

MWC-2142 Datasheet

Revision 1.0.2304

1. Introduction

1.1 Summary

The MWC-2142 is a complete USB 3.0 to 802.11ad module with advanced features for long range, outdoor applications. It utilizes the 802.11ad 60 GHz phased array chipset which includes a baseband processor and a high-power mmWave beamforming transceiver RFIC.

The MWC-2142 incorporates a 32-element phased array antenna. This antenna is integrated into the PCB and provides uniform performance over the entire 802.11ad band from 57 to 71 GHz.

The Baseband processor is the PRS4601 B2E. This provides all MAC and PHY layer functionality necessary for 802.11ad operation and supports point-to-point or point-to-multipoint capability.

The PRS1165 RFIC provides 16 RF chains with high transmit power levels. It supports all 6 of the 802.11ad defined channels.

1.2 Applications

- mmWave point-to-point backhaul links
- PtMP Fixed Wireless Access
- High performance 60 GHz access points and clients

1.3 Abbreviations and Acronym Definitions

BB	Baseband
MIB	Management Information Base
EIRP	Equivalent Isotropic Radiated Power
PtP	Point to point
PtMP	Point to multipoint
BPSK	Binary phase shift key modulation
QPSK	Quadrature phase shift key modulation
QAM	Quadrature Amplitude Modulation
HPBW	Half power beamwidth
BW	Bandwidth
RSSI	Received Signal Strength Indicator
SNR	Signal to Noise Ratio
DMG-TM / DMG	Directional Multi-Gigabit Test Mode
HBM	Human Body Model

1.4 Common RF Parameters

The MWC-2142 can be tuned WiGig Channels 1-6. Refer to Table 1-1 for the channels and center frequencies.

Table 1-1: IEEE 802.11ad/ay channels and center frequencies

Channel	Center Frequency (GHz)	Frequency Range (GHz)
Channel 1	58.32	57.24 – 59.40
Channel 2	60.48	59.40 – 61.56
Channel 3	62.64	61.56 – 63.72
Channel 4	64.80	63.72 – 65.88
Channel 5	66.96	65.88 – 68.04
Channel 6	69.12	68.04 – 70.2

Table 1-2: Modulation Code and raw PHY data rates

MCS Index	Modulation	Code Rate	PHY Data Rate (Mbps)
MCS0	DBPSK	1/2	27.5
MCS1	$\Pi/2$ BPSK	1/2	385
MCS2	$\Pi/2$ BPSK	1/2	770
MCS3	$\Pi/2$ BPSK	5/8	962.5
MCS4	$\Pi/2$ BPSK	3/4	1155
MCS5	$\Pi/2$ BPSK	13/16	1251.25
MCS6	$\Pi/2$ QPSK	1/2	1540
MCS7	$\Pi/2$ QPSK	5/8	1925
MCS8	$\Pi/2$ QPSK	3/4	2310
MCS9	$\Pi/2$ QPSK	13/16	2502.5

2. Product Overview

2.1 General Description

The MWC-2142 operates from a single 5V supplied through the connector. The MWC-2142 provides all of the functionality of a multi-gigabit wireless transceiver compliant with the 802.11ad standard, supporting the complete solution from SuperSpeed USB connectivity to 60GHz wireless functionality.

The integrated 32-element antenna performs beamforming. This antenna can also operate with a quasi-omnidirectional antenna pattern. This module is not suitable for use with a reflector antenna.

No factory calibration is required, as all calibration is performed at run-time.

Channel	Gain (dBi)	-3dB Beamwidth (deg)	
		Elevation	Azimuth
Channel 1	19.4	13	25
Channel 2	19.8	13	24
Channel 3	20.0	12	23
Channel 4	20.1	12	23
Channel 5	20.3	12	22

Table 3-6: Key Antenna Specifications

Parameter	Value
Scan Range (-3dB) (Azimuth)	+/-45°
Scan Range (-3dB) (Elevation)	+/-25°
Maximum Side Lobe (boresight beam)	-12.5 dB

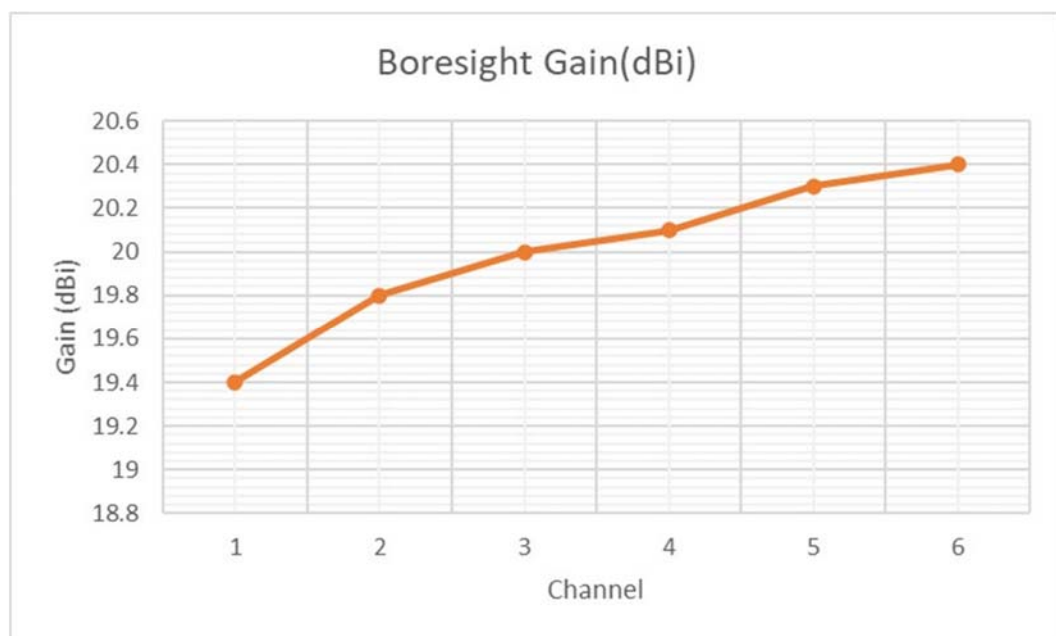


Figure 3-1: Peak antenna gain across all channels

5. Typical Performance Characteristics

Unless otherwise noted, all specifications are at 25 °C.

5.1 Typical Antenna Performance

Figure 4-1 to Figure 4-2 show 2D integrated plots for the antenna gain and the drop from peak gain for all channels.

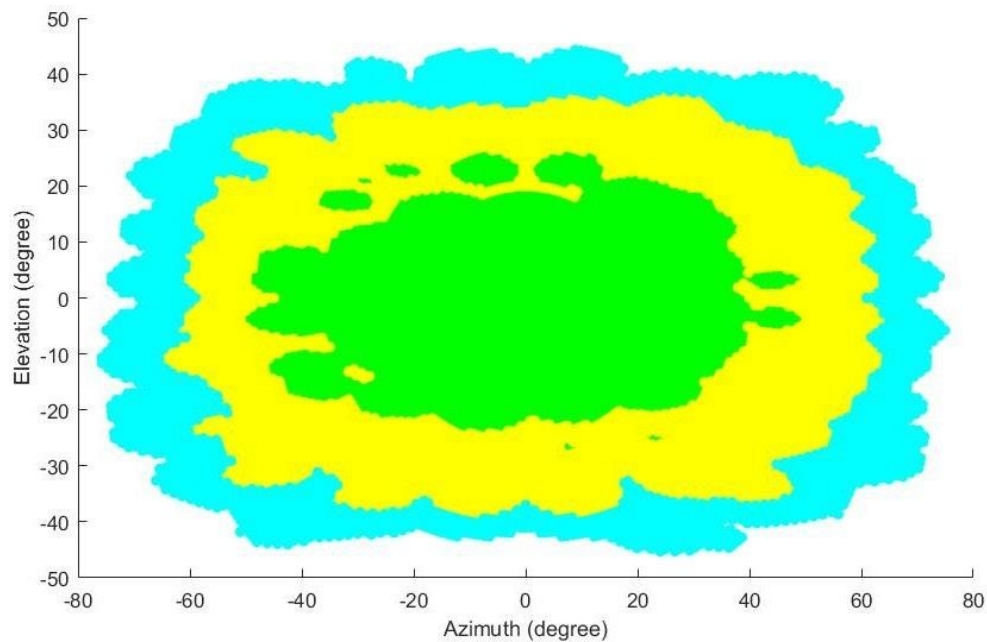


Figure 4-1: 2D surface plot showing gain drop from peak for Ch. 1

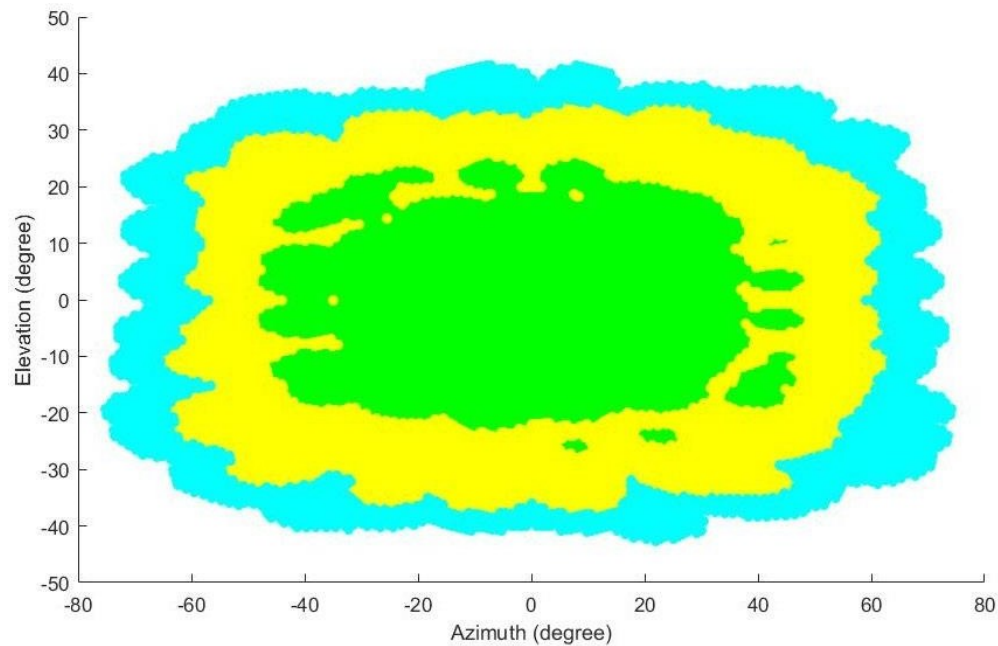


Figure 4-2: 2D surface plot showing gain drop from peak for Ch. 2

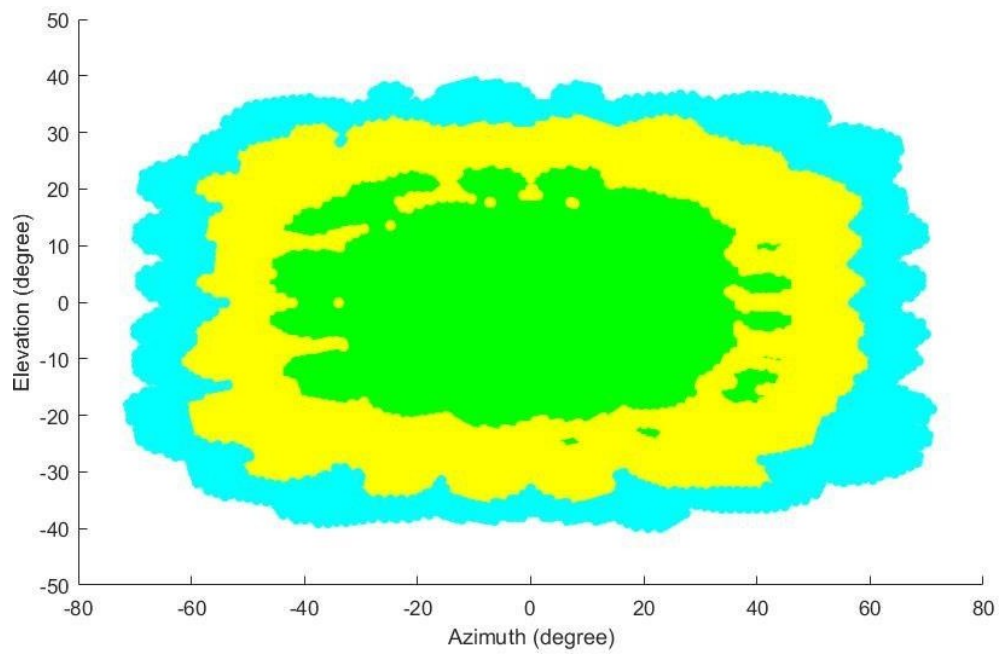


Figure 4-3: 2D surface plot showing gain drop from peak for Ch. 3

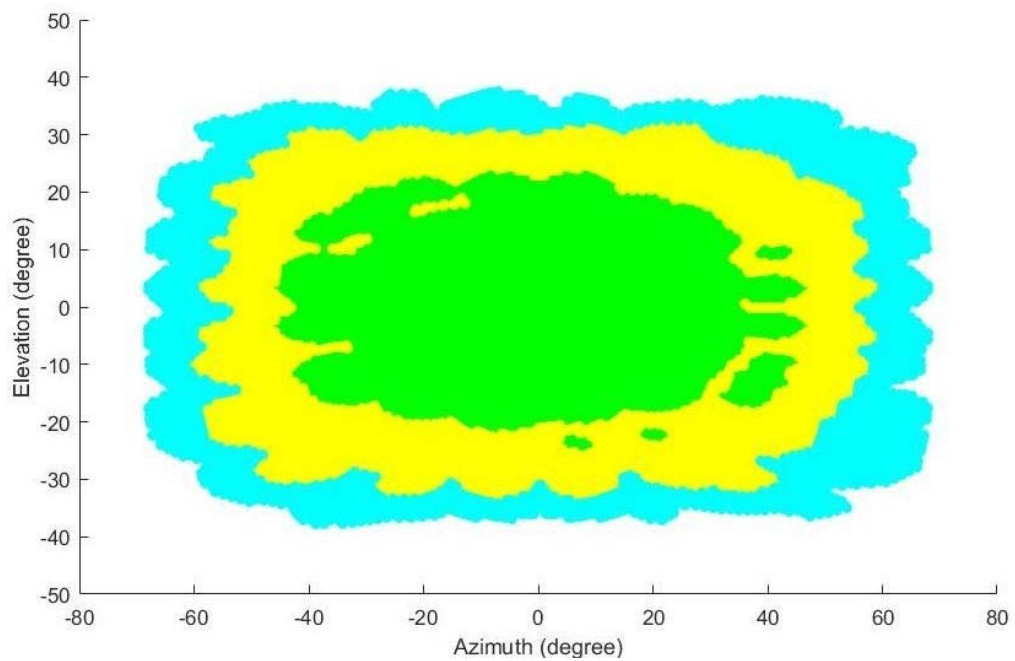


Figure 4-4: 2D surface plot showing gain drop from peak for Ch. 4

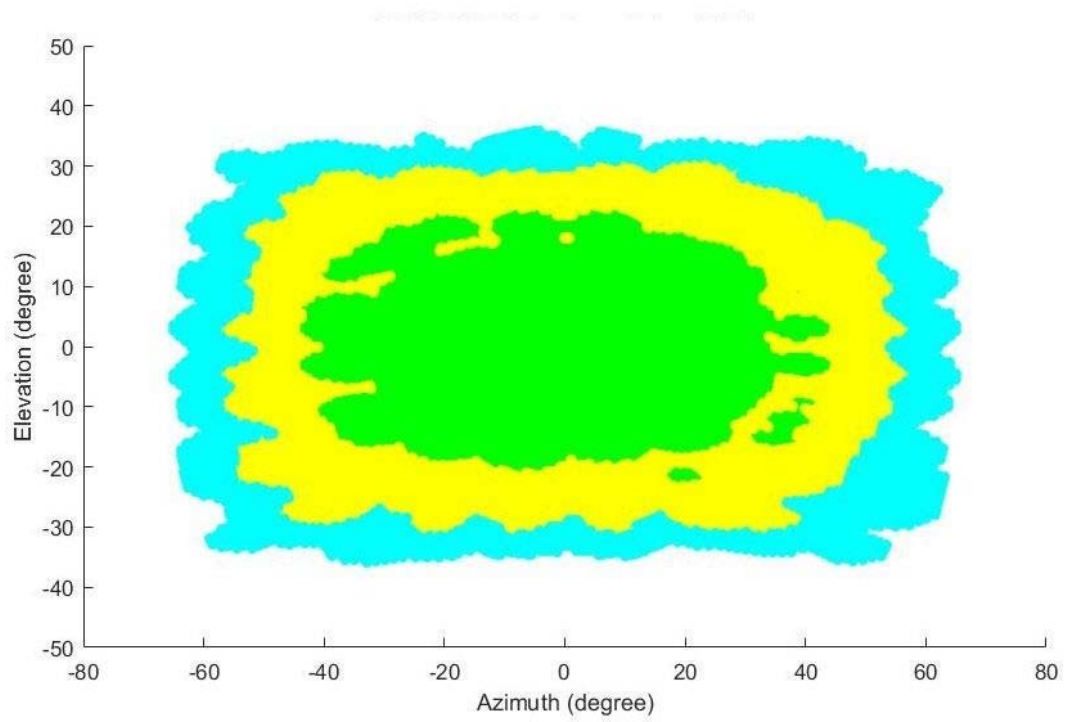


Figure 4-5: 2D surface plot showing gain drop from peak for Ch. 5

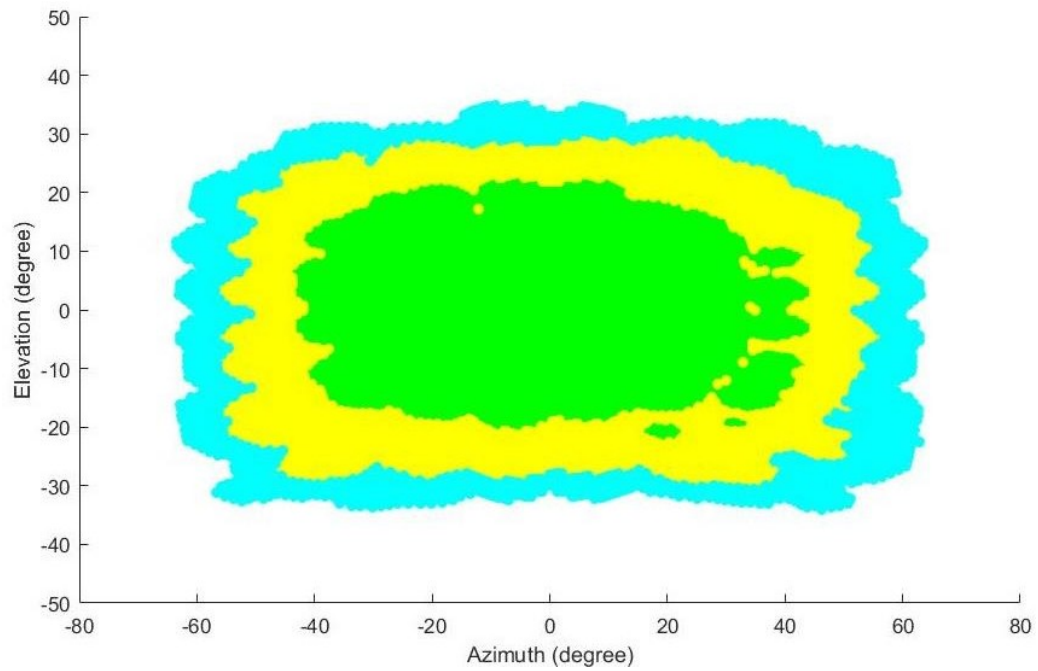


Figure 4-6: 2D surface plot showing gain drop from peak for Ch. 6

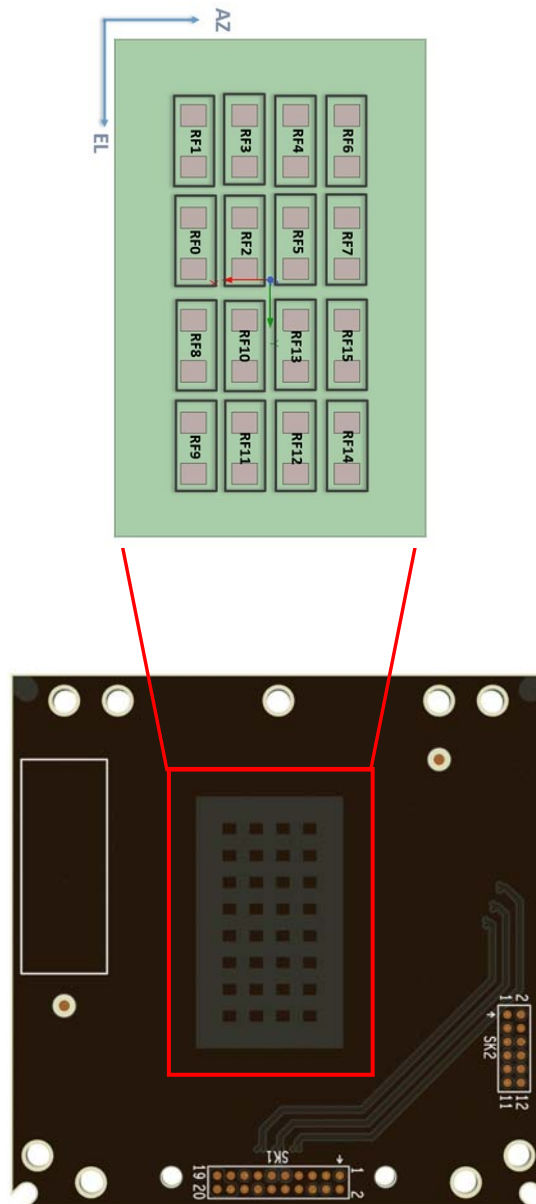


Figure 6-1: Diagram of the MWC-2142 32-element antenna and position on the module