

WR-12 Horn Antenna, 23 dBi Gain (60-90 GHz)

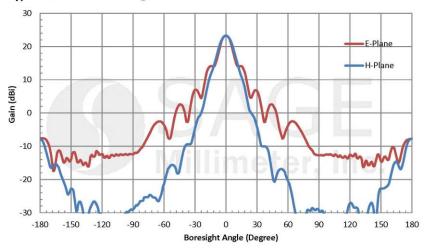
SAR-2309-12-S2

Rev. 1.1

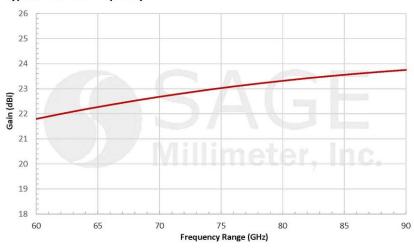


WR-12 Pyramidal Horn Antenna, 23 dBi Gain

Typical Antenna Pattern @ 75 GHz



Typical Gain vs. Frequency



RoHS

www.sagemillimeter.com | 3043 Kashiwa Street, Torrance, CA 90505 Phone: 424-757-0168 | Fax: 424-757-0188 | Email: sales@sagemillimeter.com

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WR-08 Horn Antenna, 23 dBi Gain (90-140 GHz)

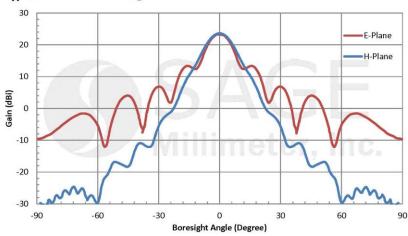
SAR-2309-08-S2

Rev. 1.1



WR-08 Pyramidal Horn Antenna, 23 dBi Gain

Typical Antenna Pattern @ 115 GHz



Typical Gain vs. Frequency



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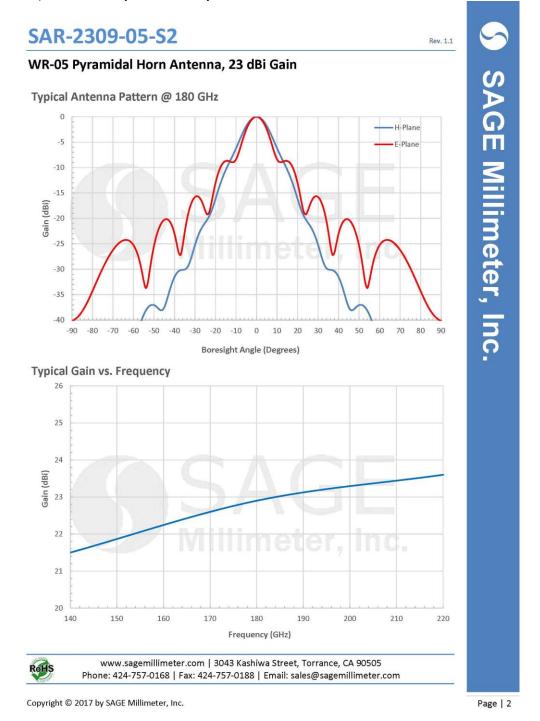
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WR-05 Horn Antenna, 23 dBi Gain (140-220 GHz)



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10.3 Test Scope Accreditation



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

Element Materials Technology Morgan Hill 1 (formerly PCTEST) 382 Piercy Road San Jose, CA 95138

RJ Ortanez Phone: 410 290 6652 Nima Molaei Phone: 408 538 5600

ELECTRICAL

Valid to: May 31, 2024 Certificate Number: 2041.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory at the location listed above, as well as the satellite laboratory locations listed below 2, to perform the following EMC, SAR, HAC, RF, Conformance, Protocol, and OTA testing of wireless devices:

Test Technology:	Test Method(s) 1:
CBRS/WInnforum	CBRSA-TS-9001 CBRS Alliance OnGo Certification Test Plans; WINNF-TS-0122 WInnforum CBRS CBSD Test Specification
OTA	CTIA Test Plan for Wireless Device Over-the-Air Performance; CTIA Test Plan for 2x2 Downlink MIMO and Transmit Diversity Over-the-Air Performance; PTCRB NAPRD.03; PTCRB PPMD; OTA Carrier Aggregation; VZW OTA Radiated Performance for CDMA & LTE Multimode Devices; VZW 5G NR FR1 RF OTA Test Plan, VZW Location Determination Test Plan; VZW LTE LBS Performance Test Plan; VZW LTE Over the Air Radiated Performance Test Plan; T-Mobile Radiated Performance TRD; AT&T 13340 OTA; USCC CDMA Over The Air Radiated Test Plan; USCC LTE Over The Air Radiated Test Plan; CTIA Test Plan for RF Performance Evaluation of Wi-Fi Mobile

GSMA TS.24 Operator Acceptance Values for Device Antenna Performance; 3GPP TS 34.114 Technical Specification UE/MS OTA Antenna

Performance;

3GPP TS 37.544 Technical Specification UTRA & E-UTRA UE

Converged Devices;

OTA Antenna Performance;

3GPP TS 38.521 NR UE Conformance Specification; Radio

Transmission and Reception

² This accreditation covers testing performed at the main laboratory listed above, and the following satellite laboratory listed below:

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5202 Presidents Court, Suite 220 | Frederick, MD 21703-8515 | Phone: 301 644 3248 | Fax: 240 454 9449 | www.A2LA.org

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18855 Adams Court Building AM1, AM2 Morgan Hill, CA 95037

Test Technology: Test Method(s) 1:

Emissions

Radiated and Conducted CFR 47 FCC Part 15, Subpart B (using ANSI C63.4:2014);

(3m semi-anechoic chambers) CFR 47 FCC Part 18 (using MP-5:1986); IEC/CISPR 11; EN 55011; KS C 9811;

CISPR 14-1 (excluding click and power disturbance);

IEC/EN 55014-1; KS C 9814-1;

CISPR 15; IEC/EN 55015; IEC/CISPR 22; IEC/EN 55022; IEC/EN 55032; CISPR 32; EN 55103-1; KS C 9832;

AS/NZS CISPR 11; AS/NZS CISPR 32; ICES-001; ICES-003;

ICES-005:

VCCI V-3; VCCI-CISPR 32 (up to 6 GHz); CNS 13803; CNS 13783-1; CNS 13438; CNS 15936 (up to 6 GHz);

TCVN 7189 (2009)

Harmonic Current IEC 61000-3-2; EN 61000-3-2; KS C 9610-3-2

Flicker and Fluctuations IEC 61000-3-3; EN 61000-3-3; KS C 9610-3-3

Immunity

Electrostatic Discharge (ESD) IEC 61000-4-2; EN 61000-4-2; KS C 9610-4-2

Radiated Immunity IEC 61000-4-3; EN 61000-4-3; KS C 9610-4-3

Electrical Fast Transient/Burst IEC 61000-4-4; EN 61000-4-4; KS C 9610-4-4

Surge Immunity IEC 61000-4-5; EN 61000-4-5; KS C 9610-4-5

IEC 61000-4-6; EN 61000-4-6; KS C 9610-4-6 Conducted Immunity

Power Frequency Magnetic

Field Immunity

IEC 61000-4-8; EN 61000-4-8; KS C 9610-4-8

IEC 61000-4-11; EN 61000-4-11; KS C 9610-4-11 Voltage Dips, Short Interrupts, and Line Voltage Variations

Harmonics and Inter-harmonics IEC 61000-4-13; EN 61000-4-13

Voltage Fluctuations IEC 61000-4-14; EN 61000-4-14

Voltage Frequency Variations IEC 61000-4-28; EN 61000-4-28

Voltage Dips, Short Interruptions and Voltage Variations on DC Input Power

Port

IEC 61000-4-29; EN 61000-4-29

Automotive EMC CISPR 25

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Test Technology: Test Method(s) 1:

Generic or Product Specific EMC Standards

EN/IEC 61000-6-1; EN/IEC 61000-6-2; EN/IEC 61000-6-3;

EN/IEC 61000-6-4; KS C 9610-6-1;

KS C 9610-6-2; KS C 9610-6-3; KS C 9610-6-4;

IEC/EN 61204-3;

EN/IEC 61547; KS C 9547;

EN 62233; EN 55103-2; EN/IEC 61800-3; KS C 9800-3; CISPR 24; EN 55024; EN 50121-1;

EN 50130-4; EN 50121-4; EN 50121-3-2; EN/IEC 50155; EN 50270; EN 50293;

EN/IEC 55014-2; IEC/CISPR 14-2; IEC/EN 61326-1; IEC/EN 61326-2-1; IEC/EN 61326-3-1; IEC/EN 61326-3-2;

IEC/EN 60601-1-2; KS C IEC 60601-1-2;

TCVN 7317:2003; TCVN 7189:2009; TCVN 7317:2003

EMC for Radio Equipment and Services

ETSI EN 301 489-1; ETSI EN 301 489-3; ETSI EN 301 489-4; ETSI EN 301 489-5; ETSI EN 301 489-6; ETSI EN 301 489-7;

ETSI EN 301 489-8; ETSI EN 301 489-9; ETSI EN 301 489-10;

ETSI EN 301 489-12; ETSI EN 301 489-15; ETSI EN 301 489-16; ETSI EN 301 489-17; ETSI EN 301 489-18; ETSI EN 301 489-19; ETSI EN 301 489-20; ETSI EN 301 489-23; ETSI EN 301 489-24; ETSI EN 301 489-25; ETSI EN 301 489-26; ETSI EN 301 489-31; ETSI EN 301 489-33; ETSI EN 301 489-50;

ETSI EN 301 489-52; ETSI EN 300 386; KS X 3124; KS X 3125; KN 301 489-07; KS X 3126

Radio

US/FCC 47 CFR, FCC Parts 15B/C/D/E/F/G/H (using ANSI C63.4:2014,

ANSI C63.10:2013, ANSI C63.10:2020; ANSI C63.17:2013

and/or FCC KDB 905462 D02 (v02));

47 CFR Parts 2, 11, 20, 21, 22, 24, 25, 27, 30, 73, 74, 80, 87, 90, 95, 96, 97, and 101 (using ANSI/TIA-603-D, ANSI/TIA-603-E,

TIA-102.CAAA-E, ANSI C63.26:2015);

CFR 47 Part 90 (using ANSI/TIA-603-D, ANSI/TIA 603-E)

Canada/ISED RSS-111; RSS-112; RSS-117; RSS-119; RSS-123; RSS-125;

RSS-127; RSS-130; RSS-131; RSS-132; RSS-133; RSS-134; RSS-135; RSS-137; RSS-139; RSS-140; RSS-141; RSS-142; RSS-170; RSS-181; RSS-182; RSS-191; RSS-192; RSS-194; RSS-195; RSS-196; RSS-197; RSS-199; RSS-210; RSS-211; RSS-213; RSS-215; RSS-216; RSS-220; RSS-222; RSS-236; RSS-238; RSS-243; RSS-244; RSS-246; RSS-247; RSS-248;

RSS-251; RSS-252; RSS-287; RSS-288; RSS-310; RSS-Gen

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<u>Test Technology:</u> <u>Test Method(s) 1:</u>

EU EN 301 126-1; EN 301 390; EN 301 751;

EN 302 217-2-2; EN 302 217-2; EN 302 217-3; EN 302 326-2; EN 300 224; EN 300 224-2;

EN 300 341; EN 300 113; EN 301 166;

EN 300 390; EN 300 471-1; EN 300 471-2; EN 300 330;

EN 300 220-2; EN 300 220-3-1; EN 300 220-3-2; EN 300 220-4;

EN 300 440; EN 300 440-2; EN 300 440-4; EN 300 328; EN 302 536-2; EN 302 571;

EN 305 550-1; EN 305 550-2;

EN 303 687; EN 301 893;

EN 302 502; EN 301 559; EN 301 598;

EN 302 544-1; EN 302 544-2; EN 301 091-1; EN 301 091-2;

EN 302 208; EN 302 291-1; EN 302 291-2;

EN 303 204; EN 302 065-1; EN 302 065-2; EN 302 065-3;

EN 302 065-4; EN 303 413; EN 303 417;

EN 302 567;

EN 300 433; EN 301 502; EN 301 511;

EN 301 908-1; EN 301 908-2; EN 301 908-3;

EN 301 908-10; EN 301 908-11; EN 301 908-12;

EN 301 908-13; EN 301 908-14; EN 301 908-15; EN 301 908-16; EN 301 908-17; EN 301 908-18;

EN 301 908-19; EN 301 908-20; EN 301 908-21; EN 301 908-22

Korea Ordinance of MSIT No. 63, Dec 24, 2020;

MSIT Public Notification 2021-86, Nov 29, 2021;

KS X 3123 Conformity Assessment Test Methods for Radio

Equipment; KS X 3142;

RRA Public Notification 2019-3, Mar 4, 2019;

RRA Public Notification 2021-15, Oct 12, 2021;

KS X 3074, (RRA Public Notification 2020- 6, Sep 25, 2020;

RRA Public Notification 2021-3, Feb 8, 2021; MSIT Public Notification 2019-4, Jan 16, 2019; RRA Public Notification 2019-1, Jan 17, 2019

Hong Kong HKCA 1035; HKCA 1039; HKCA 1042; HKCA 1043;

HKCA 1049; HKCA 1053; HKCA 1054; HKCA 1056;

HKCA 1057; HKCA 1061; HKCA 1080

Singapore IMDA TS WBA (October 2016); IMDA TS SRD (Apr 2018);

IMDA TS LMR (October 2016); IMDA TS CMT (Sep 2020);

IMDA TS UWB (October 2016)

Taiwan DGT C-IS2031-0 (2020); DGT C-IS2034-0 (2020);

PLMN01 (2020); PLMN02 (2020); PLMN08 (2020);

PLMN09 (2020); DGT LP0001 (2020); DGT LP0002 (2020); RTTE01 (2020); CNS 13438; CNS 15936 (2016) (up to 6 GHz)

Australia AS/NZS 4268:2017

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Test Technology: Test Method(s) 1:

Vietnam QCVN 11:2010/BTTTT; QCVN 14:2010/BTTTT;

QCVN 15:2015/BTTTT; QCVN 16:2010/BTTTT;

QCVN 18:2014/BTTTT;

QCVN 23:2011/BTTTT; QCVN 25:2011/BTTTT; QCVN 41:2011/BTTTT; QCVN 42:2011/BTTTT; QCVN 43:2011/BTTTT; QCVN 44:2011/BTTTT; QCVN 45:2011/BTTTT; QCVN 46:2011/BTTTT; QCVN 48:2011/BTTTT; QCVN 49:2011/BTTTT; QCVN 54:2011/BTTTT; QCVN 55:2011/BTTTT; QCVN 65:2013/BTTTT; QCVN 66:2013/BTTTT; QCVN 53:2011/BTTTT; QCVN 73:2013/BTTTT;

QCVN 74:2013/BTTTT;

QCVN 95:2015/BTTTT; QCVN 96:2015/BTTTT

Japan (Specified Radio Equipment Article 38-2-2, paragraph 1), Item 1

of Radio Law;

(Specified Radio Equipment Article 38-2-2, paragraph 1), Item 2

of Radio Law:

(Specified Radio Equipment Article 38-2-2, paragraph 1), Item 3

of Radio Law:

ARIB Standard STD-T29; STD-T53; STD-T56; STD-T57; STD-T64; STD-T66; STD-T70; STD-T71; STD-T81; STD-T90;

STD-T106; STD-T107; STD-T108

NOM-084-SCT1-2002; NOM-088/2-SCT1-2002; Mexico

IFT-008-2015; NOM-208-SCFI-2016;

NOM-EM-016-SCFI-2015

RF Exposure / SAR (Specific Absorption Rate)

IEEE 1528-2013; EN IEC/IEEE 62209-1528:2021;

RSS-102 Measurements (RF Exposure, SAR, LPD and NS);

SPR-001; SPR-002; SPR-003; SPR-004;

IEEE C95.3-2021; EN 50566-2017; EN 50360-2017;

EN 62209-1:2016; EN 62209-3: 2019; EN 62209-2:2010/A1:2019;

IEC 62209-1 2nd Edition 2016; IEC 62209-2:2010;

IEC 62209-3:2019; IEC PAS 63083:2017; EN 50401:2017; IEC PAS 63184:2021; EN 50385:2017; EN 62311:2020; EN 62232:2017; IEC 62232:2017; EN 62311:2008; IEC 62311:2019; IEC 62311:2020; IEC TR 62630:2010; IEC 62209-2 AMD 1; EN 62479:2010; IEC 62479:2010;

EN 50663:2017; IEC/IEEE 62209-1528:2020; IEC/IEEE 63195-1:2022; AS/NZS 2772.2:2016;

Australian Communications Authority Radio Communications (Electromagnetic Radiation - Human Exposure) Standard 2014;

ANSI/IEEE C95.1-2005; ANSI/IEEE C95.1-1992; ANSI/IEEE C95.3-2002; ANSI/IEEE C95.3.1-2010; ANSI/IEEE C95.1:2019; ICNIRP (100KHz-300GHz):2020;

IEC TR 63170:2018;

RRA Public Notification 2018-18, December 7, 2018

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<u>Test Technology:</u> <u>Test Method(s) 1:</u>

Hearing Aid Compatibility ANSI C63.19:2011; ANSI C63.19:2019;

CBRS/WInnforum CTIA Test Plan for Hearing Aid Compatibility; RSS-HAC CBRS/WInnforum CBRSA-TS-9001 CBRS Alliance OnGo Certification Test Plan;

WINNF-TS-0122 WInnforum CBRS CBSD Test Specification

SunSpec Alliance SunSpec - CSIP (Common Smart Inverter Profile) Conformance

Test Procedures;

SunSpec – Advanced Function Inverter Test Lab Specification; SunSpec – UL1741 Supplement SA/Rule 21 Implementation

Guide;

IEEE 2030.5-2018 Smart Energy Profile Application Protocol

¹ When the date, edition, version, etc. is not identified in the scope of accreditation, laboratories may use the version that immediately precedes the current version for a period of one year from the date of publication of the standard measurement method, per part C., Section 1 of A2LA R101 - General Requirements- Accreditation of ISO-IEC 17025 Laboratories.

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Testing Activities Performed in Support of FCC Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.13:

Rule Subpart/Technology	Test Method	Maximum Frequency
<u>Unintentional Radiators</u> Part 15B	ANSI C63.4:2014	40 GHz
Industrial, Scientific, and Medical Equipment		
Part 18	FCC MP-5 (February 1986)	330 GHz
<u>Intentional Radiators</u> Part 15C	ANSI C63.10:2013	330 GHz
<u>Unlicensed Personal Communication</u> Systems Devices		
Part 15D	ANSI C63.17:2013	40 GHz
<u>U-NII without DFS Intentional Radiators</u> Part 15E	ANSI C63.10:2013	40 GHz
<u>U-NII with DFS Intentional Radiators</u> Part 15E	FCC KDB 905462 D02 (v02)	40 GHz
<u>UWB Intentional Radiators</u> Part 15F	ANSI C63.10:2013	40 GHz
BPL Intentional Radiators Part 15G	ANSI C63.10:2013	40 GHz
White Space Device Intentional Radiators Part 15H	ANSI C63.10:2013	40 GHz
Commercial Mobile Services (FCC Licensed Radio Service Equipment)		
Parts 22 (cellular), 24, 25 (below 3 GHz), and 27	ANSI/TIA-603-E; TIA-102.CAAA-E or ANSI C63.26:2015	330 GHz
General Mobile Radio Services (FCC Licensed Radio Service Equipment)		
Parts 22 (non-cellular), 90 (below 3GHz), 95, 97, and 101 (below 3GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E or ANSI C63.26:2015	330 GHz
Citizens Broadband Radio Services (FCC Licensed Radio Service Equipment)		
Part 96	ANSI/TIA-603-E; TIA-102.CAAA-E or ANSI C63.26:2015	330 GHz

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Testing Activities Performed in Support of FCC Certification in Accordance with 47 Code of Federal Regulations and FCC KDB 974614, Appendix A, Table A.13:

Rule Subpart/Technology	Test Method	Maximum Frequency
Maritime and Aviation Radio Services Parts 80 and 87	ANSI/TIA-603-E; ANSI C63.26:2015	330 GHz
Microwave and Millimeter Bands Radio Services		
Parts 25, 30, 74, 90 (above 3 GHz), 95 (above 3 GHz), 97 (above 3 GHz), and 101	ANSI/TIA-603-E; TIA-102.CAAA-E or ANSI C63.26:2015	330 GHz
Broadcast Radio Services Parts 73 and 74 (below 3 GHz)	ANSI/TIA-603-E; TIA-102.CAAA-E or ANSI C63.26:2015	330 GHz
RF Exposure Devices Subject to SAR Requirements	IEEE Std 1528:2013	6 GHz
Hearing Aid Compatibility Part 20 (HAC for Commercial Mobile Services)	ANSI C63.19:2011	6 GHz
Signal Boosters Part 20 (Wideband Consumer Signal Boosters, Provider-specific signal boosters, and Industrial Signal Boosters), Section 90.219	ANSI C63.26:2015	330 GHz

³ Accreditation does not imply acceptance to the FCC equipment authorization program. Please see the FCC website (https://apps.fcc.gov/oetcf/eas/) for a listing of FCC approved laboratories.

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