Section 1 Specifications

1.1 Antenna electrical properties

Frequency	433.42 MHz
Radiation pattern	Omni-directional
Gain (max)	3.53 dBd

1.2 Physical properties

Operating temperature	-20°C to 55°C
Antenna type	PCB printed helical antenna
Number of conductive strips	17
Antenna dimensions	25 × 10 mm
Connector	N/A



TITLE	B812
PART NUMBER:	F01U419429 (#V: 02) (MTE: 110CT24
LAYER	SECONDARY SIDE
	VIEWED FROM THE PRIMARY SIDE

Figure 1.2-1: Antenna layout diagram

Section 1 Specifications



Figure 1.2-2: Antenna location photo

Section 2 Antenna testing

2.1 Test setup details

Frequency Range:	30 MHz - 1 GHz	
Receiver:	ESRP 7 [ESRP 7] @ VISA (ADR TCPIP::178.168.48.30::INST0::INSTR), SN 1316.4500K07/101367, FW 3.36 SP2	
Signal Path:	ESRP7-TS-PANT-No Pre-Amp	
Correction Table:	W414.01- CP1-X1- PREAMP Correction Table: RCVR - CP1-X1	
Antenna:	TS-PANT	
Correction Table (vertical):	TS PANT Typical 3m Correction Table (horizontal): TS PANT Typical 3m	
Antenna Tower:	Maturo Antenna Tower [Maturo Antenna Tower] @ GPIB0 (ADR 7)	
Turntable:	Maturo Turntable [Maturo Turntable] @ GPIB0 (ADR 7)	

2.2 Testing details

Measurement Type:	Antenna Pattern
Hardware Setup:	EMI radiated\Azimuth TS-PANT EMI Radiated, No Pre-Amp-EXP
Display Type:	Absolute

Table 2.2-1: Measurement Settings

Subrange	Detectors	IF BW	Meas. Time	Receiver
30 MHz - 1 GHz	MaxPeak	120 kHz	0.1 s	ESRP 7
Accessories Loop Settings:				
Polarization:	V			
Azimuth:	-10 - (5) - 360 deg			
Frequency:	433 - 433 MHz			

2.3 EMS Scan details

Hardware Setup:	EMS radiated\EMS RADIATED
Level On:	Substitution Method: SINGLE POINT REFCAL\20231102_SinglePoint_1.55x3mx85cm80M_6GHz_01

2.4 Measurement details

To measure the gain of antenna operating below 1GHz anechoic chamber with reflection ground floor was used.

The gain - comparison method [1] will be applied with modification:

- UAT will be in Transmit mode.
- Dipole as standard device connected to the Signal Generator will transmit.
- LogPeriodic Antenna will be in Receive mode.

The calculation of the Gain Antenna unit (Gaut) uses Friss equation. Two measurements characterize two equations:

 $G_{aut} + G_{logpe} = 20^* Log(4^*\pi^*R/\lambda) + 10^* Log(P_{aut}/P_{logper})$

 $G_{dipole} + G_{logp} = 20*Log(4* \pi *R/\lambda) + 10*Log(P_{dipole}/P_{logper})$

 G_{aut} is the gain of the test unit antenna. G_{dipole} is the dipole antenna gain (known)

Gain of the AUT in dBd:

 $G_{aut} = G_{dipole} + (P_{aut}-P_{dipole})$

 P_{aut} is the unit Transmit Power applied to Antenna P_{dipole} is the Power applied to the dipole antenna from Signal Generator

During follow procedure voltage received by LogPeriodic Antenna will be keep equal for both measurements.

2.5 Measurement procedure

Collect Antenna Pattern for the UUT in CW mode with Radiated Power level corresponds to Log Periodic antenna Peak received voltage does not exceed FCC limit 100.8 dBµV/m at 3 m at frequency 433.42 MHz. From collected data find out the height of received antenna and UUT azimuth position corresponds to EIRP (max received signal).

Put receive Log Periodic Antenna on the height corresponds to EIRP. Make transmit setup for Dipole Antenna connected to Signal Generator. Apply power from Signal Generator to have the same receive voltage value corresponds to EIRP.

After these two measurements calculate gain of the AUT.

G _{dipole} = 1.42 dBi	H _{eirp} = 110 cm
P _{aut} = 2.73 dBm	Az = 40 deg
$P_{dipole} = 2.04 \text{ dBm}$	Polarization Vertical

G_{aut} = 3.53 dBd

Section 2 Antenna testing

2.6 Azimuth 2D Chart



Figure 2.6-1: Vertical Azimuth 2D chart

Table 2.6-1: Azimuth chart evaluation

Frequency (MHz)	Max. value (dBµV/m)	Azimuth (deg)	Min. value (dBµV/m)	Azimuth (deg)	Average (dBµV/m)
433.420000	100.23	40	88.17	130	97.23

Section 2 Antenna testing

Azimuth (deg)	Frequency 433.420 MHz (dBµV/m)
-10.0	99.45
-5.0	99.49
5.0	99.62
10.0	99.74
15.0	99.79
25.0	100.02
30.0	100.15
35.0	100.21
40.0	100.23
50.0	100.15
55.0	100.04
60.0	99.94 99.75
70.0	99.53
75.0	99.24
80.0	98.87
90.0	97.78
95.0	97.01
100.0	96.15
110.0	93.72
115.0	92.23
120.0	90.64
125.0	88.90
135.0	88.81
140.0	90.02
145.0	91.51
155.0	93,94
160.0	95.01
165.0	95.81
170.0	96.58 97.24
180.0	97.78
185.0	98.23
190.0	98.63
200.0	99.16
205.0	99.26
210.0	99.21
220.0	98.80
225.0	98.33
230.0	97.80
235.0 240.0	97.13 96.34
245.0	95.53
250.0	94.81
255.0 260.0	94.20
265.0	94.10
270.0	94.50
275.0	95.13 95.85
285.0	96.51
290.0	97.16
295.0	97.71
305.0	98.50
310.0	98.78
315.0	98.99
325.0	99.12
330.0	99.26
335.0	99.33
340.0 345.0	99.36
350.0	99.42
355.0	99.46
360.0	99.52