

## Specification

**Part No.** : **TLS.20.105111**

**Description** : Shockwave 450-470MHz  
Permanent Mount External Antenna  
1m CFD-200 SMA(M) connector

**Features** : CDMA 450-470MHz with at least 45% efficiency  
Mechanically robust for indoor/outdoor applications  
Height: 79.45mm(3.13") ; Diameter : 42mm(1.65")  
IP67 and IP69K Waterproof  
1 meter of low loss CFD-200 cable  
SMA(M) connector  
RoHS & REACH compliant



## 1. Introduction

The Shockwave TLS.20.105111 is a mechanically robust, waterproof, external antenna operating at 450-470MHz with 1 meter of low loss CFD-200 and SMA(M) connector. It has been designed to be used on a Ground Plane. Common applications are, for instance :

- Public safety
- Smart meters
- Mesh networks
- Transportation

The antenna has greater than 45% efficiency and -0.71 dBi peak gain at CDMA 450-470MHz on a 30x30 cm ground plane. Stable radiation patterns over low angles provides consistent gain in the horizontal plane, meaning that it is especially suitable for mesh networks or hot spots.

A unique indent tab on the base of the antenna allows a wrench to be used to solidly lock the antenna on top of its mounting location while tightening up the nut beneath the metal panel. Waterproof O-rings around the bottom base prevent water from leaking under the antenna.

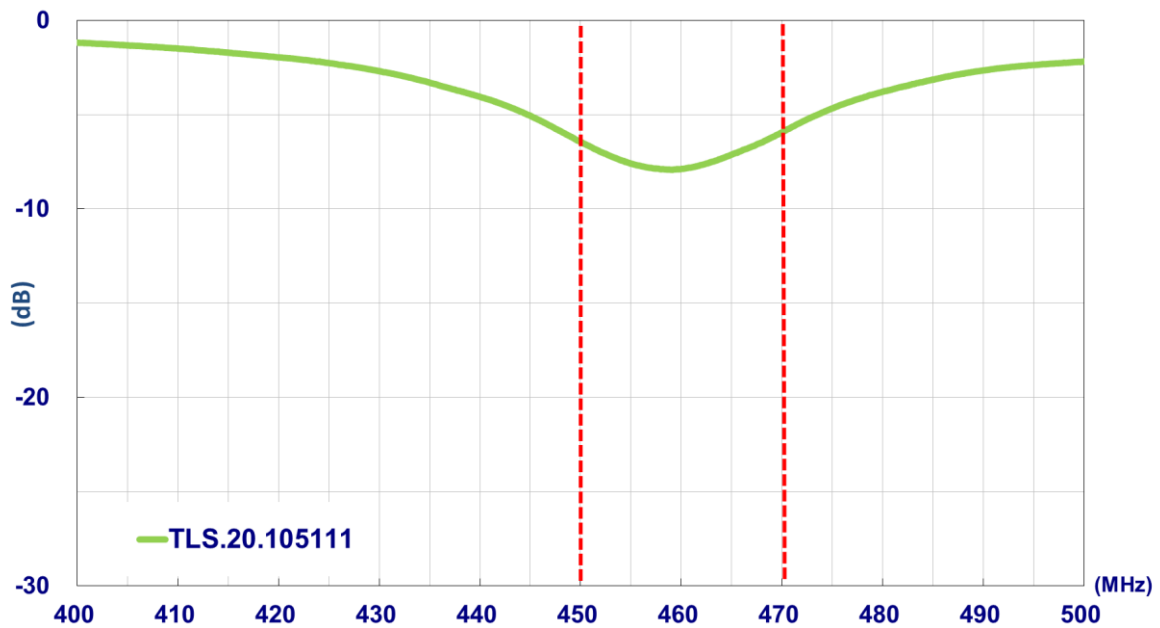
The TLS.20 antenna is IP67 waterproof and IP69K resistant against high pressure water jets in commercial cleaning environments, which makes the antenna ideal for 450-470MHz applications in harsh outdoor environments.

## 2. Specification

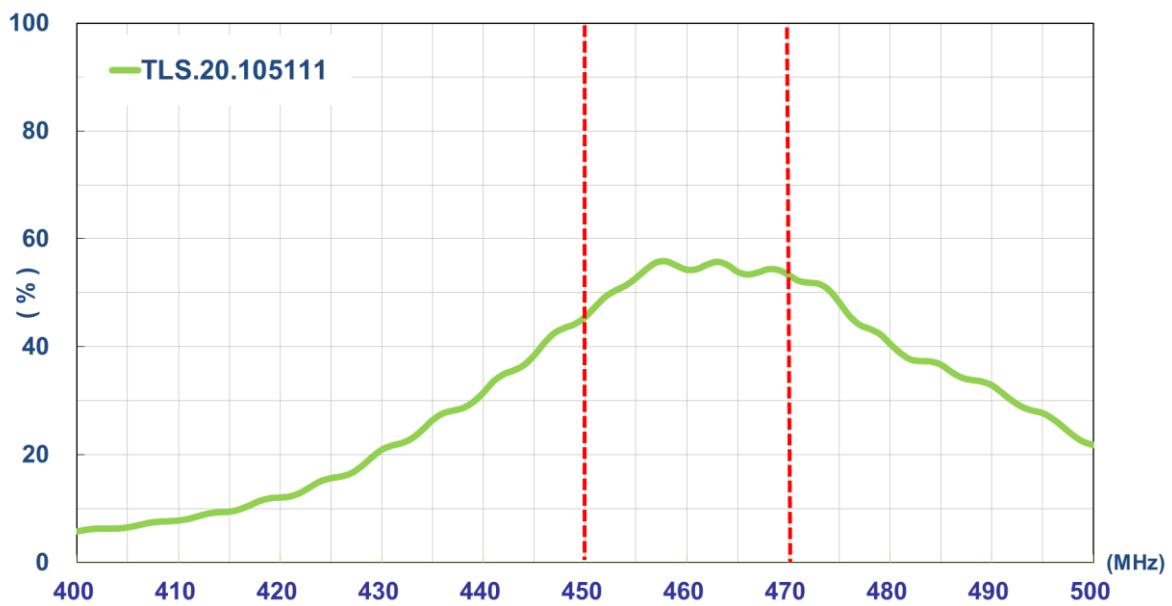
ELECTRICAL			
Operation Band	CDMA450		
Operation Frequency(MHz)	450	460	470
	On 30 x 30 cm ground plane		
Efficiency (%)	45.50	54.28	53.34
Peak Gain (dBi)	-1.33	-0.71	-0.79
Average Gain (dBi)	-3.23	-2.65	-2.72
Return Loss (dB)	< -5		
Impedance	50 Ω		
Polarization	Vertical		
Radiation Property	Omni-Directional		
Max Input Power	100 W		
MECHANICAL			
Dimension (mm)	Height: 79.45mm(3.13") ; Diameter : 42mm(1.65")		
Cable	1 meter CFD-200		
Connector	SMA(M)		
Material	Housing : UV Resistant ABS , Base : Nickel Plated Zinc Alloy		
Weight (g)	205		
Rec. Torque for Mounting	4.018 N.m		
Max. Torque for Mounting	9.8 N.m		
ENVIRONMENTAL			
Waterproof Rating	IP67 and IP69K		
Operation Temperature	-40°C to 85°C		
Humidity	Non-condensing 65°C 95% RH		

### 3. Antenna Characteristics

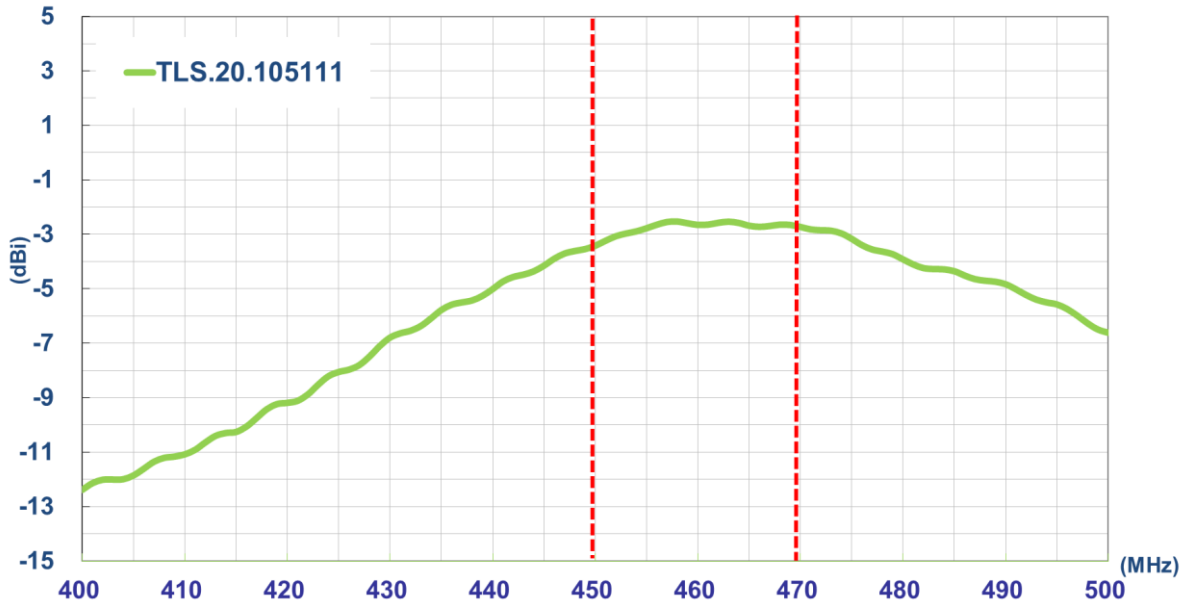
#### 3.1. Return Loss



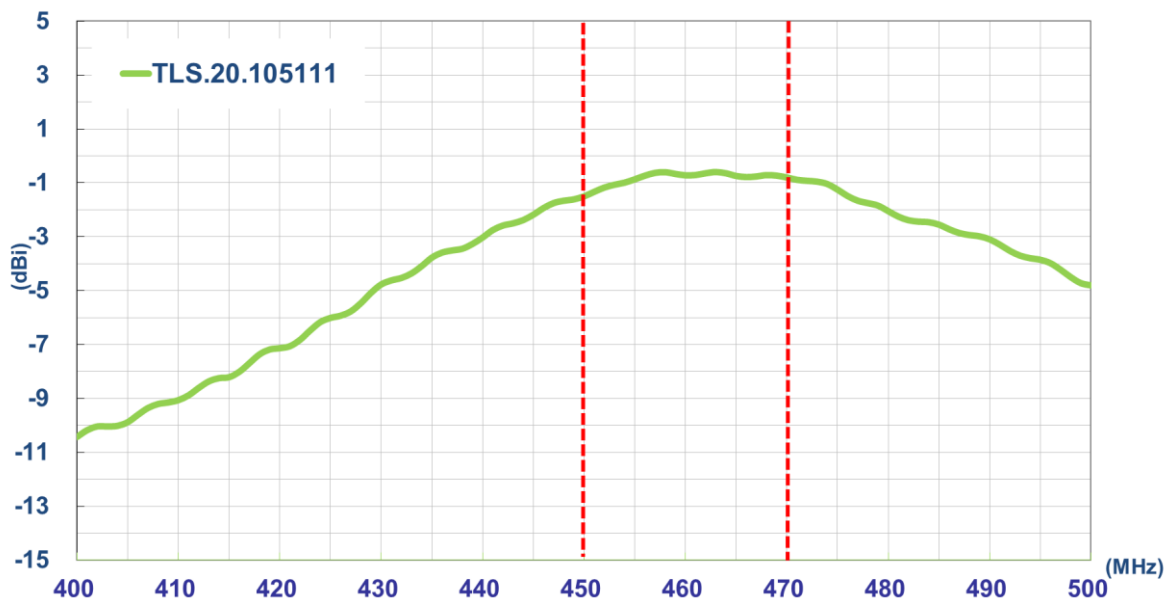
#### 3.2. Efficiency



### 3.3. Average Gain



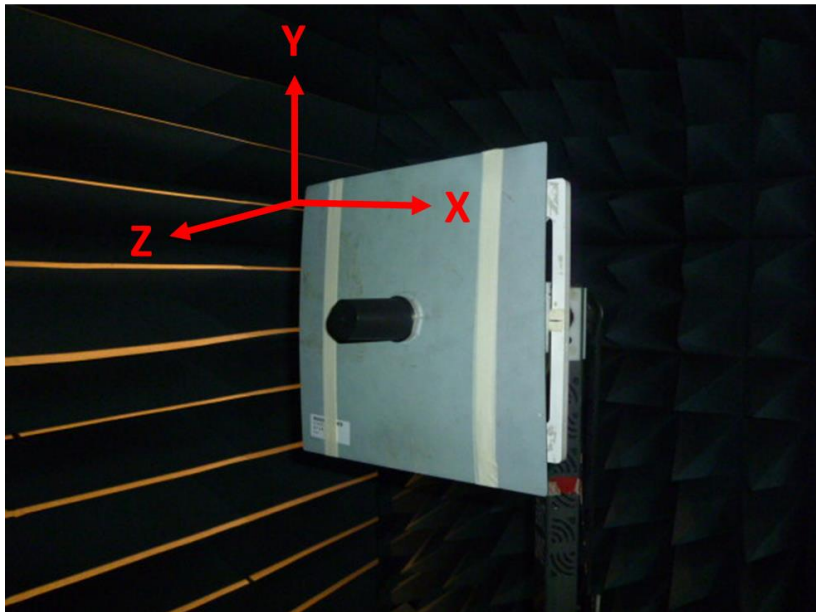
### 3.4. Peak Gain



## 4. Antenna Radiation Pattern

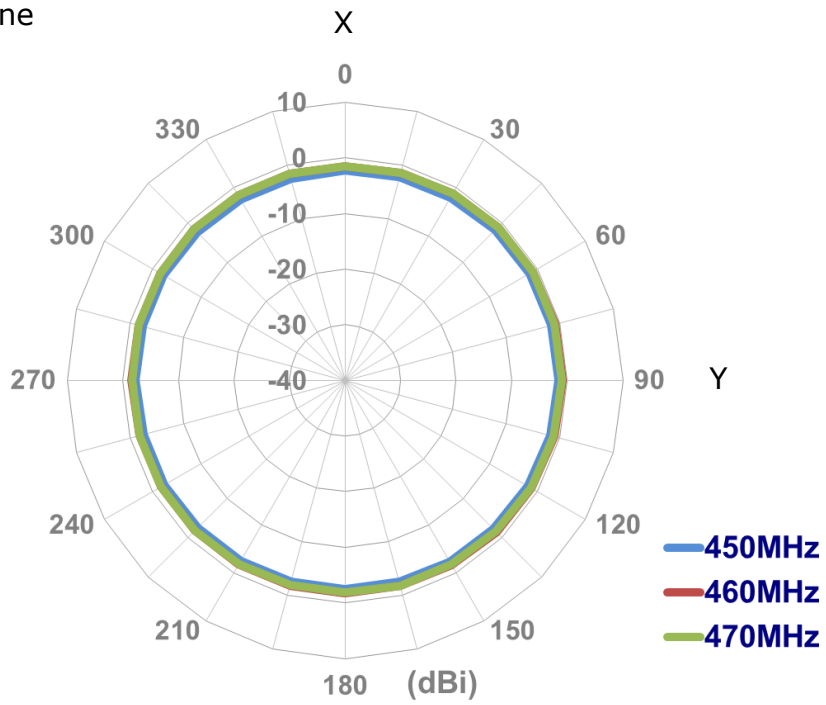
### 4.1. Measurement Setup

The TLS.20 antenna is tested in a CTIA certified ETS-Lindgren Anechoic Chamber. The test setup is shown below.

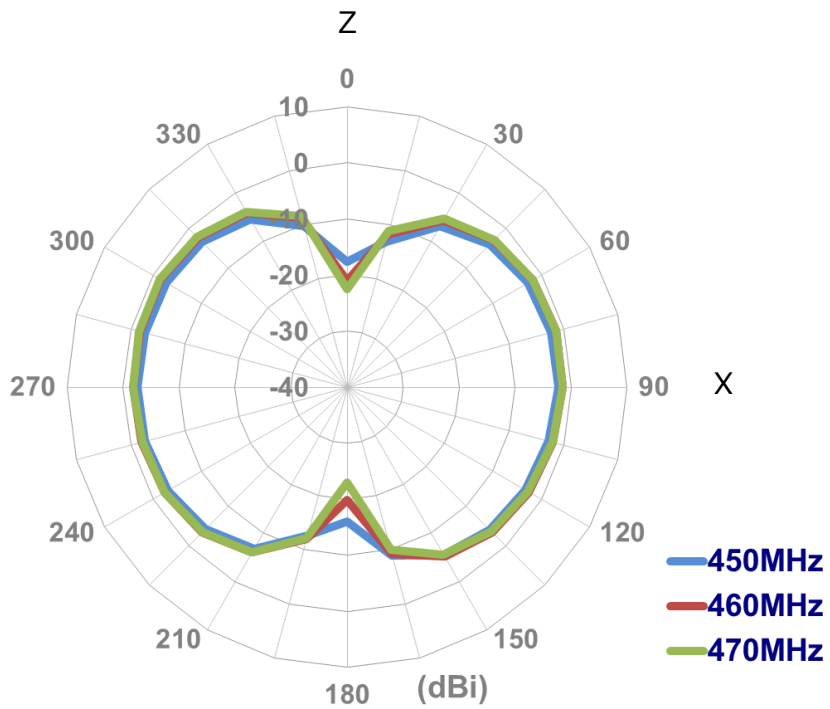


## 4.2. 2D Radiation Pattern

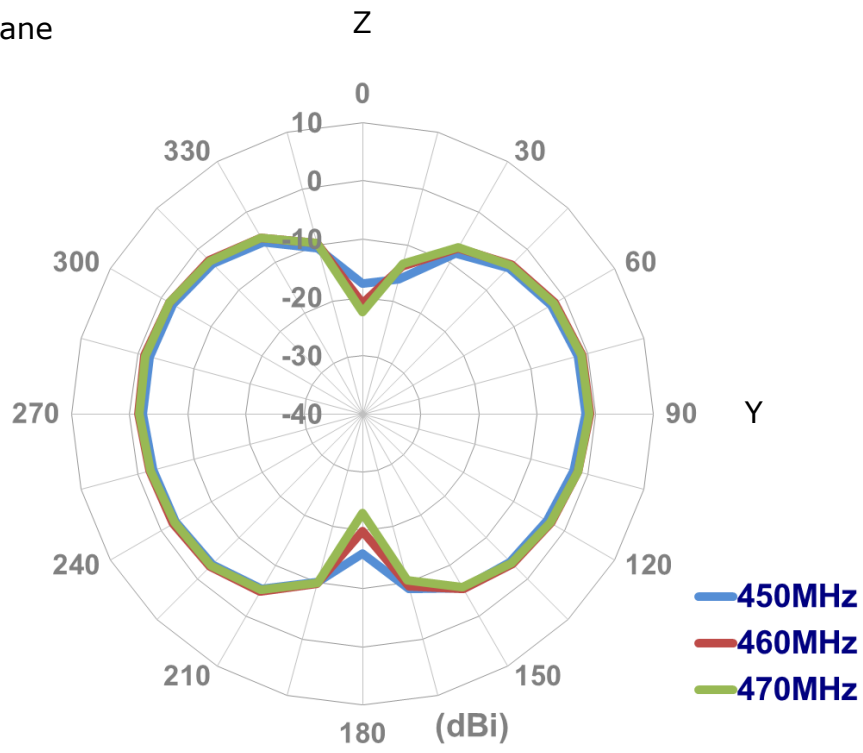
XY Plane



XZ Plane



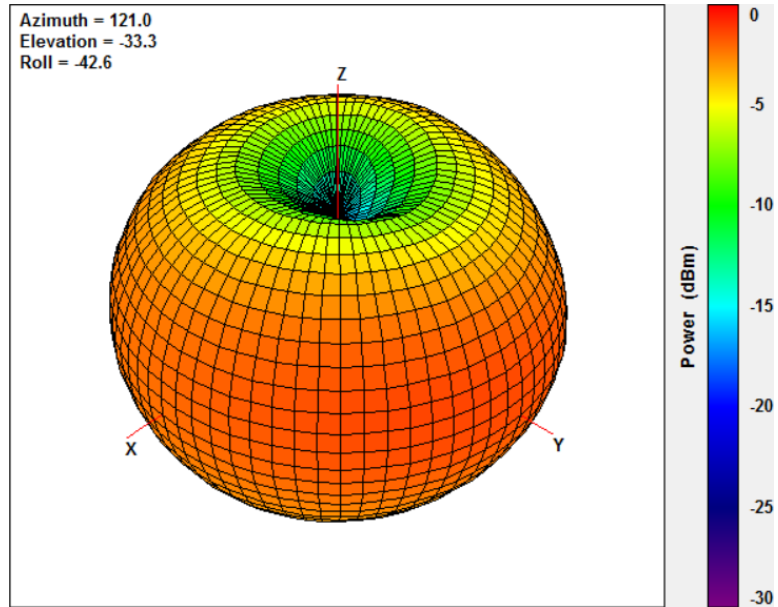
YZ Plane



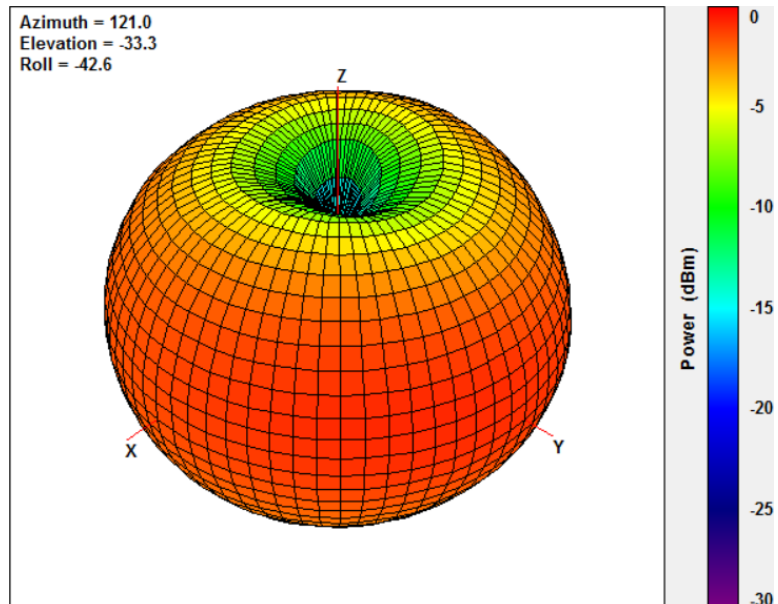


### 4.3. 3D Radiation Pattern

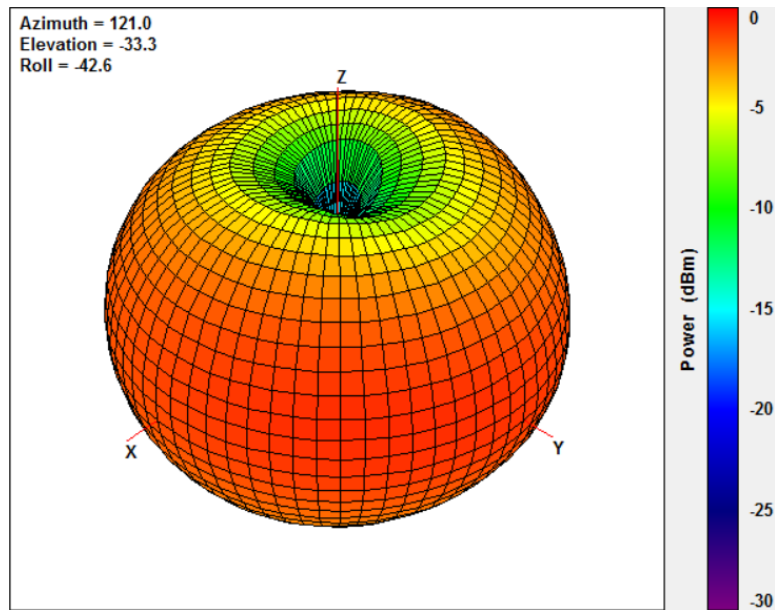
@450MHz



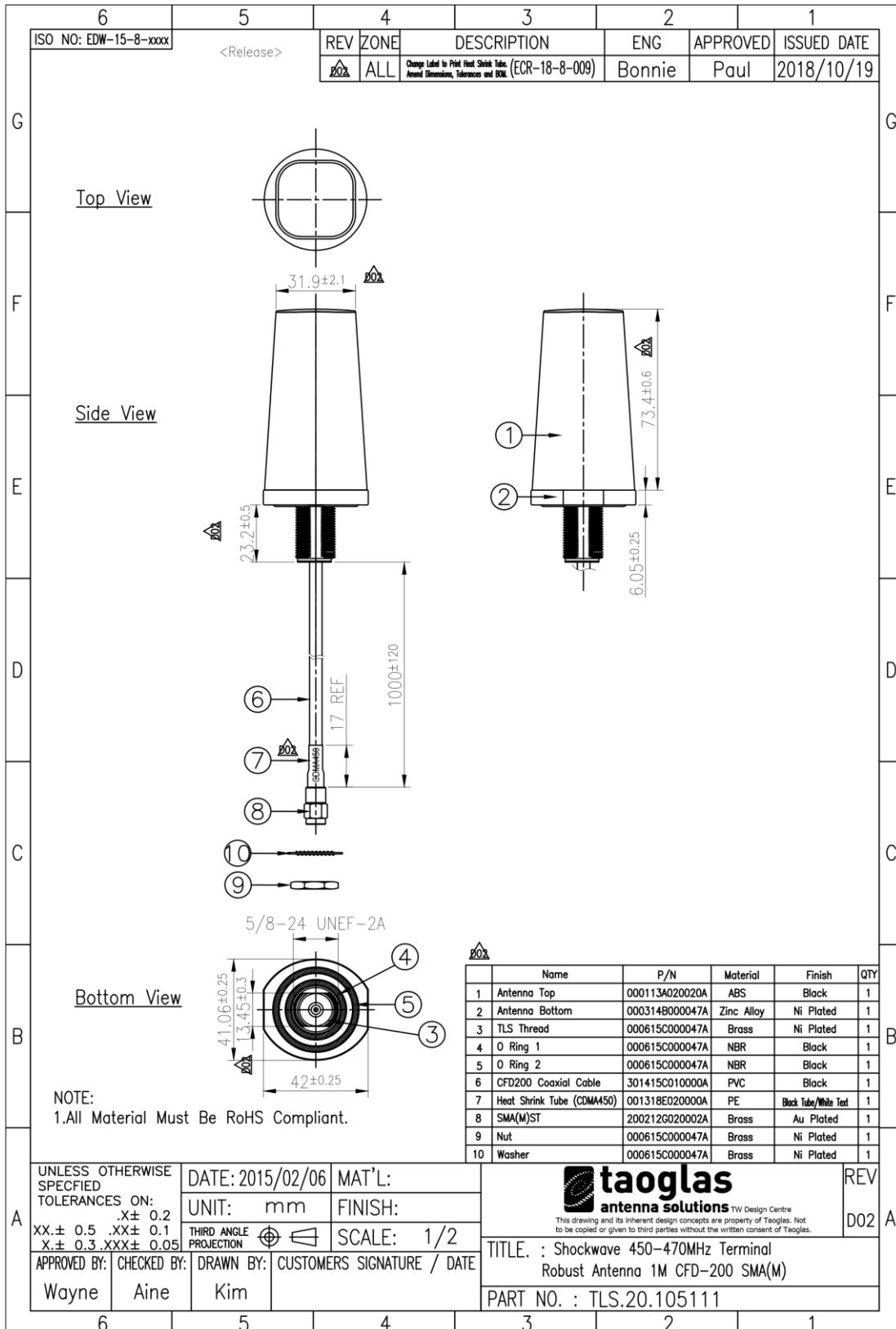
@460MHz



@470MHz

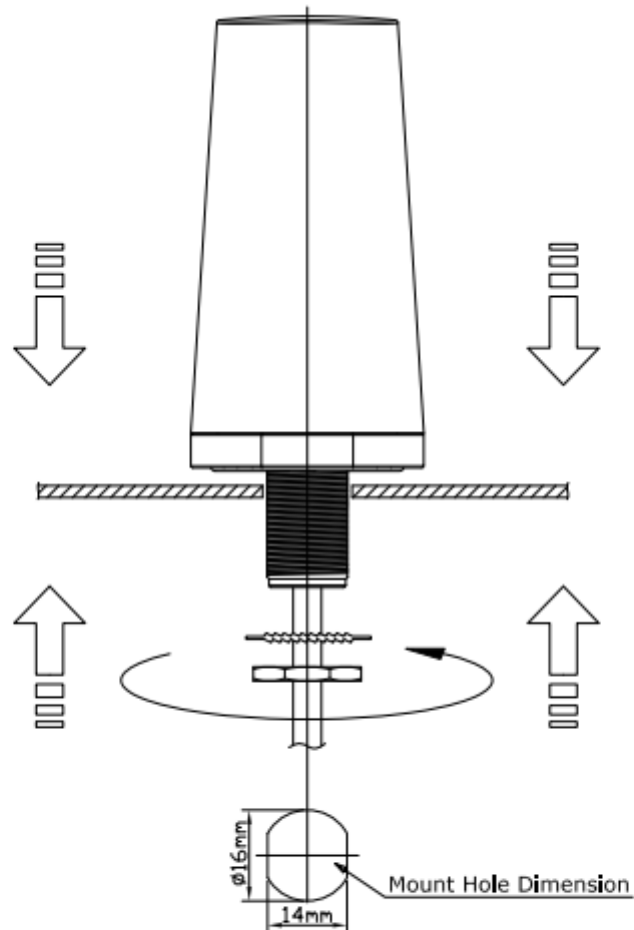


## 5. Mechanical Drawing





## 6. Installation



Recommended torque for mounting is 4.018 N.m or 41 kgf.cm

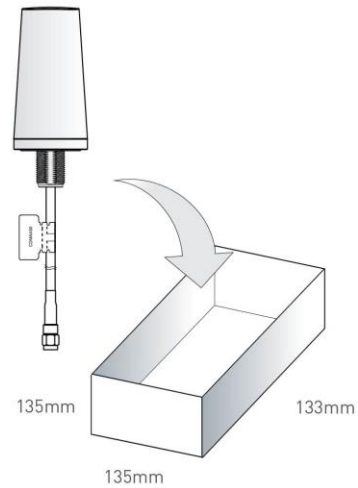
Maximum torque for mounting is 9.8 N.m or 100 kgf.cm

## 7. Packaging

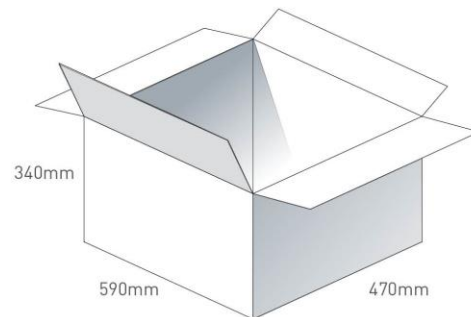
### TLS.20.105111

#### Packaging Specifications

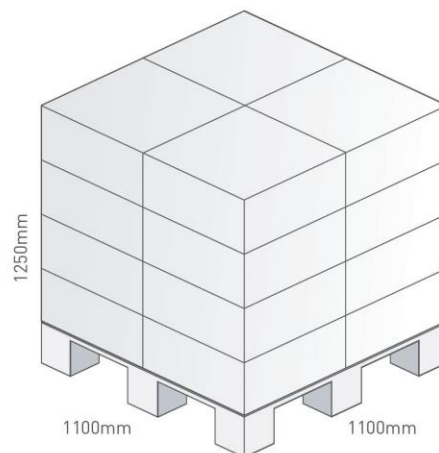
1 No. TLS.20.105111 per small box  
 Box Dimensions - 135 x 135 x 133mm  
 Weight - 280g



1 Outer Carton  
 Carton Dimensions - 590 x 470 x 340mm  
 24 pcs TLS.20.105111 per carton  
 Weight - 8.5Kg



Pallet Dimensions 1100\*1100\*1250mm  
 16 Cartons per Pallet  
 4 Cartons per layer  
 4 Layers



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