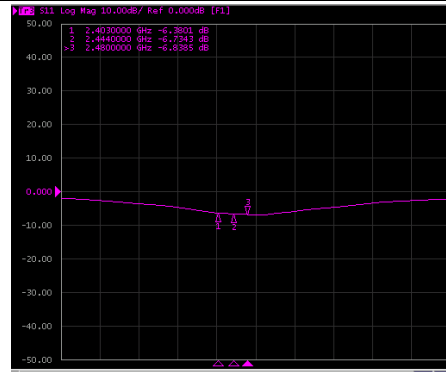


Smith Chart





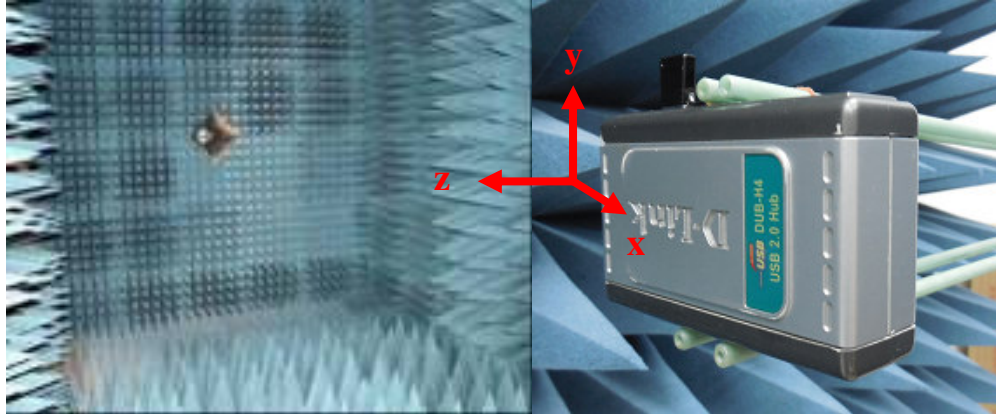
Return loss

Sample219	Sample233	Sample406																		
 <table><tr><td>2403 MHz</td><td>< -5</td></tr><tr><td>2444 MHz</td><td>< -8</td></tr><tr><td>2480 MHz</td><td>< -14</td></tr></table>	2403 MHz	< -5	2444 MHz	< -8	2480 MHz	< -14	 <table><tr><td>2403 MHz</td><td>< -5</td></tr><tr><td>2444 MHz</td><td>< -8</td></tr><tr><td>2480 MHz</td><td>< -13</td></tr></table>	2403 MHz	< -5	2444 MHz	< -8	2480 MHz	< -13	 <table><tr><td>2403 MHz</td><td>< -4</td></tr><tr><td>2444 MHz</td><td>< -7</td></tr><tr><td>2480 MHz</td><td>< -10</td></tr></table>	2403 MHz	< -4	2444 MHz	< -7	2480 MHz	< -10
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Sample219+port4	Sample233+port4	Sample406+port4																		
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S21 Test Setup

1. Testing Environment



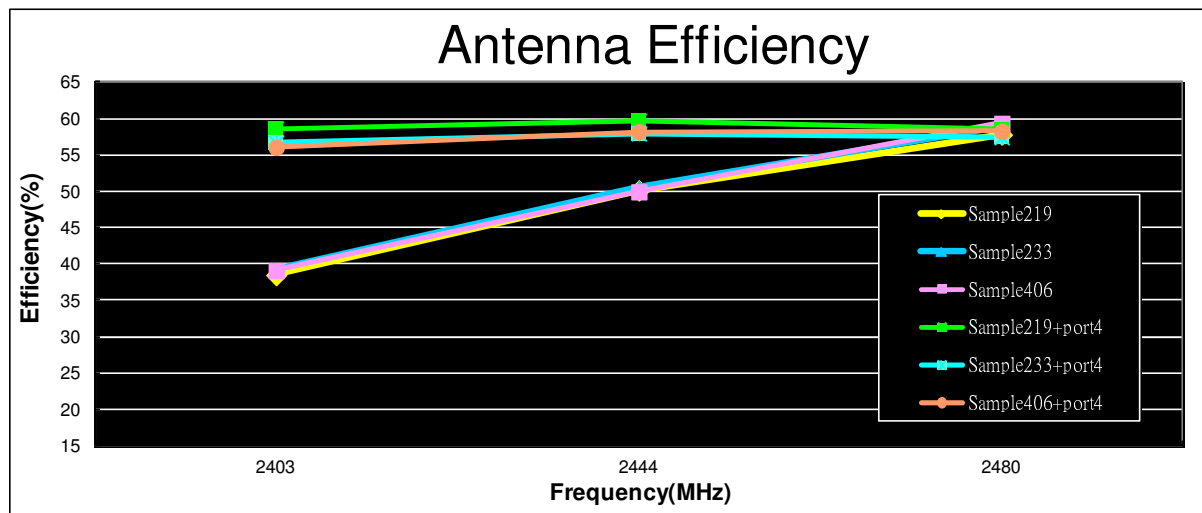
- **Lab standard:** 3D Chamber for CTIA standard
- **Chamber size:** 7.2 * 3.6 * 3.6(meter)
- **Chamber type:** Fully anechoic Chamber
- **Chamber usable frequency range:** 700~6000MHz
- **Measurement instrument:** Network Analyzer
- **Measurement Software:** EMQuest (ETS-Lindgren)
- **DUT :** Dongle

ETS-Lindgren

AMS-8500



2. Antenna Performance

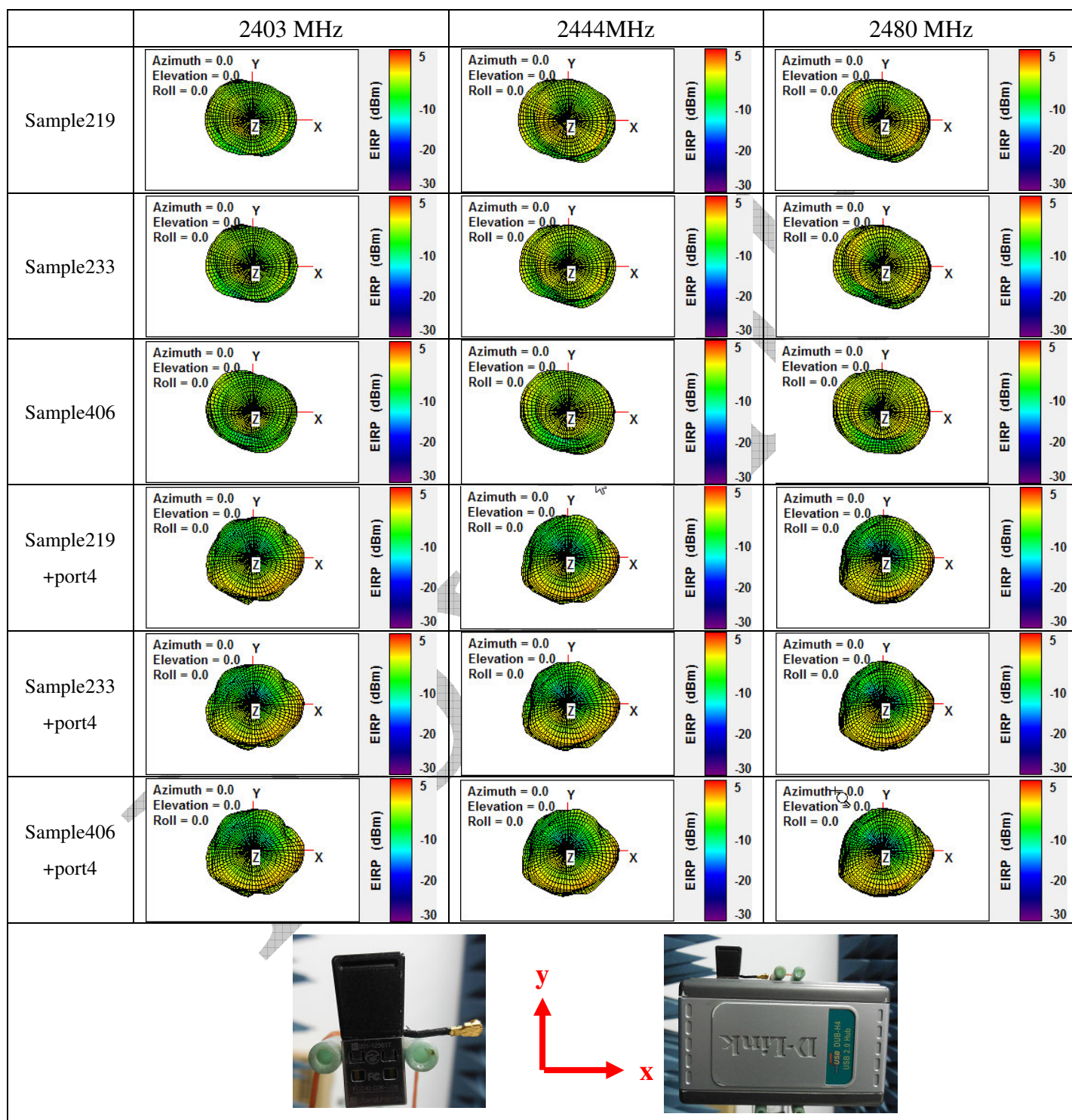


3. Experiment Result

Dongle		2403	2444	2480
Sample219	Total Rad. Power(dBi)	-4.15	-3.00	-2.38
	Peak EIRP(dBi)	0.29	1.37	2.18
	Efficiency(%)	38.50	50.13	57.80
	Average Efficiency(%)	48.81		
Sample233	Total Rad. Power(dBi)	-4.05	-2.96	-2.31
	Peak EIRP(dBi)	0.97	1.97	2.17
	Efficiency(%)	39.34	50.61	58.79
	Average Efficiency(%)	49.58		
Sample406	Total Rad. Power(dBi)	-4.08	-3.02	-2.26
	Peak EIRP(dBi)	2.35	2.61	3.01
	Efficiency(%)	39.11	49.94	59.37
	Average Efficiency(%)	49.47		
Sample219+port4	Total Rad. Power(dBi)	-2.32	-2.24	-2.33
	Peak EIRP(dBi)	2.82	2.30	2.01
	Efficiency(%)	58.63	59.71	58.48
	Average Efficiency(%)	58.94		
Sample233+port4	Total Rad. Power(dBi)	-2.46	-2.37	-2.41
	Peak EIRP(dBi)	2.65	2.17	2.08
	Efficiency(%)	56.70	57.96	57.45
	Average Efficiency(%)	57.37		
Sample406+port4	Total Rad. Power(dBi)	-2.51	-2.35	-2.35
	Peak EIRP(dBi)	2.62	2.26	2.09
	Efficiency(%)	56.05	58.19	58.25
	Average Efficiency(%)	57.50		

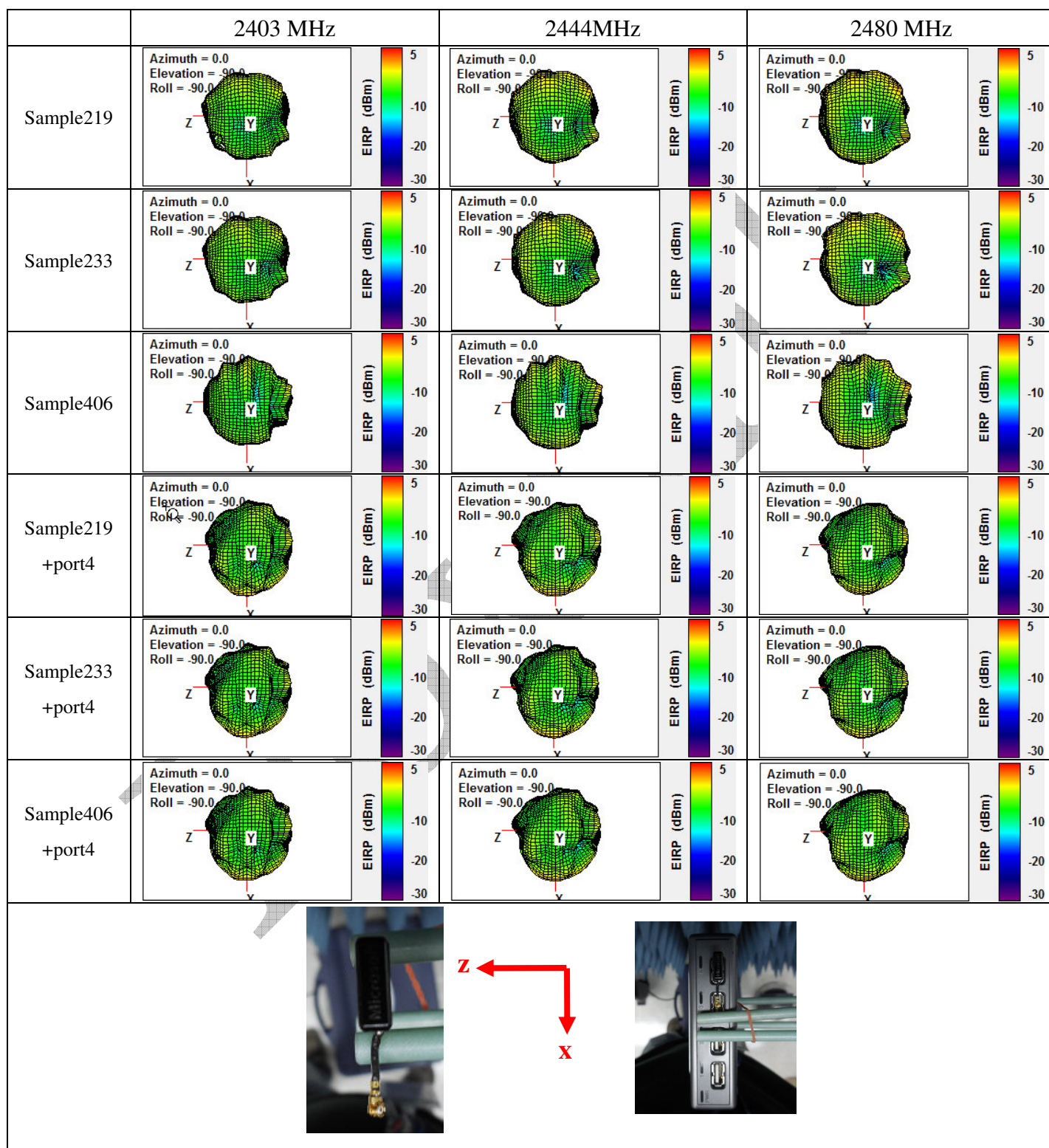


4. Antenna Pattern—3D (X-Y Cut)



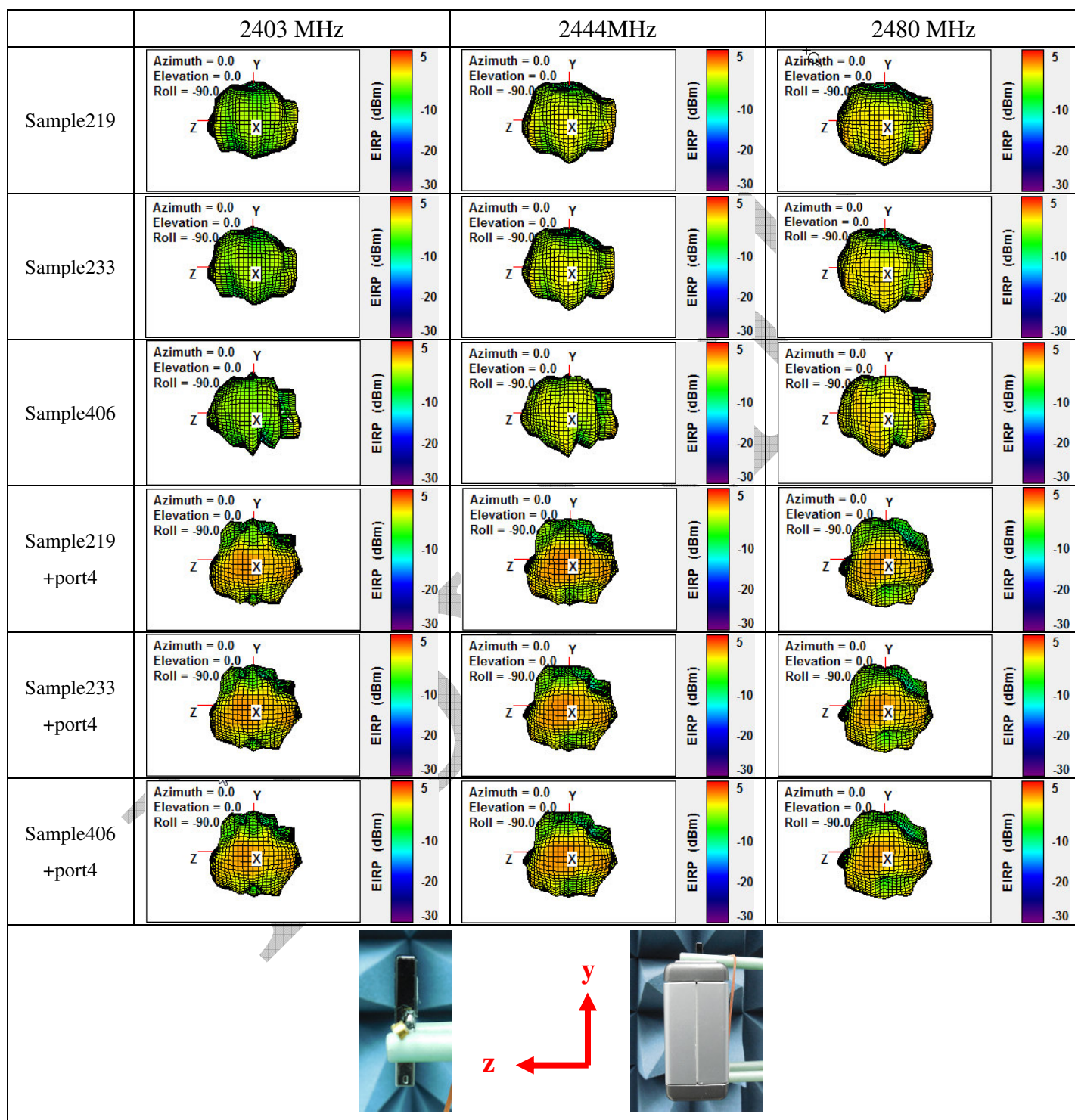


4. Antenna Pattern—3D (X-Z Cut)





4. Antenna Pattern—3D (Y-Z Cut)





Conclusion

This report provides a series of experiments dongle samples.

Experimental results such as the above data.

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