



Test report No:
NIE: 39776RRF.001

Test report

CTIA Test plan for mobile station over the air performance. Method of measurement for radiated RF power and receiver performance. August 2013. Revision 3.2.2

Identification of item tested.....:	CELLO CANIQ 3G
Trademark	Cellocator
Model and/or type reference	CT7800140-000
Other identification of the product	FCC ID:RIUE910NA IC:5131A-UE910NA
Final HW version	B00
Final SW version	33J
Features	Fully featured UMTS/GNSS End unit for fleet management ,Driver Behavior&CAN BUS triggering
Applicant	POINTER TELELOCATION LTD Pointer Telelocation Inc. 8600 NW 53 rd Terrace #105. Doral, FL 33166 USA 520041476 Itamar Gohary (786) 420-5646 Itamarg@pointer.com
Test method requested, standard.....:	[1] CTIA Test plan for mobile station over the air performance. Method of measurement for radiated RF power and receiver performance. August 2013. Revision 3.2.2.
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Alejandro Llamas Radiofrequency Laboratory Manager
Date of issue	2014-05-29
Report template No.....:	FDT08_15

Instrumentation used.....:

1. Anechoic chamber ETS LINDGREN RFD-F/A- 60.
2. Positioning system ETS LINDGREN 2115-72
3. Positioning system controller ETS LINDGREN 2090
4. Laser system CST/Berger, modelo MP5
5. Log spiral conical antenna ETS LINDGREN 3102
6. Limiting amplifier ETS LINDGREN 109643
7. Dual polarized horn antenna ETS LINDGREN 3164-04
8. OTA measurement software ETS LINDGREN EMQuest v1.08
9. Spectrum analyser Rohde & Schwarz FSU
10. Universal radiocommunication analyzer Rohde & Schwarz CMU200
11. RF switch unit mainframe Agilent 3499A
12. Dual 1 to 6 microwave module Agilent N2276A.
13. Microwave switch module Agilent 44476A
14. Temperature and Humidity probe, model HUMIDIPROBE

Index

Competences and guarantees.....	4
General conditions.....	4
Uncertainty	4
Usage of samples.....	4
Test sample description	4
Test samples supplier	5
Test samples manufacturer	5
Testing period.....	5
Environmental conditions.....	5
Testing verdicts	5
Appendix A – Test result.....	7
Appendix B - Photographs	38

Competences and guarantees

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AT4 wireless is a CTIA authorized testing laboratory with lab code 20080208-00.

In order to assure the traceability to other national and international laboratories, AT4 wireless has a calibration and maintenance program for its measurement equipment.

AT4 wireless guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at AT4 wireless at the time of performance of the test.

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The results presented in this Test Report apply only to the particular item under test established in this document.

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Uncertainty

Uncertainty (factor $k=2$) was calculated according to the following documents:

1. CTIA Test plan for mobile station over the air performance. Method of measurement for radiated RF power and receiver performance. August 2013. Revision 3.2.2.
2. FRF080: Measurement Uncertainty Report.

Usage of samples

Samples undergoing test have been selected by the client.

Sample M/01 is composed of the following elements:

Control N°	Description	Model	Serial N°	Date of reception
39776B/001	Integrated device	CT7800140-000	790653	2014-05-26

1. Sample M/01 has undergone the test(s) specified in subclause "Test method requested".

Test sample description

The test sample consists of a fully featured UMTS/GNSS End unit for fleet management, Driver Behavior & CAN BUS triggering.

Test samples supplier

Same as applicant (see cover page).

Test samples manufacturer

Same as applicant (see cover page).

Testing period

The performed test started on 2014-05-26 and finished on 2014-05-27.

The tests have been performed at AT4 wireless.

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 21.34 °C Max. = 24.75 °C
Relative humidity	Min. = 39.15 % Max. = 46.51 %

Testing verdicts

Not applicable	N/A
Pass	P
Fail	F
Not measured	N/M

GSM 850:

CTIA Test Plan for Mobile Station Over the Air. Revision 3.2.2, PARAGRAPH	VERDICT			
	NA	P	F	NM
5.4 : TRP	P			
6.4 : TIS	P			
6.4.: Intermediate Channel Relative Sensitivity	P			

GPRS 850:

CTIA Test Plan for Mobile Station Over the Air. Revision 3.2.2, PARAGRAPH	VERDICT			
	NA	P	F	NM
5.5 : TRP	P			
6.5 : TIS	P			
6.5.: Intermediate Channel Relative Sensitivity	P			

EGPRS 850:

CTIA Test Plan for Mobile Station Over the Air. Revision 3.2.2, PARAGRAPH	VERDICT			
	NA	P	F	NM
5.6 : TRP	P			
6.6 : TIS	P			
6.6.: Intermediate Channel Relative Sensitivity	P			

GSM 1900:

CTIA Test Plan for Mobile Station Over the Air. Revision 3.2.2, PARAGRAPH	VERDICT			
	NA	P	F	NM
5.4 : TRP	P			
6.4 : TIS	P			
6.4.: Intermediate Channel Relative Sensitivity	P			

GPRS 1900:

CTIA Test Plan for Mobile Station Over the Air. Revision 3.2.2, PARAGRAPH	VERDICT			
	NA	P	F	NM
5.5 : TRP	P			
6.5 : TIS	P			
6.5.: Intermediate Channel Relative Sensitivity	P			

EGPRS 1900:

CTIA Test Plan for Mobile Station Over the Air. Revision 3.2.2, PARAGRAPH	VERDICT			
	NA	P	F	NM
5.6 : TRP	P			
6.6 : TIS	P			
6.6.: Intermediate Channel Relative Sensitivity	P			

WCDMA II:

CTIA Test Plan for Mobile Station Over the Air. Revision 3.2.2, PARAGRAPH	VERDICT			
	NA	P	F	NM
5.7 : TRP	P			
6.7 : TIS	P			
6.7.: Intermediate Channel Relative Sensitivity	P			

WCDMA Band V:

CTIA Test Plan for Mobile Station Over the Air. Revision 3.2.2, PARAGRAPH	VERDICT			
	NA	P	F	NM
5.7 : TRP	P			
6.7 : TIS	P			
6.7.: Intermediate Channel Relative Sensitivity	P			

Appendix A – Test result

INDEX

1. TEST CONDITIONS.....	9
1.1 Power supply (V)	9
1.2 Temperature (°C).....	9
1.3 Test frequencies and Output Power.....	9
1.4 Device orientation and Setup Requirements	9
2. TEST RESULTS	10
2.1 Equipment Under Test (EUT) information.....	10
2.2 EUTs used for each test.....	10
2.3 Cellular OTA Summation Test Report.....	11
2.4 GSM/GPRS/EGPRS and WCDMA Intermediate Channel Relative Sensitivity (RS)	14
2.5 Minimum TRP level requirements	15
2.6 Maximum TIS level requirements.....	16
3. EXPANDED MEASUREMENTS UNCERTAINTIES	17
4. RF TEST RESULT ON 3D	18
4.1 TRP GSM 850.....	18
4.2 TIS GSM 850	19
4.3 TRP GPRS 850.....	20
4.4 TIS GPRS 850.....	21
4.5 TRP EGPRS 850	22
4.6 TIS EGPRS 850	23
4.7 TRP GSM 1900.....	24
4.8 TIS GSM 1900	25
4.9 TRP GPRS 1900.....	26
4.10 TIS GPRS 1900.....	27
4.11 TRP EGPRS 1900	28
4.12 TIS EGPRS 1900	29
4.13 TRP WCDMA Band II.....	30
4.14 TIS WCDMA Band II.....	31
4.15 TRP WCDMA Band V.....	32
4.16 TIS WCDMA Band V.....	33
5. RANGE REFERENCE MEASUREMENT DATA.....	34

1. TEST CONDITIONS

1.1 Power supply (V)

Power supply (V) under test:

V_n = supplied by a fully charged 3.7 V_{DC} rechargeable Li-ion battery.

1.2 Temperature (°C)

T_n = +18 to +30

The subscript n indicates normal test conditions.

1.3 Test frequencies and Output Power

In all required operating bands the measurements for Total Radiated Power (TRP) and Total Isotropic Sensitivity (TIS) measurements were performed on lowest, middle and highest channels defined by the standard [1]. Continuum of channels across each supported band was performed for Intermediate Channel Sensitivity (ICS) tests.

The output power of the device was set to maximum for all tests.

1.4 Device orientation and Setup Requirements

The device under test has been oriented as indicated in the standard [1]. See figure 18 in this report.

The device under test has only one mechanical configuration and it was tested in the following scenario required by the standard [1]:

- “Free-space” configuration, whereby the EUT has been placed directly on a support.

2. TEST RESULTS

2.1 Equipment Under Test (EUT) information

Manufacturer	POINTER TELOCATION LTD
Model	CT7800140-000
Serial Number(s)/ESN(s)/IMEI(s)	790653
FCC ID Number	FCC ID:RIUE910NA
Hardware Version	B00
Software Version	33J
Configuration of Primary Mechanical Mode	EUT supports only one mechanical mode

2.2 EUTs used for each test

Serial Number/ ESN/IMEI	CATL/ Chamber used	RAT(s)	Band(s)	Test Type(s)	Test Condition(s)
SN: 790653	Code 20080208-00 / ETS Lindgren S501 Hatch	GSM / GPRS / GPRS / WCDMA	Cellular 850 / PCS 1900	TRP / TIS / RS	Free Space

2.3 Cellular OTA Summation Test Report

GSM/GPRS/EGPRS – TRP Test Results

Band / Tech	Channel	Frequency (MHz)	Conducted power (dBm)	TRP (dBm)					NHPRP ± 45° (dBm)					NHPRP ± 30° (dBm)				
				FS	HL	HR	BHHL	BHHR	FS	HL	HR	BHHL	BHHR	FS	HL	HR	BHHL	BHHR
Cellular / GSM 850	128	824.20	-	27.07	-	-	-	-	25.64	-	-	-	-	24.67	-	-	-	-
	190	836.6	-	27.05	-	-	-	-	25.66	-	-	-	-	24.70	-	-	-	-
	251	848.80	-	27.89	-	-	-	-	26.55	-	-	-	-	25.56	-	-	-	-
Cellular / GPRS 850	128	824.20	-	28.92	-	-	-	-	27.49	-	-	-	-	26.52	-	-	-	-
	190	836.6	-	29.05	-	-	-	-	27.66	-	-	-	-	26.70	-	-	-	-
	251	848.80	-	29.12	-	-	-	-	27.78	-	-	-	-	26.79	-	-	-	-
Cellular / EGPRS 850	128	824.20	-	21.75	-	-	-	-	20.32	-	-	-	-	19.35	-	-	-	-
	190	836.6	-	22.04	-	-	-	-	20.65	-	-	-	-	19.69	-	-	-	-
	251	848.80	-	22.82	-	-	-	-	21.48	-	-	-	-	20.49	-	-	-	-
PCS / GSM 1900	512	1850.2	-	28.89	-	-	-	-	27.26	-	-	-	-	25.73	-	-	-	-
	661	1880	-	29.23	-	-	-	-	27.63	-	-	-	-	26.06	-	-	-	-
	810	1909.8	-	29.34	-	-	-	-	27.74	-	-	-	-	26.13	-	-	-	-
PCS / GPRS 1900	512	1850.2	-	28.66	-	-	-	-	27.04	-	-	-	-	25.50	-	-	-	-
	661	1880	-	29.23	-	-	-	-	27.63	-	-	-	-	26.07	-	-	-	-
	810	1909.8	-	29.55	-	-	-	-	27.94	-	-	-	-	26.34	-	-	-	-
PCS / EGPRS 1900	512	1850.2	-	25.88	-	-	-	-	24.25	-	-	-	-	22.71	-	-	-	-
	661	1880	-	26.49	-	-	-	-	24.90	-	-	-	-	23.33	-	-	-	-
	810	1909.8	-	26.15	-	-	-	-	24.55	-	-	-	-	22.95	-	-	-	-

FS = Free Space
HL = Hand Left (Hand Phantom Only)
HR = Hand Right (Hand Phantom Only)
BHHL = Beside Head and Hand Left Side (Head and Hand Phantom)
BHHR = Beside Head and Hand Right Side (Head and Hand Phantom)
N/A = Not Applicable

GSM/GPRS/EGPRS – TIS Test Results

Band / Tech	Channel	Frequency (MHz)	Conducted sensitivity (dBm)	TIS (dBm)					NHPIS ± 45° (dBm)					NHPIS ± 30° (dBm)				
				FS	HL	HR	BHHL	BHHR	FS	HL	HR	BHHL	BHHR	FS	HL	HR	BHHL	BHHR
Cellular / GSM 850	128	869.20	-	-106.19	-	-	-	-	-105.1	-	-	-	-	-104.1	-	-	-	-
	190	881.60	-	-105.48	-	-	-	-	-104.4	-	-	-	-	-103.4	-	-	-	-
	251	893.80	-	-104.65	-	-	-	-	-103.6	-	-	-	-	-102.6	-	-	-	-
Cellular / GPRS 850	128	869.20	-	-107.19	-	-	-	-	-106.1	-	-	-	-	-105.1	-	-	-	-
	190	881.60	-	-106.48	-	-	-	-	-105.4	-	-	-	-	-104.4	-	-	-	-
	251	893.80	-	-105.65	-	-	-	-	-104.6	-	-	-	-	-103.6	-	-	-	-
Cellular / EGPRS 850	128	869.20	-	-99.19	-	-	-	-	-98.1	-	-	-	-	-97.1	-	-	-	-
	190	881.60	-	-96.98	-	-	-	-	-95.9	-	-	-	-	-94.9	-	-	-	-
	251	893.80	-	-97.15	-	-	-	-	-96.1	-	-	-	-	-95.1	-	-	-	-
PCS / GSM 1900	512	1930.2	-	-107.65	-	-	-	-	-106.1	-	-	-	-	-104.5	-	-	-	-
	661	1960	-	-107.81	-	-	-	-	-106.2	-	-	-	-	-104.6	-	-	-	-
	810	1989.8	-	-107.76	-	-	-	-	-106.2	-	-	-	-	-104.6	-	-	-	-
PCS / GPRS 1900	512	1930.2	-	-110.15	-	-	-	-	-108.6	-	-	-	-	-107.0	-	-	-	-
	661	1960	-	-110.31	-	-	-	-	-108.7	-	-	-	-	-107.1	-	-	-	-
	810	1989.8	-	-110.26	-	-	-	-	-108.7	-	-	-	-	-107.1	-	-	-	-
PCS / EGPRS 1900	512	1930.2	-	-102.65	-	-	-	-	-101.1	-	-	-	-	-99.5	-	-	-	-
	661	1960	-	-102.81	-	-	-	-	-101.2	-	-	-	-	-99.6	-	-	-	-
	810	1989.8	-	-103.26	-	-	-	-	-101.7	-	-	-	-	-100.1	-	-	-	-

FS = Free Space
HL = Hand Left (Hand Phantom Only)
HR = Hand Right (Hand Phantom Only)
BHHL = Beside Head and Hand Left Side (Head and Hand Phantom)
BHHR = Beside Head and Hand Right Side (Head and Hand Phantom)
N/A = Not Applicable

WCDMA - TRP Test Results

Band / Tech	Channel	Frequency (MHz)	Conducted power (dBm)	TRP (dBm)					NHPRP ± 45° (dBm)					NHPRP ± 30° (dBm)				
				FS	HL	HR	BHHL	BHHR	FS	HL	HR	BHHL	BHHR	FS	HL	HR	BHHL	BHHR
WCDMA Band II	9262	1852.4	-	22.58	-	-	-	-	21.00	-	-	-	-	19.44	-	-	-	-
	9400	1880	-	23.34	-	-	-	-	21.79	-	-	-	-	20.23	-	-	-	-
	9538	1907.6	-	23.85	-	-	-	-	22.33	-	-	-	-	20.74	-	-	-	-
WCDMA Band V	4132	826.4	-	21.99	-	-	-	-	20.48	-	-	-	-	19.46	-	-	-	-
	4183	836.6	-	22.20	-	-	-	-	20.80	-	-	-	-	19.84	-	-	-	-
	4233	846.6	-	21.98	-	-	-	-	20.62	-	-	-	-	19.57	-	-	-	-

WCDMA – TIS Test Results

Band / Tech	Channel	Frequency (MHz)	Conducted sensitivity (dBm)	TIS (dBm)					NHPIIS ± 45° (dBm)					NHPIIS ± 30° (dBm)				
				FS	HL	HR	BHHL	BHHR	FS	HL	HR	BHHL	BHHR	FS	HL	HR	BHHL	BHHR
WCDMA Band II	9662	1932.4	-	-110.81	-	-	-	-	-109.4	-	-	-	-	-107.8	-	-	-	-
	9800	1960	-	-111.91	-	-	-	-	-110.4	-	-	-	-	-108.8	-	-	-	-
	9938	1987.6	-	-110.86	-	-	-	-	-109.4	-	-	-	-	-107.8	-	-	-	-
WCDMA Band V	4357	871.4	-	-106.37	-	-	-	-	-105.1	-	-	-	-	-103.8	-	-	-	-
	4408	881.6	-	-106.24	-	-	-	-	-104.9	-	-	-	-	-103.6	-	-	-	-
	4458	891.6	-	-106.00	-	-	-	-	-104.7	-	-	-	-	-103.4	-	-	-	-

FS = Free Space
HL = Hand Left (Hand Phantom Only)
HR = Hand Right (Hand Phantom Only)
BHHL = Beside Head and Hand Left Side (Head and Hand Phantom)
BHHR = Beside Head and Hand Right Side (Head and Hand Phantom)
N/A = Not Applicable

2.4 GSM/GPRS/EGPRS and WCDMA Intermediate Channel Relative Sensitivity (RS)

Band / Mode	Intermediate Channels	FS	BHHR	Comments
Cellular / GSM 850	128-159	Pass	Pass	
	160-220	Pass	Pass	
	221-251	Pass	Pass	
Cellular / GPRS 850	128-159	Pass	Pass	
	160-220	Pass	Pass	
	221-251	Pass	Pass	
Cellular / EGPRS 850	128-159	Pass	Pass	
	160-220	Pass	Pass	
	221-251	Pass	Pass	
PCS / GSM 1900	512-586	Pass	Pass	
	587-735	Pass	Pass	
	736-810	Pass	Pass	
PCS / GPRS 1900	512-586	Pass	Pass	
	587-735	Pass	Pass	
	736-810	Pass	Pass	
PCS / EGPRS 1900	512-586	Pass	Pass	
	587-735	Pass	Pass	
	736-810	Pass	Pass	
WCDMA Band II	9662-9728	Pass	Pass	
	9740-9860	Pass	Pass	
	9872-9938	Pass	Pass	
WCDMA Band V	4357-4372	Pass	Pass	
	4384-4432	Pass	Pass	
	4444-4458	Pass	Pass	

FS = Free Space

BHHR = Beside Head and Hand Right Side (Head and Hand Phantom)

N/A = Not Applicable

2.5 Minimum TRP level requirements for the primary mechanical mode^{1,2}

Mode	Device Held Up to Head for Voice (Yes/No ³)	Device Power Class	Multi-sol Class	Channel	TX Frequency (MHz)	FS			HL			HR			BHHL			BHHR		
						Limit (dBm)	Test Results (dBm)	Pass/Fail/Info	Limit (dBm)	Test Results (dBm)	Pass/Fail/Info	Limit (dBm)	Test Results (dBm)	Pass/Fail/Info	Limit (dBm)	Test Results (dBm)	Pass/Fail/Info	Limit (dBm)	Test Results (dBm)	Pass/Fail/Info
GSM 850	NO	4	-	128	824.2	26	27.07	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				190	836.6		27.05	Pass		-	-		-	-		-	-			
				251	848.8		27.89	Pass		-	-		-	-		-	-			
GPRS 850	NO	4	10	128	824.2	23	28.92	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				190	836.6		29.05	Pass		-	-		-	-		-	-			
				251	848.8		29.12	Pass		-	-		-	-		-	-			
EGPRS 850	NO	E2	10	128	824.2	20	21.75	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				190	836.6		22.04	Pass		-	-		-	-		-	-			
				251	848.8		22.82	Pass		-	-		-	-		-	-			
GSM 1900	NO	1	-	512	1850.2	24.5	28.89	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				661	1880		29.23	Pass		-	-		-	-		-	-			
				810	1909.8		29.34	Pass		-	-		-	-		-	-			
GPRS 1900	NO	1	10	512	1850.2	21.5	28.66	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				661	1880		29.23	Pass		-	-		-	-		-	-			
				810	1909.8		29.55	Pass		-	-		-	-		-	-			
EGPRS 1900	NO	E2	10	512	1850.2	20.5	25.88	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				661	1880		26.49	Pass		-	-		-	-		-	-			
				810	1909.8		26.15	Pass		-	-		-	-		-	-			
WCDMA Band II	NO	3	-	9262	1852.4	18.5	22.58	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				9400	1880		23.34	Pass		-	-		-	-		-	-			
				9538	1907.6		23.85	Pass		-	-		-	-		-	-			
WCDMA Band V	NO	3	-	4132	826.4	17	21.99	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				4183	836.6		22.20	Pass		-	-		-	-		-	-			
				4233	846.6		21.98	Pass		-	-		-	-		-	-			

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (in this case the EUT supports only one mechanical mode).

Note 2: The associated TRP limits for GPRS are based on measurements made with one uplink slot, which are 26 dBm for 850 MHz band and 24.5 dBm for 1900 MHz band. Devices tested using two uplink slots are allowed a TRP reduction of up to 3 dB, therefore the actual TRP limits are 23 dBm (850 MHz band) and 21.5 dBm (1900 MHz band) in this case.

Note 3: "Yes" applies if the device supports voice operation in the talking position against the head in any cellular radio mode.

Note 4: "No" would be applicable to data-centric devices that are not held up against the head, e.g., embedded laptop solutions.

- FS = Free Space
- HL = Hand Left (Hand Phantom Only)
- HR = Hand Right (Hand Phantom Only)
- BHHL = Beside Head and Hand Left Side (Head and Hand Phantom)
- BHHR = Beside Head and Hand Right Side (Head and Hand Phantom)
- TDB = To Be Determined
- N/A = Not Applicable

2.6 Maximum TIS level requirements for the primary mechanical mode¹

Mode	Device Held Up to Head for Voice (Yes/No ³)	Device Power Class	Multi-sol Class	Channel	RX Frequency (MHz)	FS			HL			HR			BHHL			BHHR		
						Limit (dBm)	Test Results (dBm)	Pass/Fail/Info	Limit (dBm)	Test Results (dBm)	Pass/Fail/Info	Limit (dBm)	Test Results (dBm)	Pass/Fail/Info	Limit (dBm)	Test Results (dBm)	Pass/Fail/Info	Limit (dBm)	Test Results (dBm)	Pass/Fail/Info
GSM 850	NO	4	-	128	824.2	-99	-106.19	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				190	836.6		-105.48	Pass		-	-		-	-		-	-			
				251	848.8		-104.65	Pass		-	-		-	-		-	-			
GPRS 850	NO	4	10	128	824.2	-99	-107.19	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				190	836.6		-106.48	Pass		-	-		-	-		-	-			
				251	848.8		-105.65	Pass		-	-		-	-		-	-			
EGPRS 850	NO	E2	10	128	824.2	-94	-99.19	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				190	836.6		-96.98	Pass		-	-		-	-		-	-			
				251	848.8		-97.15	Pass		-	-		-	-		-	-			
GSM 1900	NO	1	-	512	1850.2	-101.5	-107.65	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				661	1880		-107.81	Pass		-	-		-	-		-	-			
				810	1909.8		-107.76	Pass		-	-		-	-		-	-			
GPRS 1900	NO	1	10	512	1850.2	-101.5	-110.15	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				661	1880		-110.31	Pass		-	-		-	-		-	-			
				810	1909.8		-110.26	Pass		-	-		-	-		-	-			
EGPRS 1900	NO	E2	10	512	1850.2	-97	-102.65	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				661	1880		-102.81	Pass		-	-		-	-		-	-			
				810	1909.8		-103.26	Pass		-	-		-	-		-	-			
WCDMA Band II	NO	3	-	9662	1932.4	-102	-110.81	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				9800	1960		-111.91	Pass		-	-		-	-		-	-			
				9938	1987.6		-110.86	Pass		-	-		-	-		-	-			
WCDMA Band V	NO	3	-	4357	871.4	-100	-106.37	Pass	N/A	-	-	N/A	-	-	N/A	-	-	N/A	-	-
				4408	881.6		-106.24	Pass		-	-		-	-		-	-			
				4458	891.6		-106.00	Pass		-	-		-	-		-	-			

Note 1: Primary Mechanical Mode refers to device configured in preferred mode per manufacturer instructions (in this case the EUT supports only one mechanical mode).

Note 2: "Yes" applies if the device supports voice operation in the talking position against the head in any cellular radio mode.

Note 3: "No" would be applicable to data-centric devices that are not held up against the head, e.g., embedded laptop solutions.

3. EXPANDED MEASUREMENTS UNCERTAINTIES

The expanded measurement uncertainties are listed below for the different frequency bands. These uncertainties refer to a coverage factor of 2, corresponding to 95% confidence level.

Test Method	TRP Test Configuration	Uncertainty Expanded Uncertainty (k=2, 95 % confidence level) [dB]				
		LTE 700 699-798 MHz	Cellular 824-894 MHz	AWS-1 Tx 1710-1755 MHz	PCS 1850-1990 MHz	Limits according to CTIA test plan v3.2.2, table 7-8
Normal	FREE SPACE	1.46	1.31	1.43	1.49	2.0
	PHANTON HEAD ONLY	1.91	1.75	1.77	1.81	N/A
	PHANTOM HEAD AND HAND	2.16	2.09	2.04	2.08	2.4
	PHANTOM HAND ONLY	1.73	1.60	1.70	1.75	2.2
	LAPTOPS OVER 30cm	1.61	1.41	1.44	1.49	2.0
Alternate	FREE SPACE	1.69	1.55	1.66	1.71	2.0
	PHANTON HEAD ONLY	2.09	1.94	1.95	2.00	N/A
	PHANTOM HEAD AND HAND	2.32	2.25	2.20	2.24	2.4
	PHANTOM HAND ONLY	1.92	1.80	1.90	1.94	2.2
	LAPTOPS OVER 30cm	1.82	1.64	1.66	1.71	2.0

Test Method	TIS Test Configuration	Uncertainty Expanded Uncertainty (k=2, 95 % confidence level) [dB]					
		LTE 700 699-798 MHz	Cellular 824-894 MHz	GPS 1575.42 MHz	PCS 1850-1990 MHz	AWS-1 Rx 2110-2155 MHz	Limits according to CTIA test plan v3.2.2, table 7-8
Normal	FREE SPACE	1.74	1.62	--	1.77	1.72	2.3
	PHANTON HEAD ONLY	2.02	1.92	--	2.05	2.00	N/A
	PHANTOM HEAD AND HAND	2.26	2.23	--	2.28	2.31	2.6
	PHANTOM HAND ONLY	1.97	1.86	--	1.99	1.95	2.4
	LAPTOPS OVER 30cm	1.87	1.70	--	1.77	1.81	2.3
RSS based	FREE SPACE	--	--	1.98	--	--	2.3
	PHANTON HEAD ONLY	--	--	2.23	--	--	N/A
	PHANTOM HEAD AND HAND	--	--	2.46	--	--	2.6
	PHANTOM HAND ONLY	--	--	2.18	--	--	2.4
	LAPTOPS OVER 30cm	--	--	1.99	--	--	2.3
Alternate	FREE SPACE	1.91	1.80	--	1.94	1.90	2.3
	PHANTON HEAD ONLY	2.17	2.08	--	2.20	2.16	N/A
	PHANTOM HEAD AND HAND	2.40	2.37	--	2.42	2.45	2.6
	PHANTOM HAND ONLY	2.12	2.02	--	2.15	2.11	2.4
	LAPTOPS OVER 30cm	2.03	1.88	--	1.94	1.97	2.3

4. RF TEST RESULT ON 3D

4.1 TRP GSM 850 – Free Space

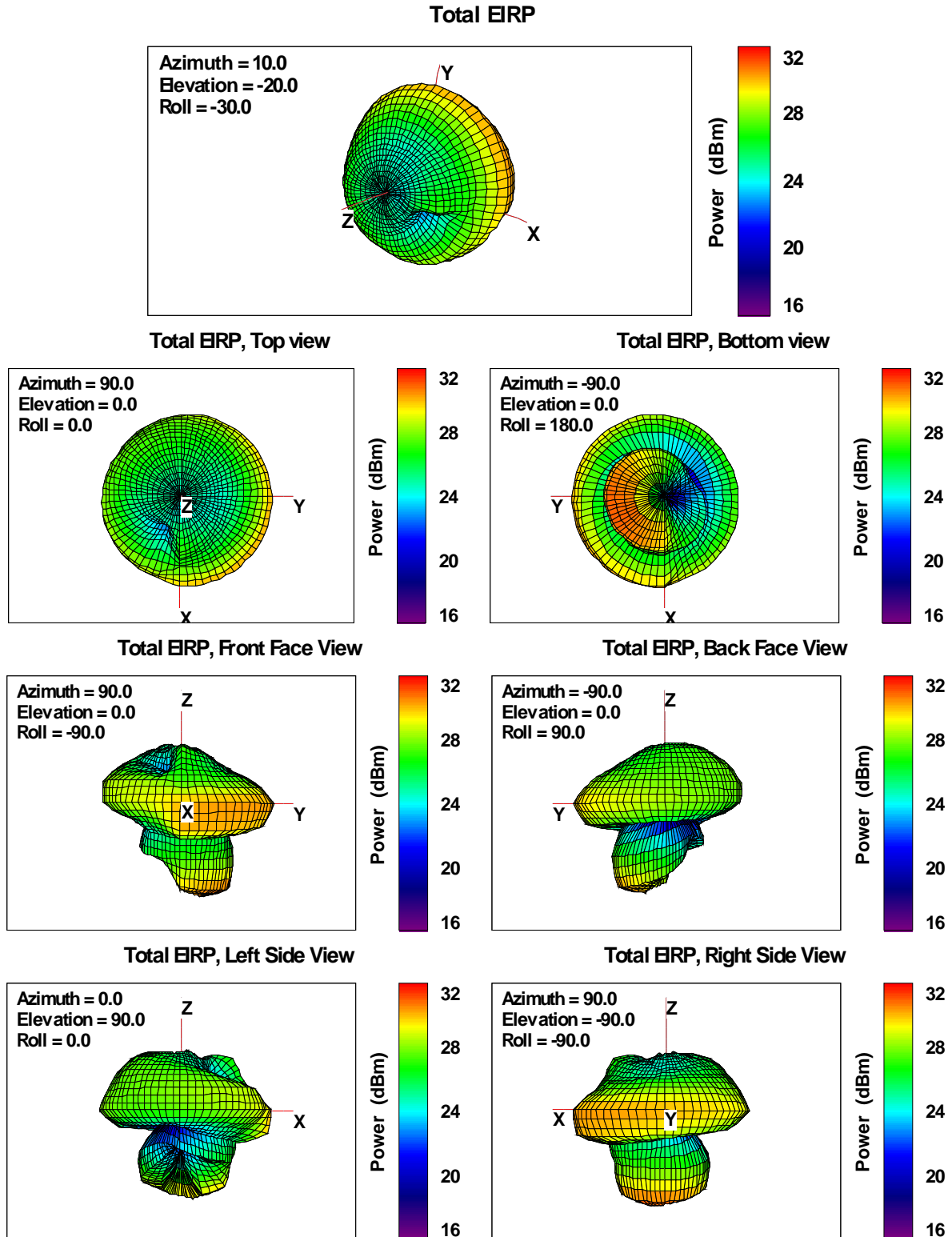


Fig. 1. Total EIRP, Free Space, middle channel, GSM 850.

4.2 TIS GSM 850 – Free Space

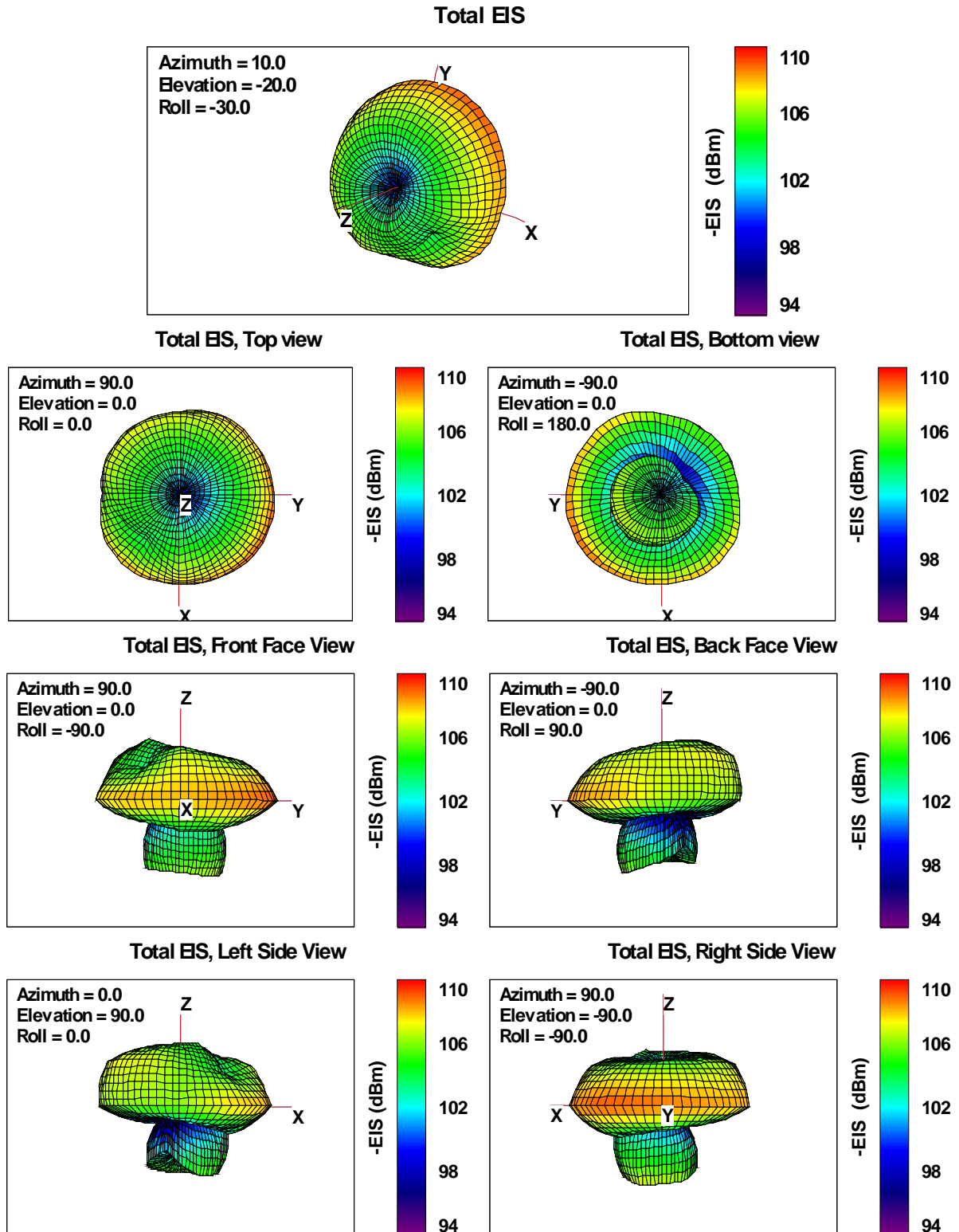


Fig. 2. Total EIS, Free Space, middle channel, GSM 850.

4.3 TRP GPRS 850 – Free Space

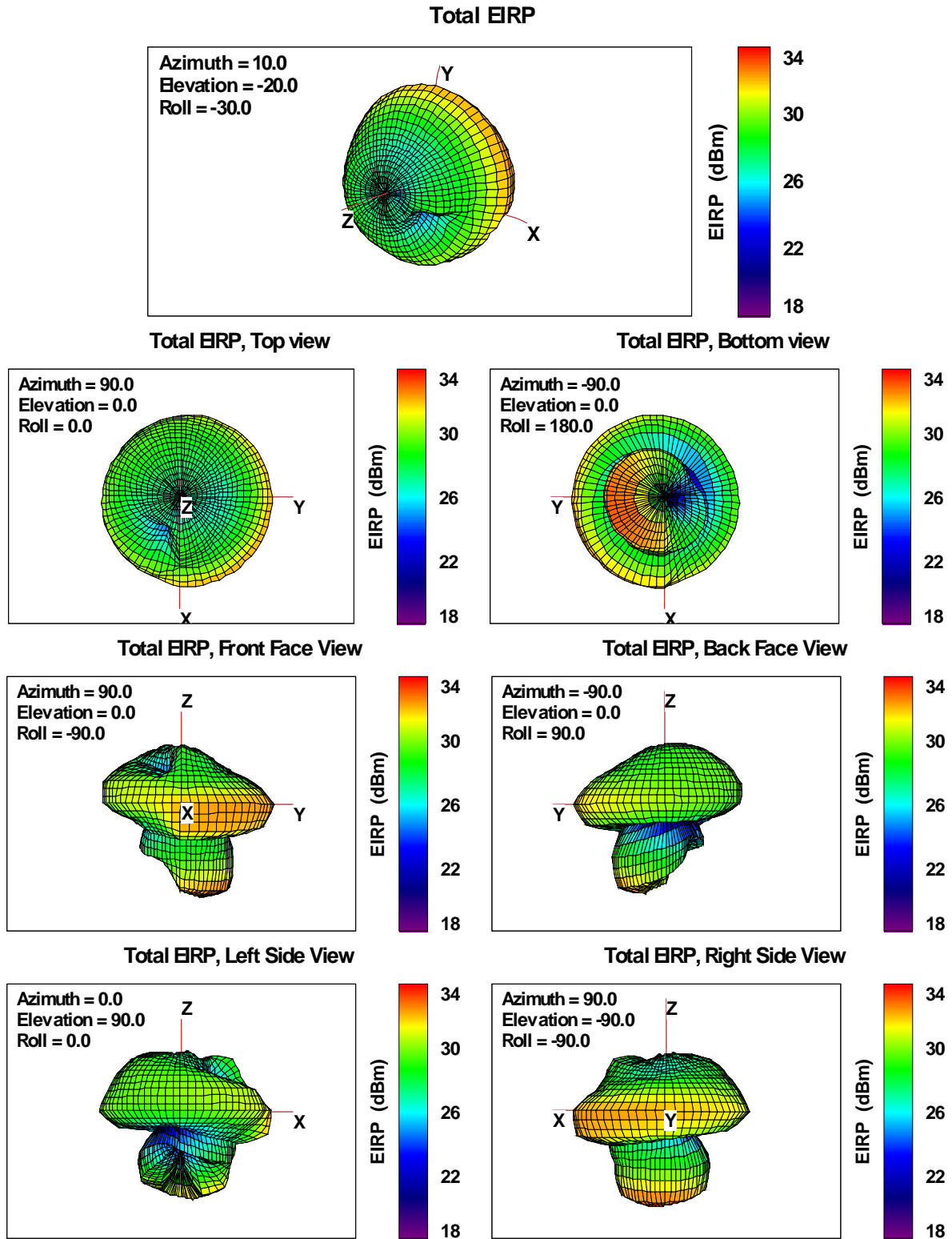


Fig. 3. Total EIRP, Free Space, middle channel, GPRS 850.

4.4 TIS GPRS 850 – Free Space

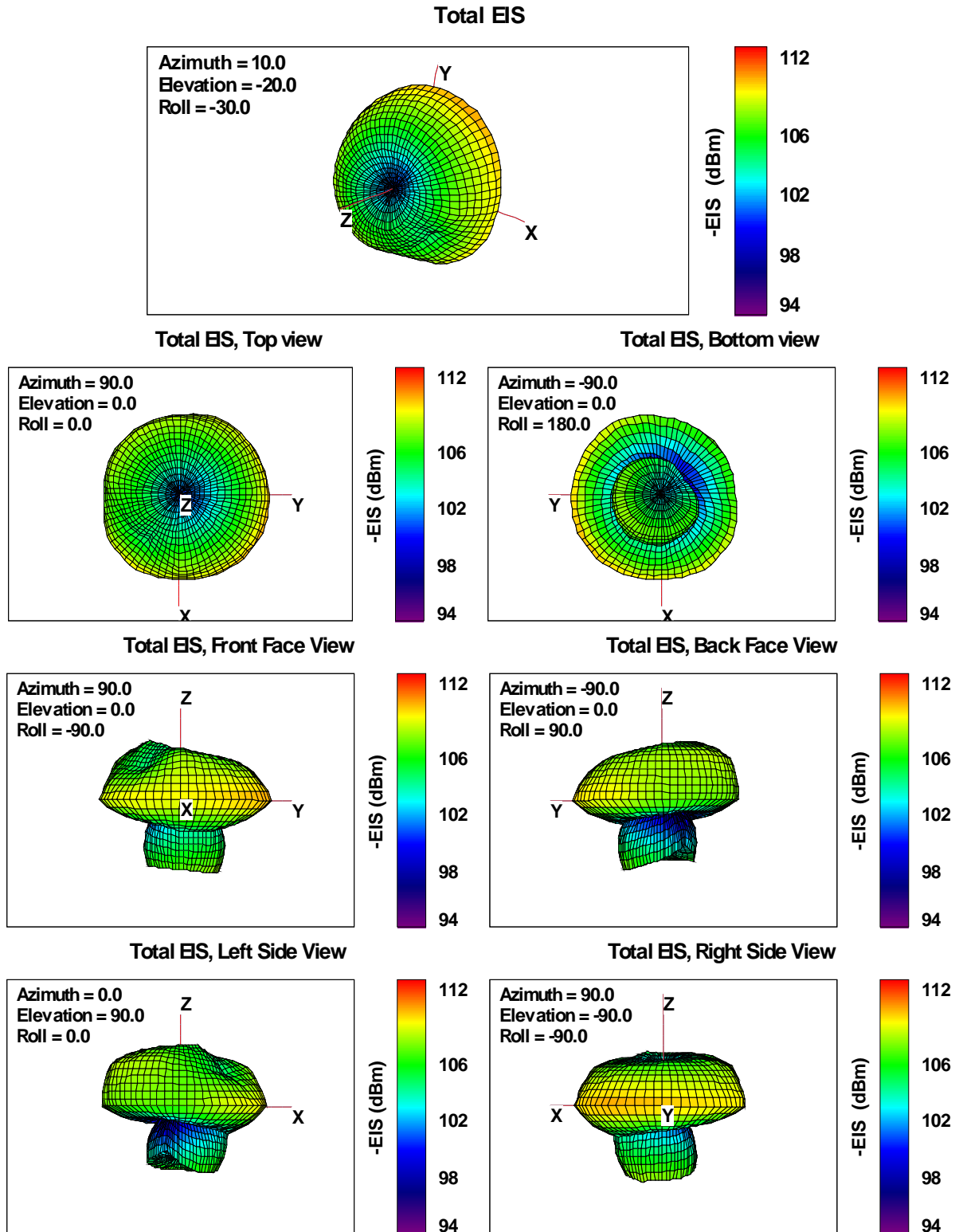


Fig. 4. Total EIS, Free Space, middle channel, GPRS 850.

4.5 TRP EGPRS 850 – Free Space

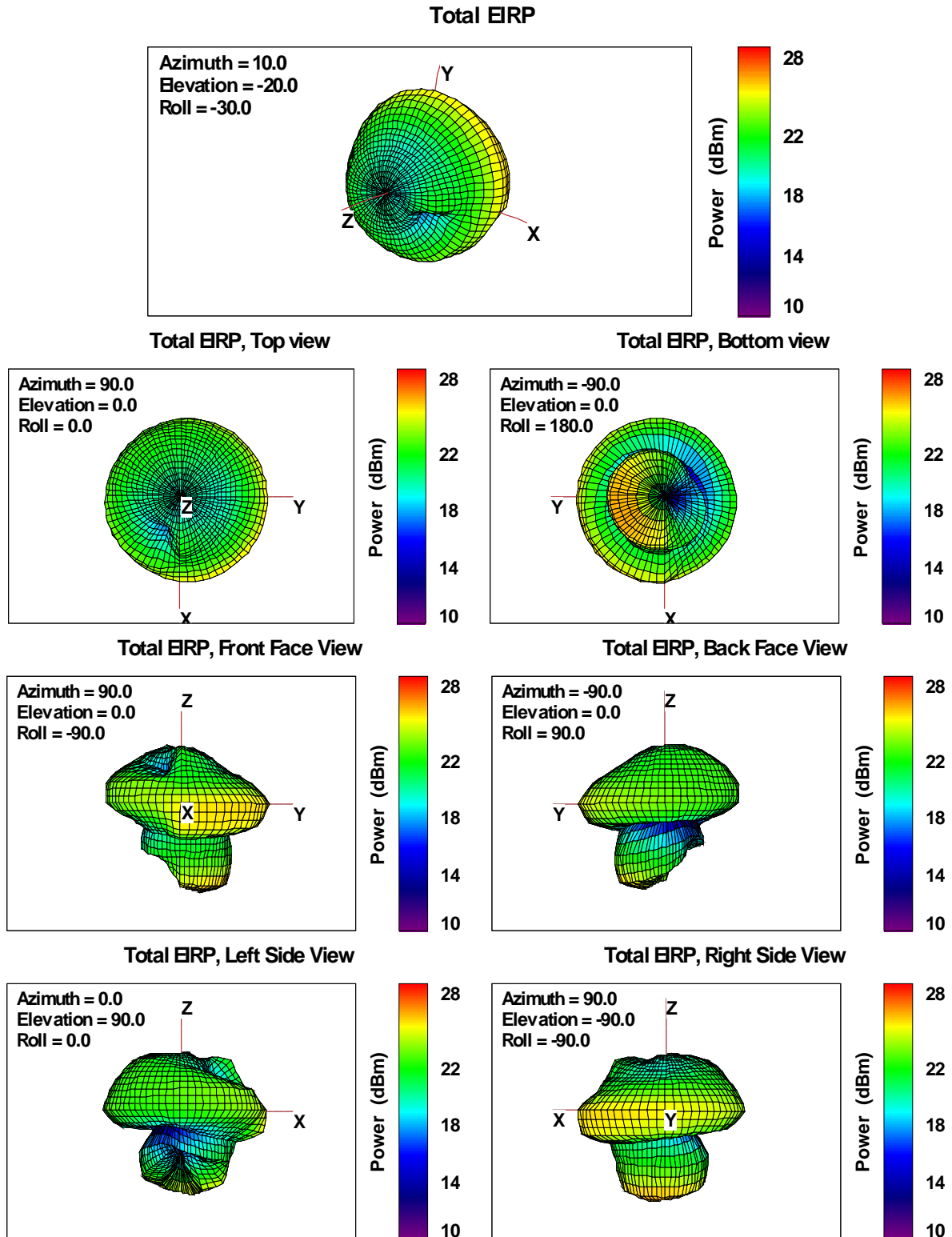


Fig. 5. Total ERP, Free Space, middle channel, EGPRS 850.

4.6 TIS EGPRS 850 – Free Space

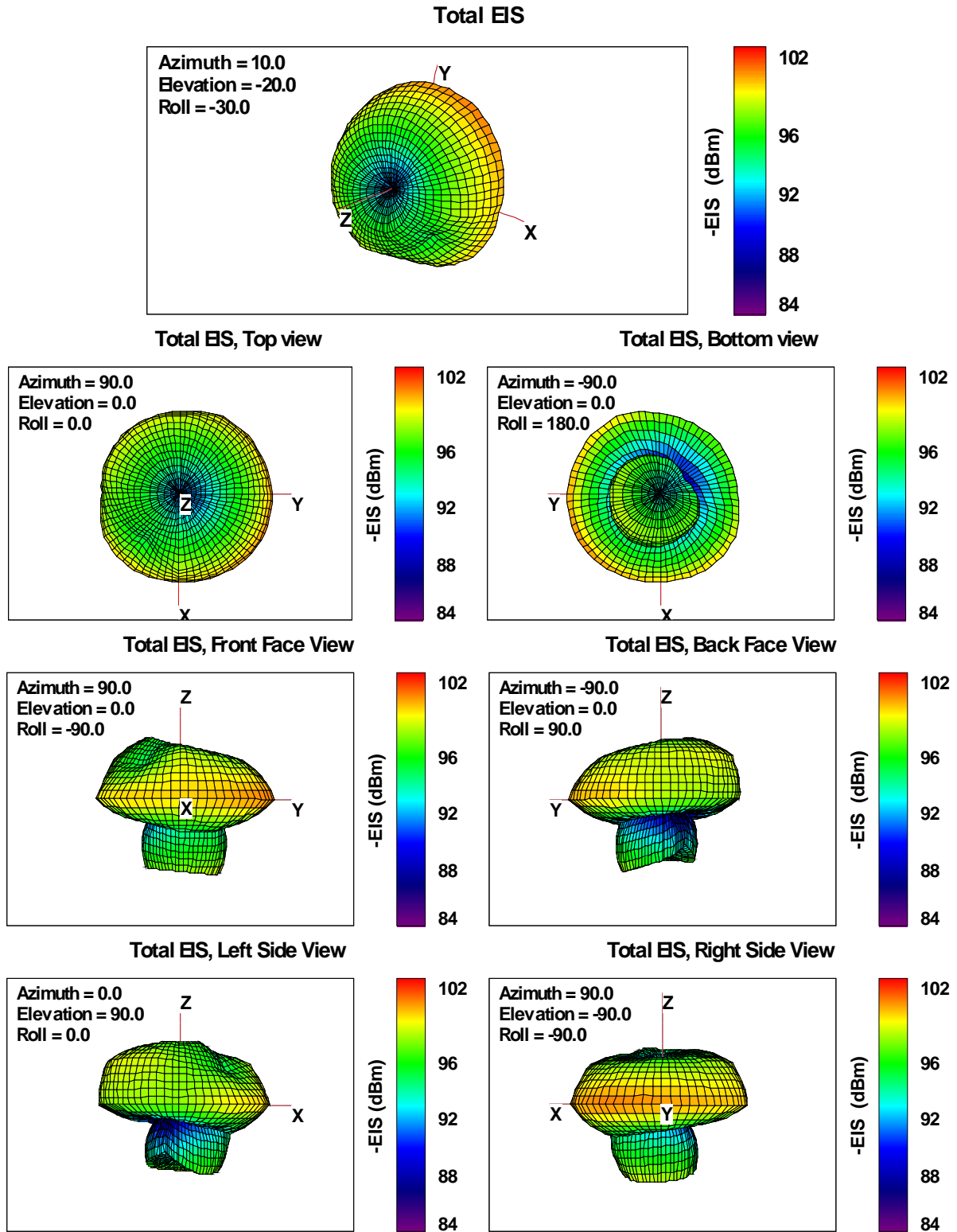


Fig. 6. Total EIS, Free Space, middle channel, EGPRS 850.

4.7 TRP GSM 1900 – Free Space

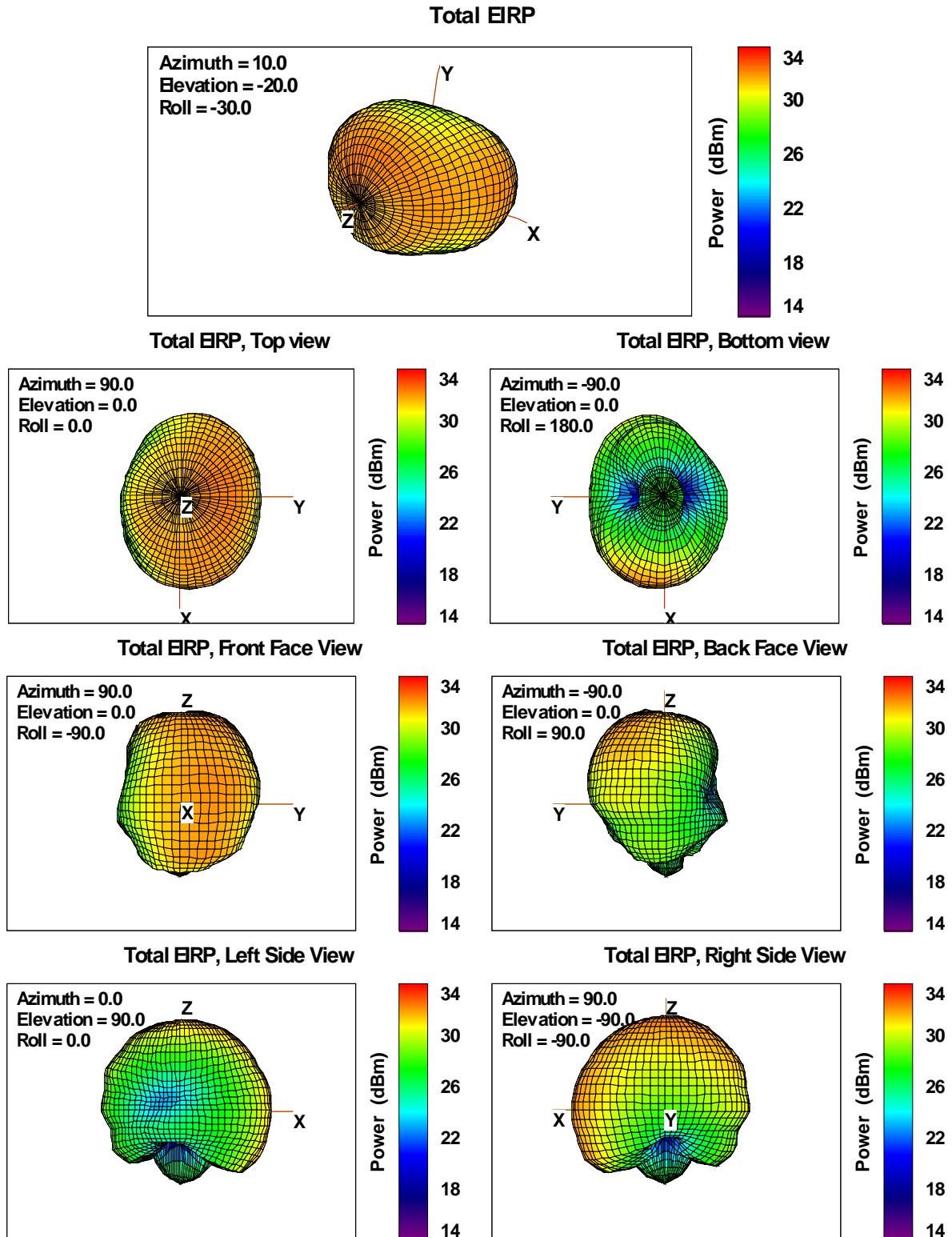


Fig. 7. Total EIRP, Free Space, middle channel, GSM 1900.

4.8 TIS GSM 1900 – Free Space

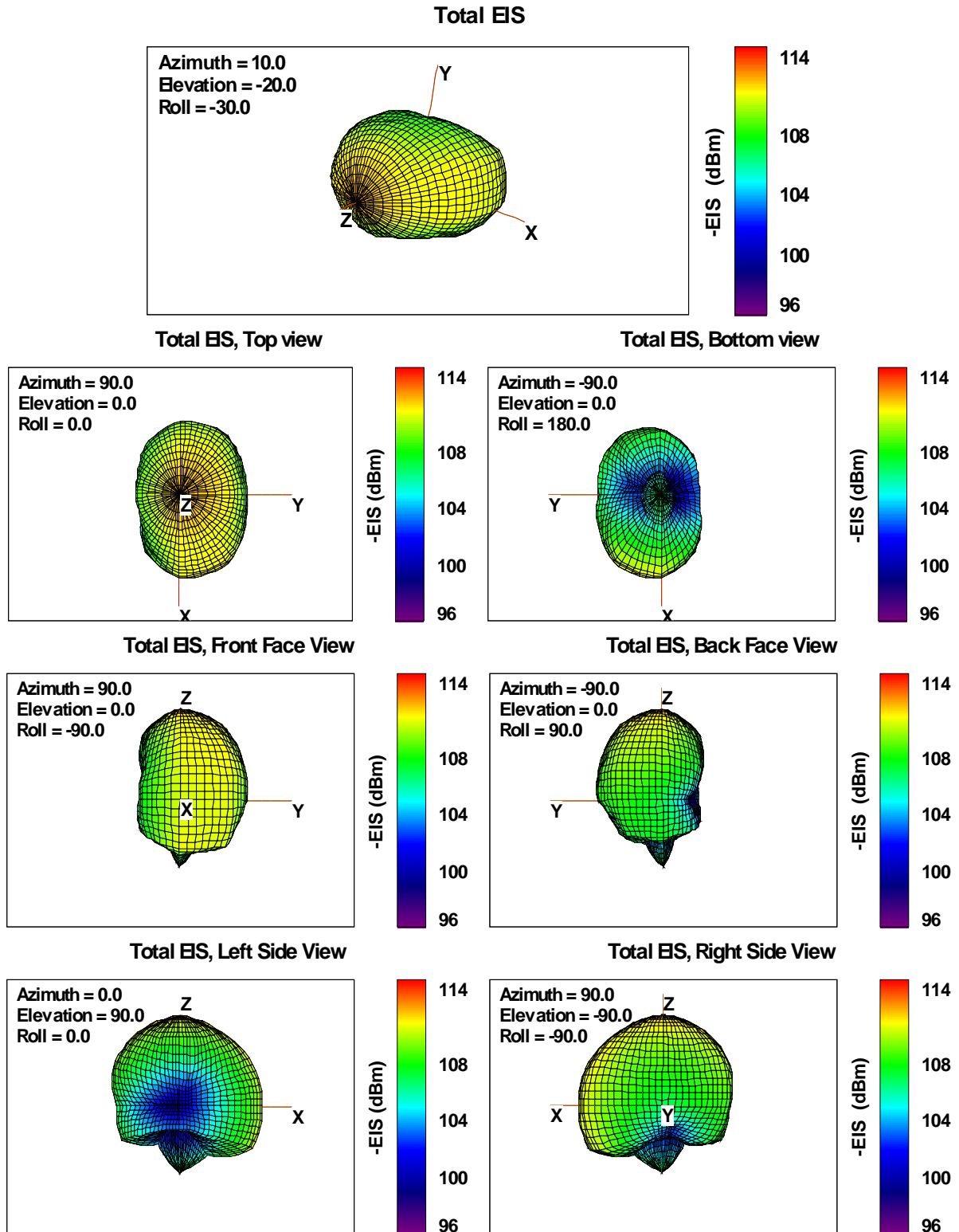


Fig. 8. Total EIS, Free Space, middle channel, GSM 1900.

4.9 TRP GPRS 1900 – Free Space

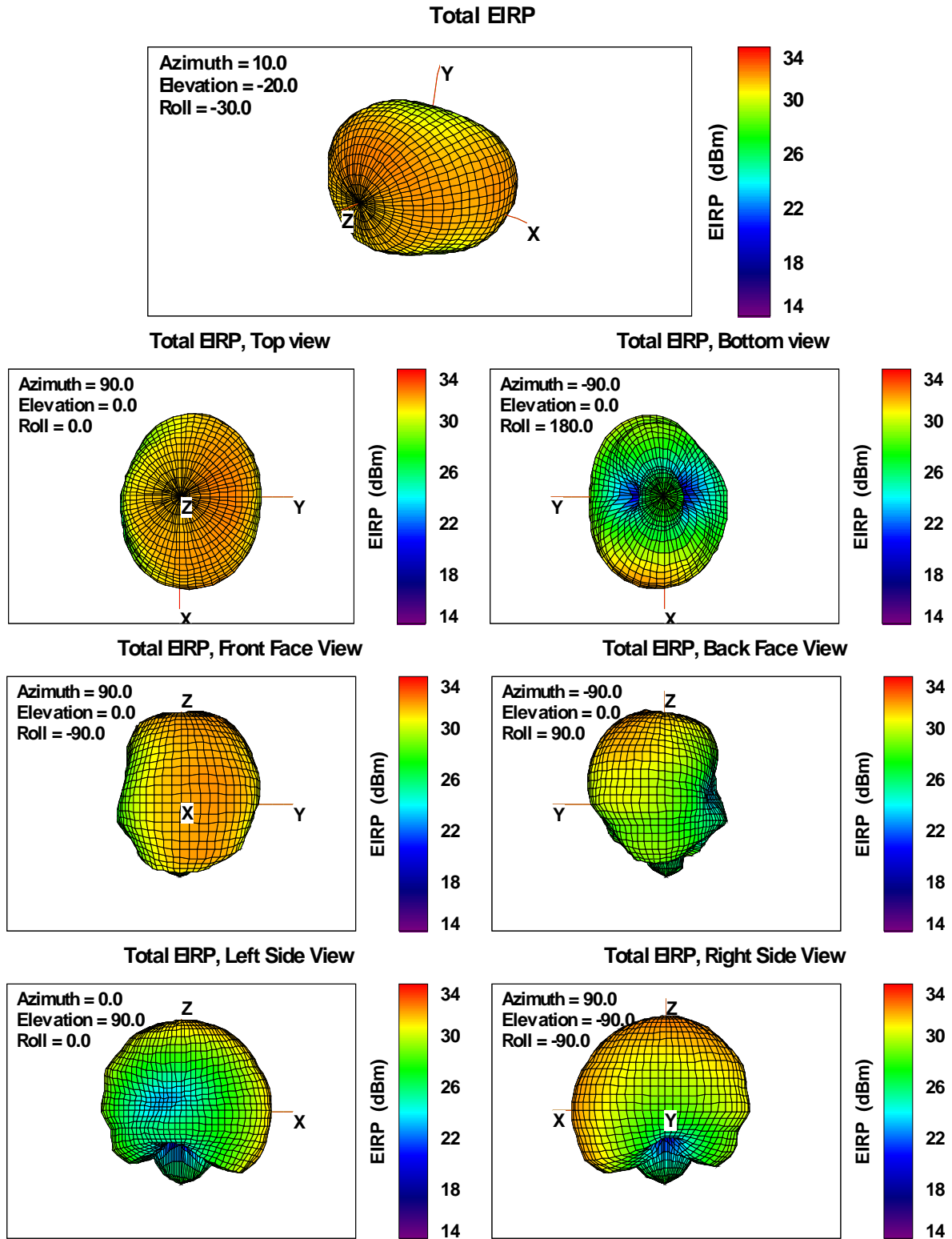


Fig. 9. Total EIRP, Free Space, middle channel, GPRS 1900.

4.10 TIS GPRS 1900 – Free Space

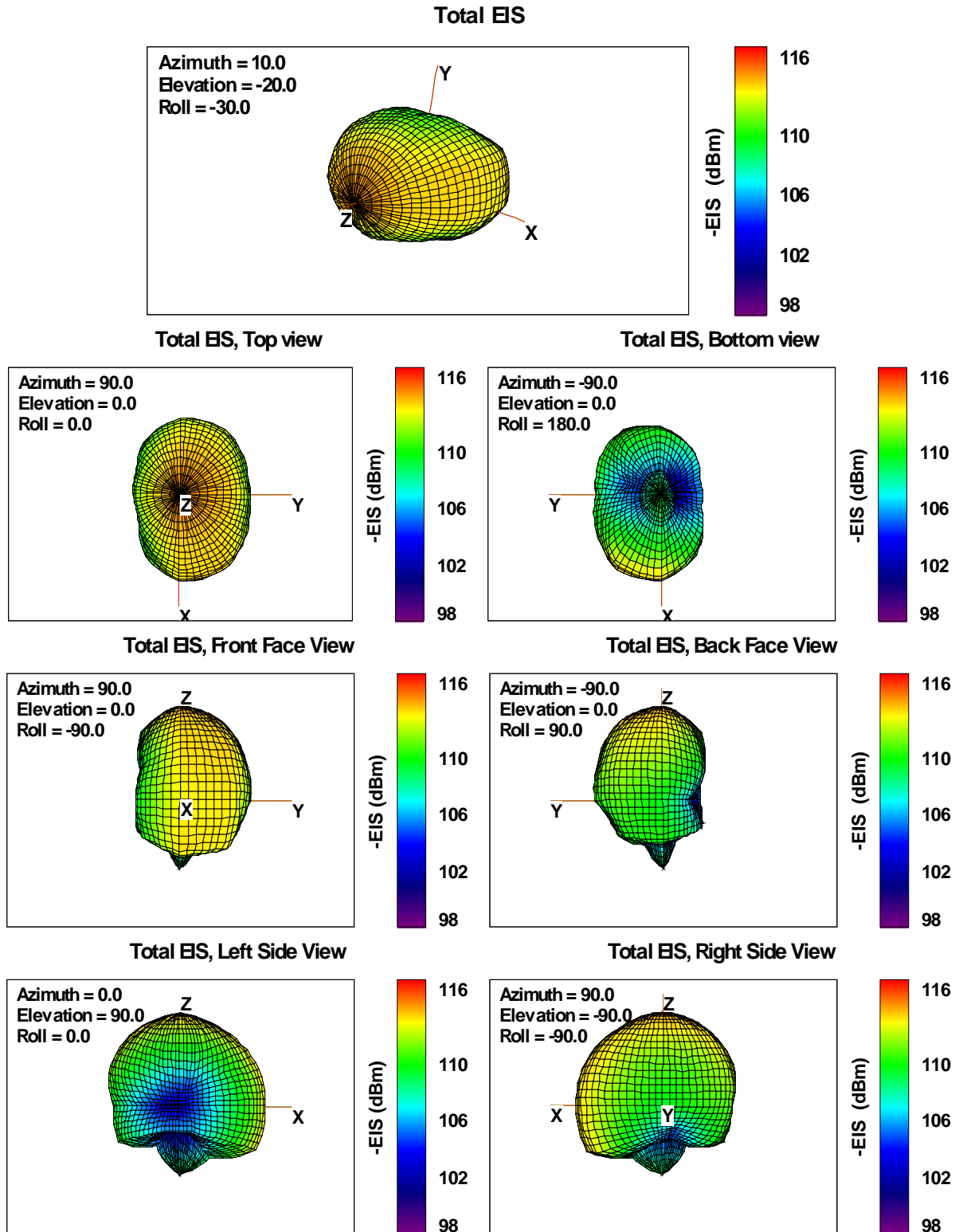


Fig. 10. Total EIS, Free Space, middle channel, GPRS 1900.

4.11 TRP EGPRS 1900 – Free Space

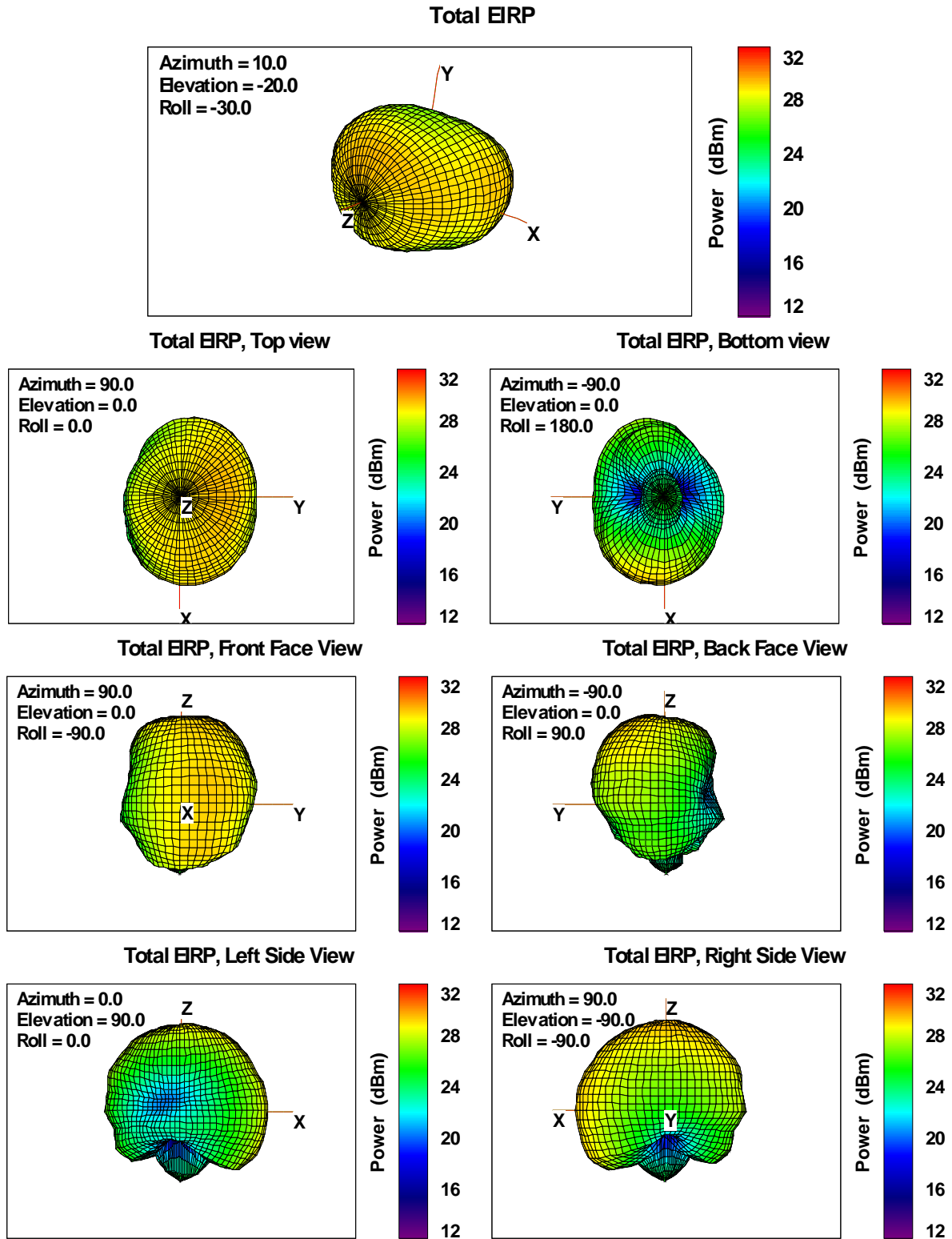


Fig. 11. Total EIRP, Free Space, middle channel, EGPRS 1900.

4.12 TIS EGPRS 1900 – Free Space

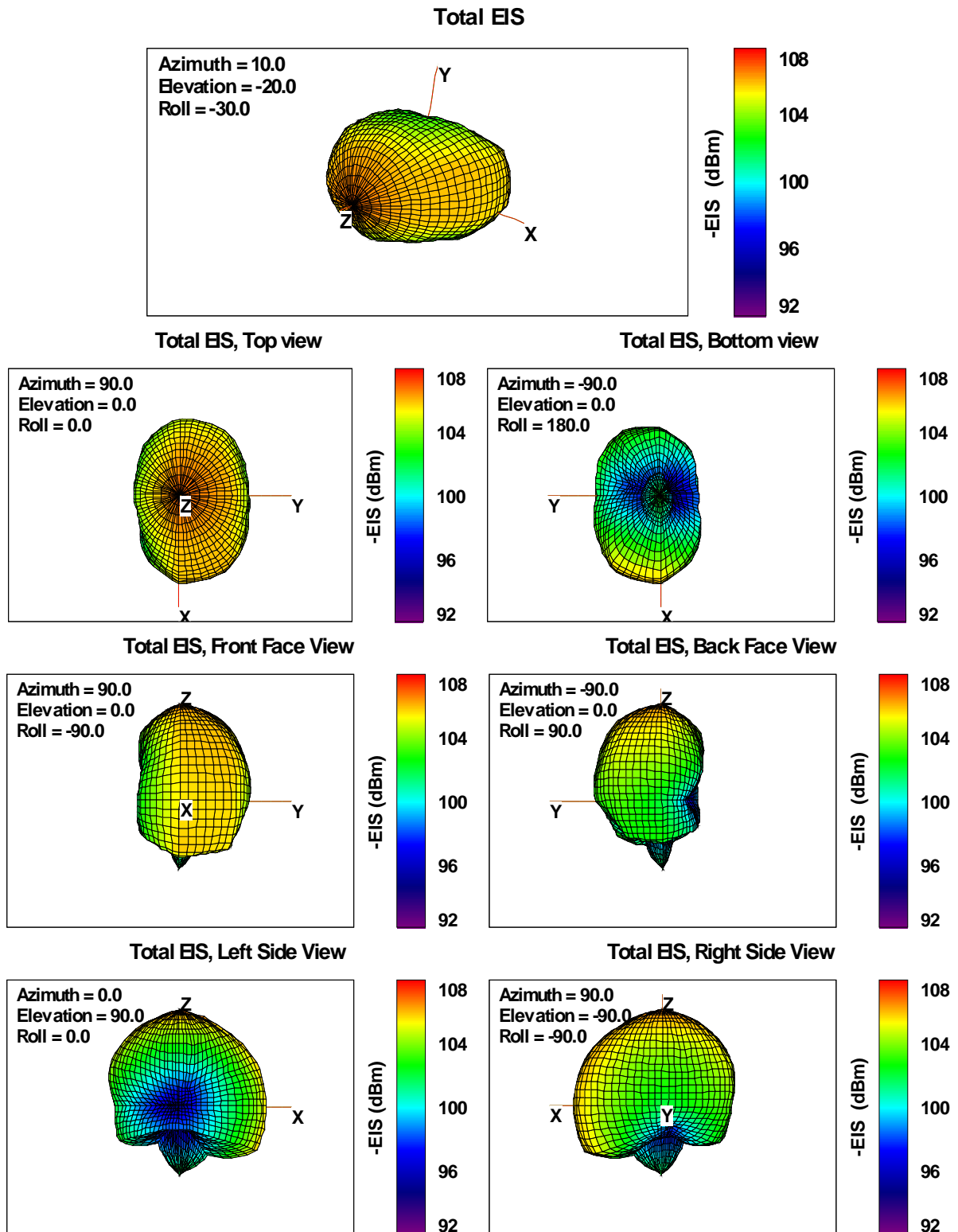


Fig. 12. Total EIS, Free Space, middle channel, EGPRS 1900.

4.13 TRP WCDMA Band II – Free Space

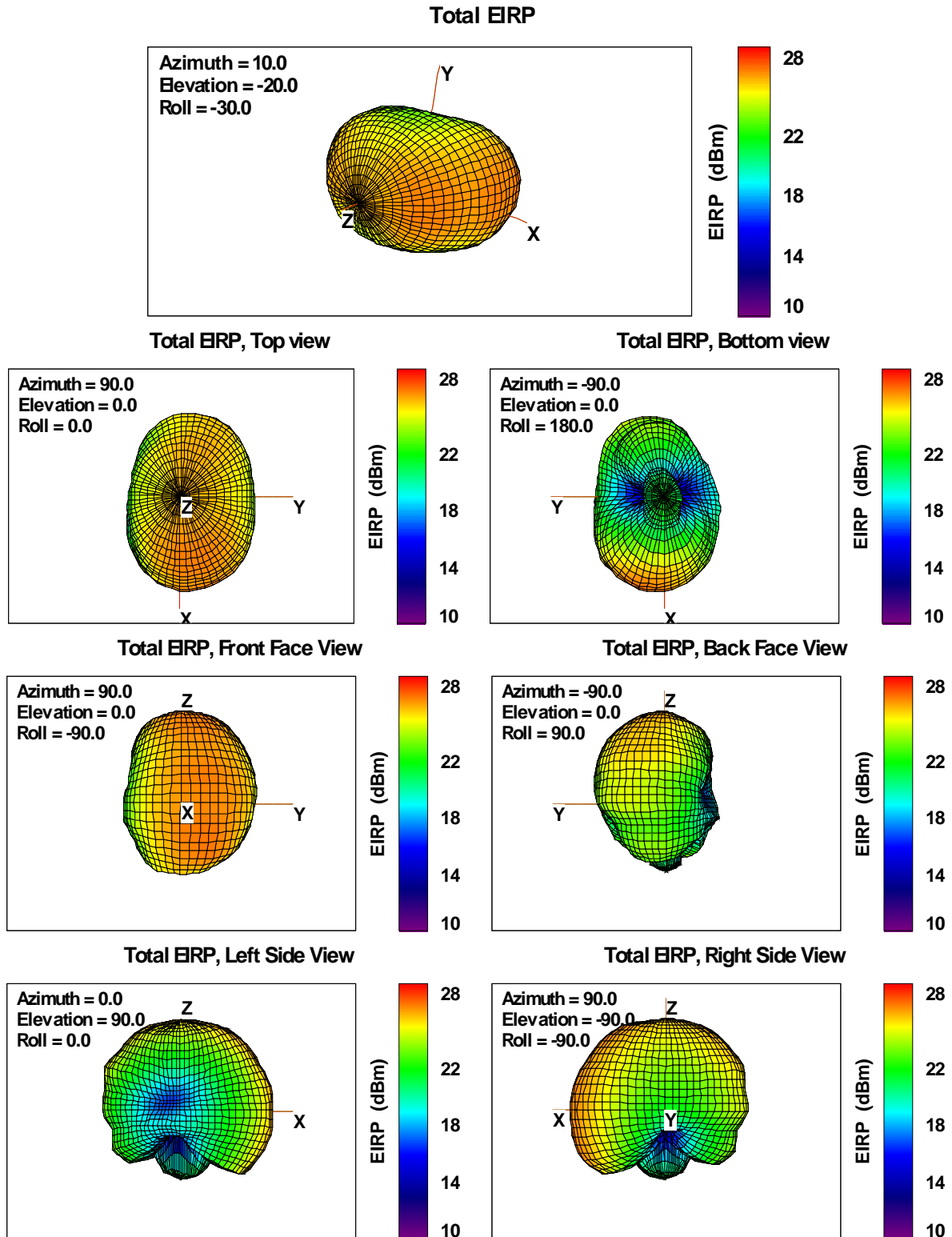


Fig. 13. Total EIRP, Free Space, middle channel, WCDMA Band II.

4.14 TIS WCDMA Band II – Free Space

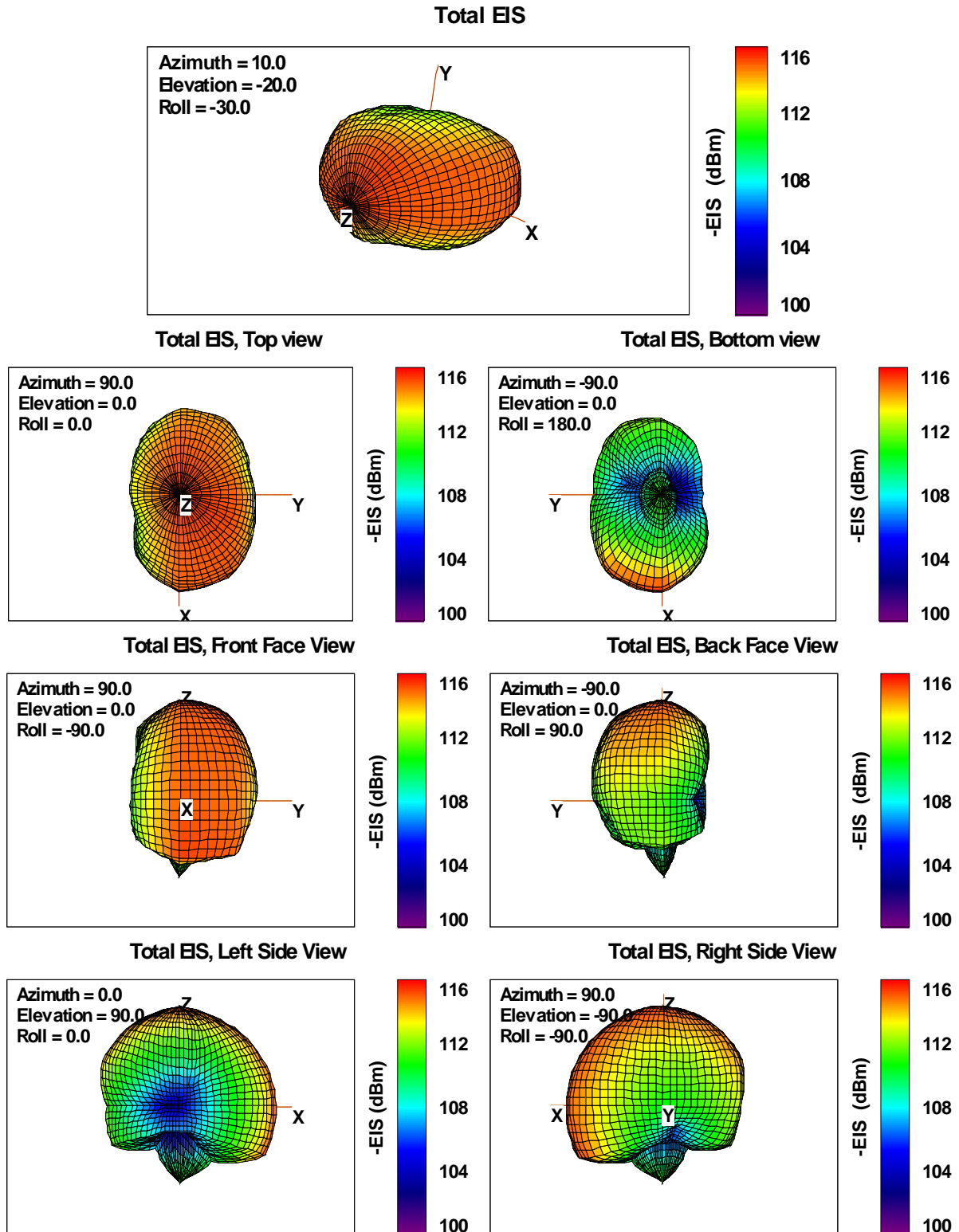


Fig. 14. Total EIS, Free Space, middle channel, WCDMA Band II.

4.15 TRP WCDMA Band V – Free Space

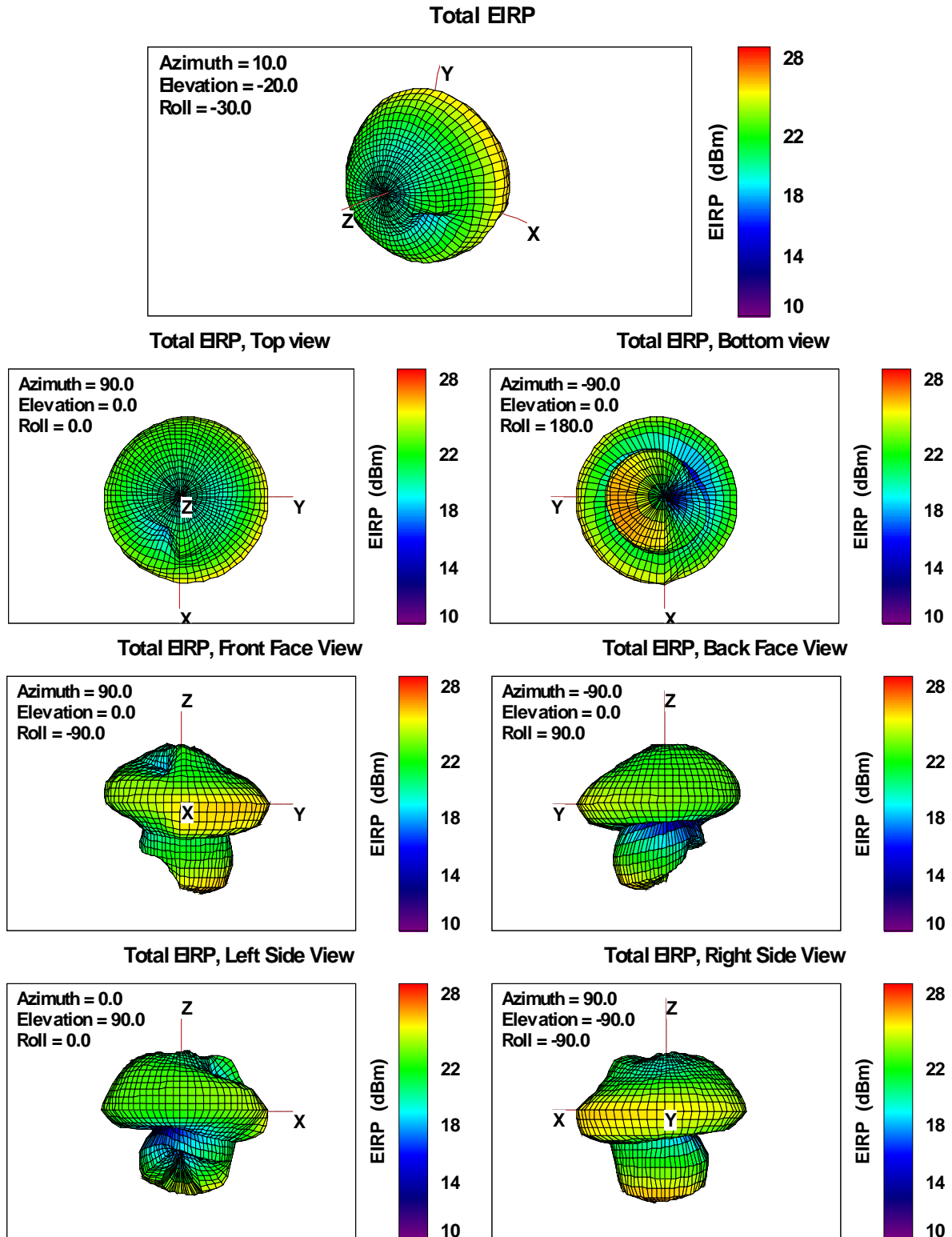


Fig. 15. Total EIRP, Free Space, middle channel, WCDMA Band V.

4.16 TIS WCDMA Band V– Free Space

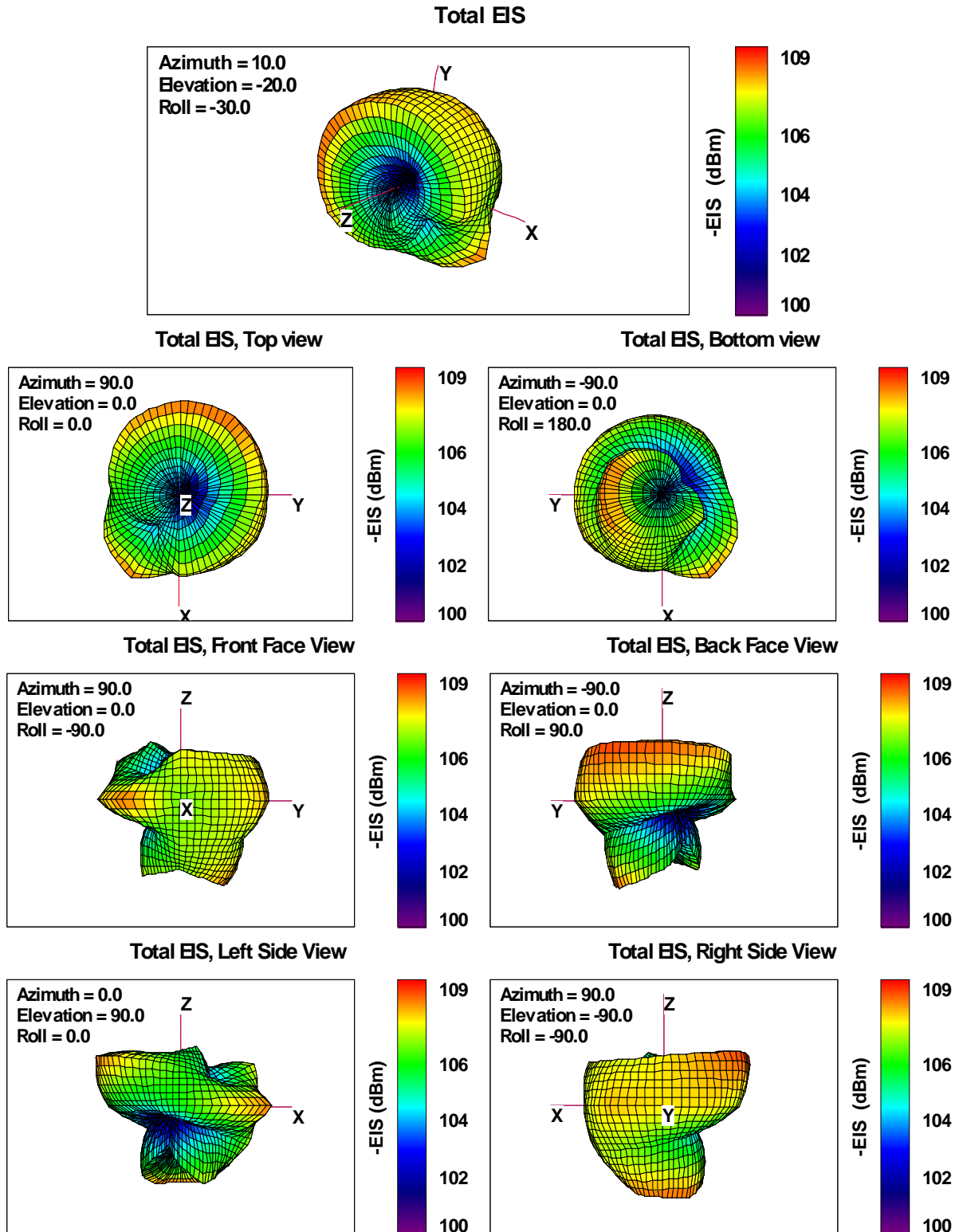


Fig. 16. Total EIS, Free Space, middle channel, WCDMA Band V.

5. RANGE REFERENCE MEASUREMENT DATA

Measurement Date:			2014-01-31						
Reference Antenna(s):			- ETS Lindgren Dipole antenna 700 MHz, model 3126-700 (700 MHz Band) - ETS Lindgren Dipole antenna 880 MHz, model 3126-880 (Cellular Band) - ETS Lindgren Dipole antenna 1845 MHz, model 3126-1845 (PCS Band)						
Polarization:			Theta						
Signal Path:			Theta Polarization to Spectrum Analyzer (TRP)						
Band	Freq. Design.	Freq. (MHz)	Cable Ref. (dBm)	Test Port (dBm)	Noise Floor (dBm)	Test Port - Cable (dB)	Test Port - Noise (dB)	Ref. Ant. Gain (dBi)	Path Loss (dB)
3GPP Band 12	CH ₁₁ -TX	699	-	-	-	47.18	-	2.12	49.30
3GPP Band 12	CH ₁₂ -TX	707	-	-	-	47.56	-	2.11	49.67
3GPP Band 12	CH ₁₃ -TX	716	-	-	-	47.96	-	2.05	50.01
3GPP Band 17	CH ₁₄ -TX	704	-	-	-	47.36	-	2.12	49.48
3GPP Band 17	CH ₁₅ -TX	710	-	-	-	47.66	-	2.09	49.75
3GPP Band 17	CH ₁₆ -TX	716	-	-	-	47.96	-	2.05	50.01
3GPP Band 13	CH ₁₇ -TX	776	-	-	-	48.64	-	1.45	50.09
3GPP Band 13	CH ₁₈ -TX	781.5	-	-	-	48.39	-	1.41	49.81
3GPP Band 13	CH ₁₉ -TX	787	-	-	-	48.04	-	1.36	49.40
3GPP Band 14	CH ₂₀ -TX	788	-	-	-	47.97	-	1.36	49.33
3GPP Band 14	CH ₂₁ -TX	793	-	-	-	47.65	-	1.33	48.97
3GPP Band 14	CH ₂₂ -TX	798	-	-	-	47.25	-	1.29	48.54
Cellular (3GPP Band 5)	CH ₁ -TX	824	-	-	-	46.91	-	1.05	47.97
Cellular (3GPP Band 5)	CH ₂ -TX	836.5	-	-	-	46.53	-	1.22	47.74
Cellular (3GPP Band 5)	CH ₃ -TX	849	-	-	-	46.44	-	1.35	47.80
PCS (3GPP Band 2)	CH ₄ -TX	1850	-	-	-	49.76	-	1.96	51.72
PCS (3GPP Band 2)	CH ₅ -TX	1880	-	-	-	51.52	-	2.01	53.53
PCS (3GPP Band 2)	CH ₆ -TX	1910	-	-	-	53.45	-	2.03	55.48
3GPP Band 25	CH ₂₃ -TX	1850	-	-	-	49.76	-	1.96	51.72
3GPP Band 25	CH ₂₄ -TX	1882.5	-	-	-	51.72	-	2.02	53.74
3GPP Band 25	CH ₂₅ -TX	1915	-	-	-	53.55	-	2.02	55.57
AWS-1 (3GPP Band 4)	CH ₈ -TX	1710	-	-	-	51.03	-	1.56	52.59
AWS-1 (3GPP Band 4)	CH ₉ -TX	1732.5	-	-	-	50.23	-	1.72	51.95
AWS-1 (3GPP Band 4)	CH ₁₀ -TX	1755	-	-	-	49.57	-	1.80	51.37

Measurement Date:			2014-01-31						
Reference Antenna(s):			- ETS Lindgren Dipole antenna 700 MHz, model 3126-700 (700 MHz Band) - ETS Lindgren Dipole antenna 880 MHz, model 3126-880 (Cellular Band) - ETS Lindgren Dipole antenna 1845 MHz, model 3126-1845 (PCS Band)						
Polarization:			Phi						
Signal Path:			Phi Polarization to Spectrum Analyzer (TRP)						
Band	Freq. Design.	Freq. (MHz)	Cable Ref. (dBm)	Test Port (dBm)	Noise Floor (dBm)	Test Port - Cable (dB)	Test Port - Noise (dB)	Ref. Ant. Gain (dBi)	Path Loss (dB)
3GPP Band 12	CH ₁₁ -TX	699	-	-	-	47.87	-	2.12	49.99
3GPP Band 12	CH ₁₂ -TX	707	-	-	-	48.27	-	2.11	50.38
3GPP Band 12	CH ₁₃ -TX	716	-	-	-	48.66	-	2.05	50.71
3GPP Band 17	CH ₁₄ -TX	704	-	-	-	48.12	-	2.12	50.24
3GPP Band 17	CH ₁₅ -TX	710	-	-	-	48.36	-	2.09	50.45
3GPP Band 17	CH ₁₆ -TX	716	-	-	-	48.66	-	2.05	50.71
3GPP Band 13	CH ₁₇ -TX	776	-	-	-	49.39	-	1.45	50.84
3GPP Band 13	CH ₁₈ -TX	781.5	-	-	-	49.03	-	1.41	50.44
3GPP Band 13	CH ₁₉ -TX	787	-	-	-	48.66	-	1.36	50.02
3GPP Band 14	CH ₂₀ -TX	788	-	-	-	48.59	-	1.36	49.94
3GPP Band 14	CH ₂₁ -TX	793	-	-	-	48.21	-	1.33	49.54
3GPP Band 14	CH ₂₂ -TX	798	-	-	-	47.75	-	1.29	49.04
Cellular (3GPP Band 5)	CH ₁ -TX	824	-	-	-	46.68	-	1.05	47.74
Cellular (3GPP Band 5)	CH ₂ -TX	836.5	-	-	-	46.53	-	1.22	47.74
Cellular (3GPP Band 5)	CH ₃ -TX	849	-	-	-	46.35	-	1.35	47.71
PCS (3GPP Band 2)	CH ₄ -TX	1850	-	-	-	51.50	-	1.96	53.47
PCS (3GPP Band 2)	CH ₅ -TX	1880	-	-	-	53.86	-	2.01	55.87
PCS (3GPP Band 2)	CH ₆ -TX	1910	-	-	-	54.56	-	2.03	56.59
3GPP Band 25	CH ₂₃ -TX	1850	-	-	-	51.50	-	1.96	53.47
3GPP Band 25	CH ₂₄ -TX	1882.5	-	-	-	54.05	-	2.02	56.07
3GPP Band 25	CH ₂₅ -TX	1915	-	-	-	54.39	-	2.02	56.41
AWS-1 (3GPP Band 4)	CH ₈ -TX	1710	-	-	-	51.06	-	1.56	52.62
AWS-1 (3GPP Band 4)	CH ₉ -TX	1732.5	-	-	-	50.33	-	1.72	52.05
AWS-1 (3GPP Band 4)	CH ₁₀ -TX	1755	-	-	-	49.59	-	1.80	51.39

Measurement Date:			2014-01-31						
Reference Antenna(s):			- ETS Lindgren Dipole antenna 700 MHz, model 3126-700 (700 MHz Band) - ETS Lindgren Dipole antenna 880 MHz, model 3126-880 (Cellular Band) - ETS Lindgren Dipole antenna 1575 MHz, model 3126-1575 (GPS Band) - ETS Lindgren Dipole antenna 1845 MHz, model 3126-1845 (PCS Band) - ETS Lindgren Dipole antenna 2145 MHz, model 3126-2145 (AWS-1 Band)						
Polarization:			Theta						
Signal Path:			Theta Polarization to Communication Tester (TIS)						
Band	Freq. Design.	Freq. (MHz)	Cable Ref. (dBm)	Test Port (dBm)	Noise Floor (dBm)	Test Port - Cable (dB)	Test Port - Noise (dB)	Ref. Ant. Gain (dBi)	Path Loss (dB)
3GPP Band 12	CH ₁₁ -RX	728	-	-	-	48.90	-	1.94	50.84
3GPP Band 12	CH ₁₂ -RX	737	-	-	-	49.32	-	1.85	51.17
3GPP Band 12	CH ₁₃ -RX	746	-	-	-	49.48	-	1.75	51.22
3GPP Band 17	CH ₁₄ -RX	734	-	-	-	49.34	-	1.88	51.21
3GPP Band 17	CH ₁₅ -RX	740	-	-	-	49.50	-	1.81	51.31
3GPP Band 17	CH ₁₆ -RX	746	-	-	-	49.48	-	1.75	51.22
3GPP Band 13	CH ₁₇ -RX	746	-	-	-	49.48	-	1.75	51.22
3GPP Band 13	CH ₁₈ -RX	751.5	-	-	-	49.35	-	1.69	51.04
3GPP Band 13	CH ₁₉ -RX	757	-	-	-	49.17	-	1.63	50.81
3GPP Band 14	CH ₂₀ -RX	758	-	-	-	49.17	-	1.62	50.79
3GPP Band 14	CH ₂₁ -RX	763	-	-	-	49.16	-	1.57	50.73
3GPP Band 14	CH ₂₂ -RX	768	-	-	-	49.13	-	1.52	50.65
3GPP Band 5	CH ₁ -RX	869	-	-	-	46.29	-	1.49	47.78
3GPP Band 5	CH ₂ -RX	881.5	-	-	-	45.93	-	1.53	47.46
3GPP Band 5	CH ₃ -RX	894	-	-	-	45.66	-	1.54	47.20
Cellular	CH ₁ -RX	869	-	-	-	46.08	-	1.49	47.57
Cellular	CH ₂ -RX	881.5	-	-	-	45.95	-	1.53	47.48
Cellular	CH ₃ -RX	894	-	-	-	45.53	-	1.54	47.08
GPS	CH ₇ -RX	1575.42	-	-	-	52.20	-	-0.11	52.10
3GPP Band 2	CH ₄ -RX	1930	-	-	-	53.41	-	2.01	55.41
3GPP Band 2	CH ₅ -RX	1960	-	-	-	53.02	-	1.98	55.00
3GPP Band 2	CH ₆ -RX	1990	-	-	-	53.68	-	1.95	55.63
PCS	CH ₄ -RX	1930	-	-	-	53.41	-	2.01	55.41
PCS	CH ₅ -RX	1960	-	-	-	53.02	-	1.98	55.00
PCS	CH ₆ -RX	1990	-	-	-	53.68	-	1.95	55.63
3GPP Band 25	CH ₂₃ -RX	1930	-	-	-	53.41	-	2.00	55.41
3GPP Band 25	CH ₂₄ -RX	1962.5	-	-	-	53.06	-	1.97	55.03
3GPP Band 25	CH ₂₅ -RX	1995	-	-	-	53.77	-	1.94	55.71
3GPP Band 4	CH ₈ -RX	2110	-	-	-	52.54	-	1.88	54.42
3GPP Band 4	CH ₉ -RX	2132.5	-	-	-	52.12	-	1.85	53.97
3GPP Band 4	CH ₁₀ -RX	2155	-	-	-	51.91	-	1.83	53.75
AWS-1	CH ₈ -RX	2110	-	-	-	52.48	-	1.88	54.36
AWS-1	CH ₉ -RX	2132.5	-	-	-	52.07	-	1.85	53.92
AWS-1	CH ₁₀ -RX	2155	-	-	-	51.86	-	1.83	53.69

Measurement Date:			2014-01-31						
Reference Antenna(s):			- ETS Lindgren Dipole antenna 700 MHz, model 3126-700 (700 MHz Band) - ETS Lindgren Dipole antenna 880 MHz, model 3126-880 (Cellular Band) - ETS Lindgren Dipole antenna 1575 MHz, model 3126-1575 (GPS Band) - ETS Lindgren Dipole antenna 1845 MHz, model 3126-1845 (PCS Band) - ETS Lindgren Dipole antenna 2145 MHz, model 3126-2145 (AWS-1 Band)						
Polarization:			Phi						
Signal Path:			Phi Polarization to Communication Tester (TIS)						
Band	Freq. Design.	Freq. (MHz)	Cable Ref. (dBm)	Test Port (dBm)	Noise Floor (dBm)	Test Port - Cable (dB)	Test Port - Noise (dB)	Ref. Ant. Gain (dBi)	Path Loss (dB)
3GPP Band 12	CH ₁₁ -RX	728	-	-	-	49.63	-	1.94	51.57
3GPP Band 12	CH ₁₂ -RX	737	-	-	-	49.98	-	1.85	51.83
3GPP Band 12	CH ₁₃ -RX	746	-	-	-	50.18	-	1.75	51.93
3GPP Band 17	CH ₁₄ -RX	734	-	-	-	49.85	-	1.88	51.72
3GPP Band 17	CH ₁₅ -RX	740	-	-	-	50.05	-	1.81	51.86
3GPP Band 17	CH ₁₆ -RX	746	-	-	-	50.18	-	1.75	51.93
3GPP Band 13	CH ₁₇ -RX	746	-	-	-	50.18	-	1.75	51.93
3GPP Band 13	CH ₁₈ -RX	751.5	-	-	-	50.32	-	1.69	52.01
3GPP Band 13	CH ₁₉ -RX	757	-	-	-	50.46	-	1.63	52.09
3GPP Band 14	CH ₂₀ -RX	758	-	-	-	50.47	-	1.62	52.09
3GPP Band 14	CH ₂₁ -RX	763	-	-	-	50.44	-	1.57	52.00
3GPP Band 14	CH ₂₂ -RX	768	-	-	-	50.12	-	1.52	51.64
3GPP Band 5	CH ₁ -RX	869	-	-	-	46.45	-	1.49	47.93
3GPP Band 5	CH ₂ -RX	881.5	-	-	-	46.21	-	1.53	47.74
3GPP Band 5	CH ₃ -RX	894	-	-	-	46.27	-	1.54	47.81
Cellular	CH ₁ -RX	869	-	-	-	46.38	-	1.49	47.87
Cellular	CH ₂ -RX	881.5	-	-	-	46.15	-	1.53	47.68
Cellular	CH ₃ -RX	894	-	-	-	46.21	-	1.54	47.75
GPS	CH ₇ -RX	1575.42	-	-	-	52.53	-	-0.11	52.43
3GPP Band 2	CH ₄ -RX	1930	-	-	-	54.90	-	2.01	56.91
3GPP Band 2	CH ₅ -RX	1960	-	-	-	53.97	-	1.98	55.95
3GPP Band 2	CH ₆ -RX	1990	-	-	-	53.43	-	1.95	55.38
PCS	CH ₄ -RX	1930	-	-	-	54.78	-	2.01	56.78
PCS	CH ₅ -RX	1960	-	-	-	53.87	-	1.98	55.85
PCS	CH ₆ -RX	1990	-	-	-	53.27	-	1.95	55.22
3GPP Band 25	CH ₂₃ -RX	1930	-	-	-	54.91	-	2.00	56.91
3GPP Band 25	CH ₂₄ -RX	1962.5	-	-	-	53.91	-	1.97	55.88
3GPP Band 25	CH ₂₅ -RX	1995	-	-	-	53.33	-	1.94	55.27
3GPP Band 4	CH ₈ -RX	2110	-	-	-	52.73	-	1.88	54.61
3GPP Band 4	CH ₉ -RX	2132.5	-	-	-	52.95	-	1.85	54.80
3GPP Band 4	CH ₁₀ -RX	2155	-	-	-	53.12	-	1.83	54.95
AWS-1	CH ₈ -RX	2110	-	-	-	52.43	-	1.88	54.31
AWS-1	CH ₉ -RX	2132.5	-	-	-	52.53	-	1.85	54.38
AWS-1	CH ₁₀ -RX	2155	-	-	-	52.81	-	1.83	54.64

Appendix B - Photographs

Equipment under test:



Fig 17. EUT front view.

Test set:

- **Free Space set-up:**
Initial position: $\Theta = 0^\circ$, $\Phi = 0^\circ$

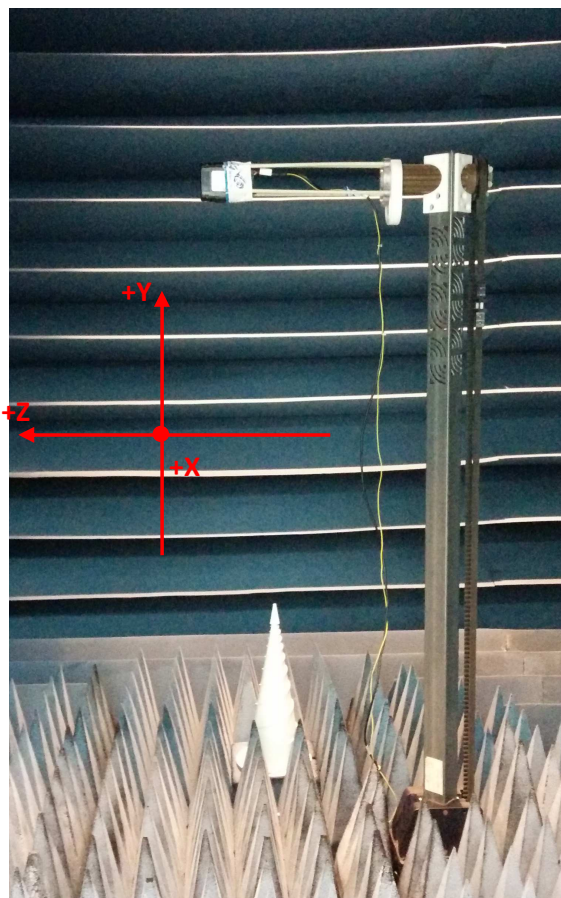
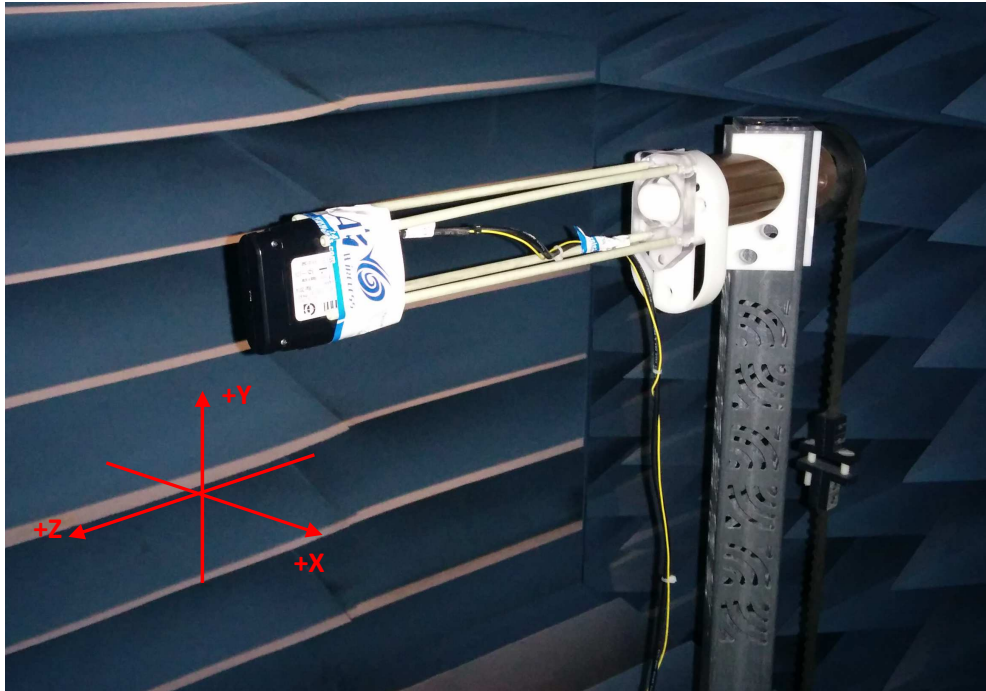


Fig 18. Free Space configuration set-up view.