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Application Note no.011

Chip Antenna Series

DTV Chip Antenna

ACT1-4010-A1-MF-S

Prepared	Checked	Approved
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Application Note

DTV Antenna – ACT14010A1MFS

Revision History: 2009-08-28 Rev.A0

Previous Version :

Page	Subjects (major changes since last revision)
All	Make up all document

ACT1-4010-A1-MF-S Application Note

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Applications

This antenna is designed for DTV application and it's suitable for cellular phones, PDA, notebook, navigator, and all devices which have DTV function.

Features

- Omni-directional radiation
- High efficiency
- Low profile and compact size(40.0 x 10.0 x 1.0mm)
- Low weight (1.0g)
- Lead free soldering compatible
- RoHS compliant
- Tape and reel packing
- Low cost

Electrical Characteristics

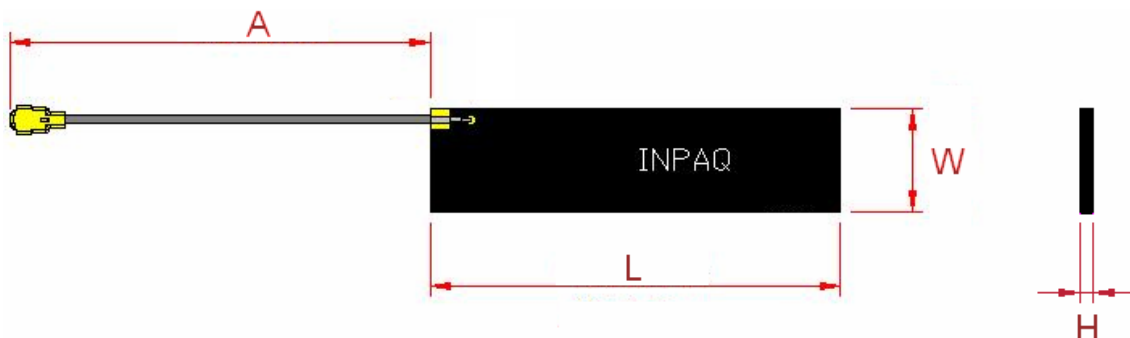
Antenna Module

Frequency Range	470MHz~870MHz
Polarization	Linear
Pattern	Omni-Directional
Ref. Impedance	50 ohm
Overall Gain	10 dB typ
Size	40.0mmX10.0mmX1.0mm

LNA Specification 470MHz ~ 870MHz

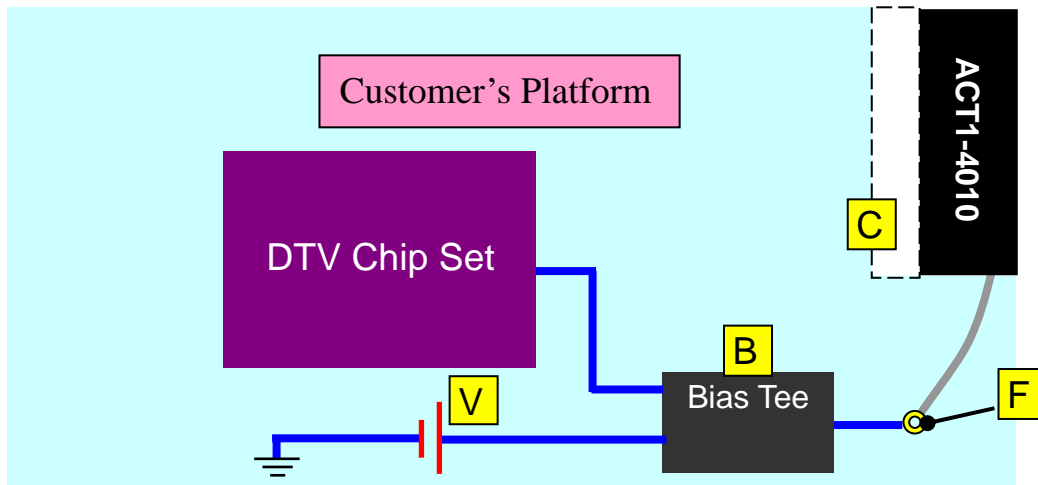
Gain	17±3dB (DC=3.0v)
Noise Figure	2dB typ(DC=3.0v)
Output V.S.W.R	2.0 max(DC=3.0v)
Voltage	3.0 ±0.3V
Current(DC= 3.0±0.01V)	4.5±1.5mA

Antenna Dimension



Mark	L	W	H	A
Dimension (mm)	40.0±0.3	10.0±0.3	1.0±0.2	41.5±3.0

Layout Description



F. Feeding Point

The signal from system connects to antenna feeding point F. Because this DTV chip antenna always put on mechanism to save the space of PCB, the antenna feeding point always connect to system by using HRS connector..

C. Clearance Area

To achieve antenna performance, the clearance area is necessary and all metallization should be removed from all PCB layers. The width and length of clearance area needs to be extended at least 5mm more from antenna edge.

B. Bias Tee Circuit

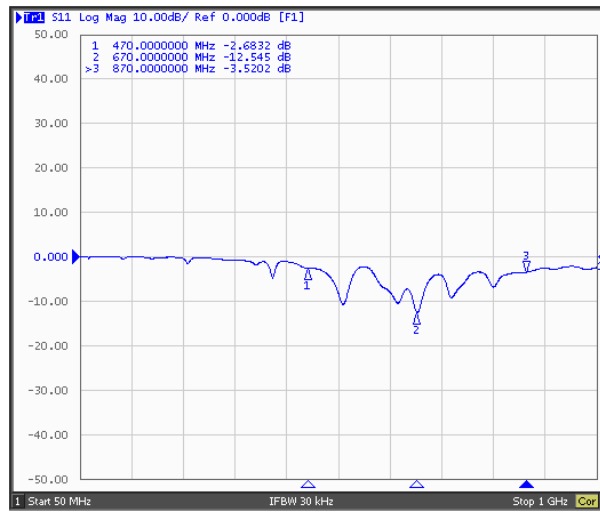
Please keep the space for bias tee circuit to separate signal and DC.

V. DC Supply

The active antenna needs 3V DC

Typical Return Loss S11- Passive

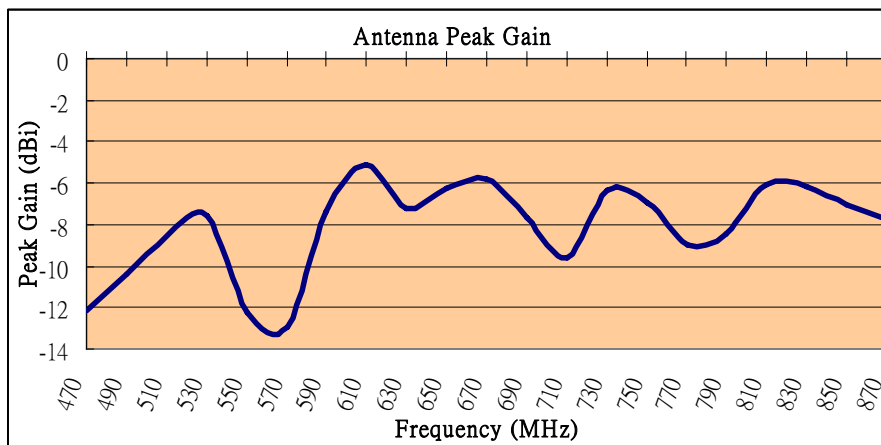
S11



Frequency	S11
470MHz	-2.68dB
670 MHz	-12.55dB
870 MHz	-3.52dB

Free Space Peak Gain- Passive

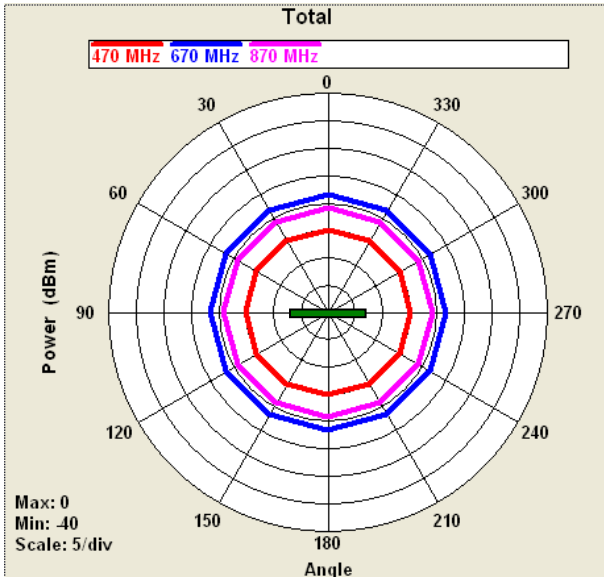
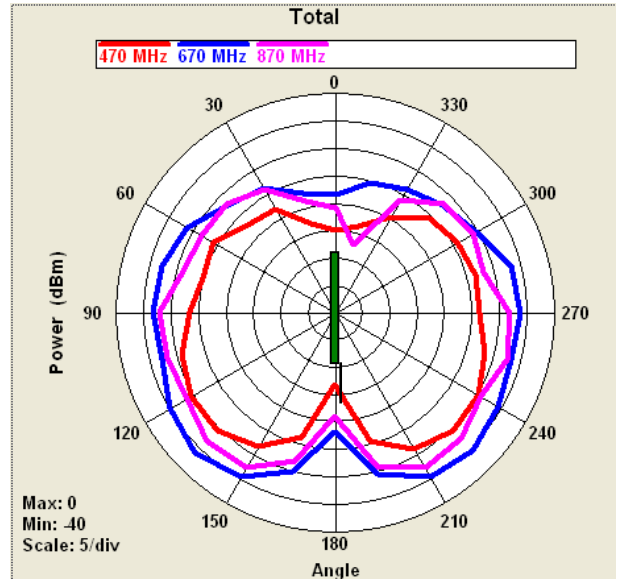
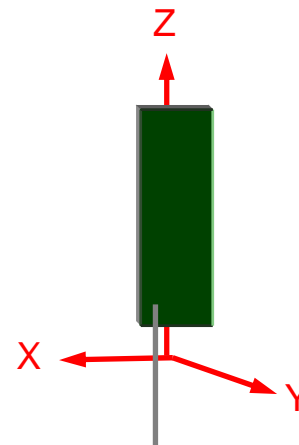
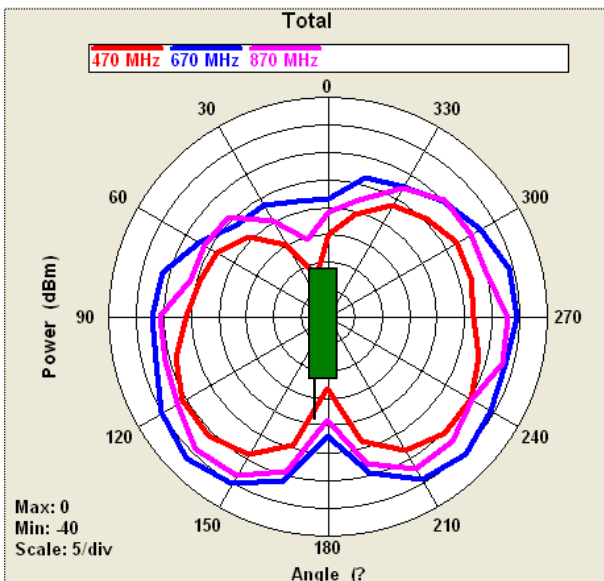
Peak Gain



Frequency	Peak Gain
470MHz	-12.13dBi
670MHz	-5.77dBi
870MHz	-7.74dBi

Typical Free Space Radiation Pattern- Passive

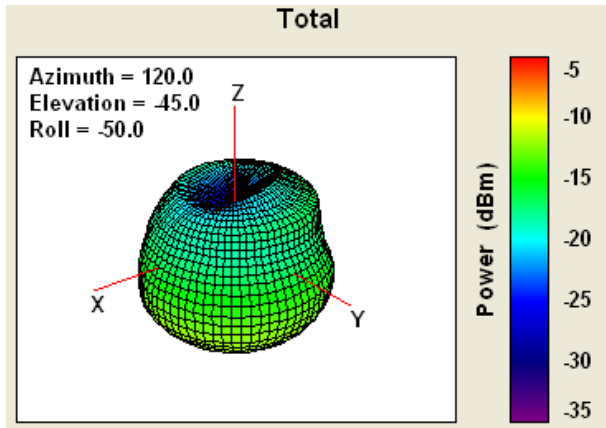
2D Radiation Pattern

X-Y Plane

Y-Z Plane

X-Z Plane


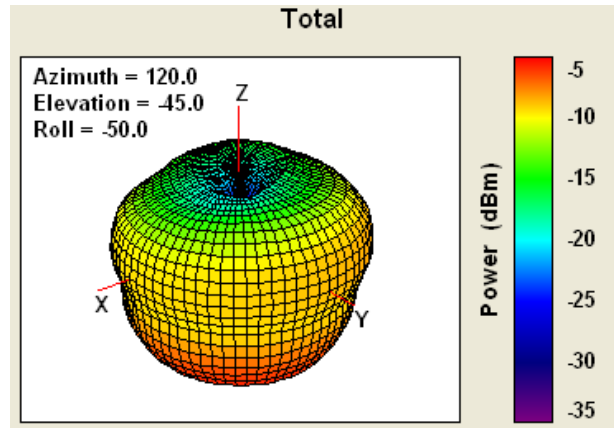
Typical Free Space Radiation Pattern- Passive

3D Radiation Pattern

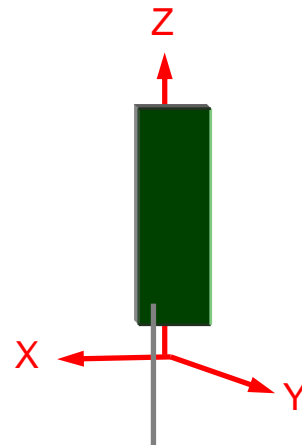
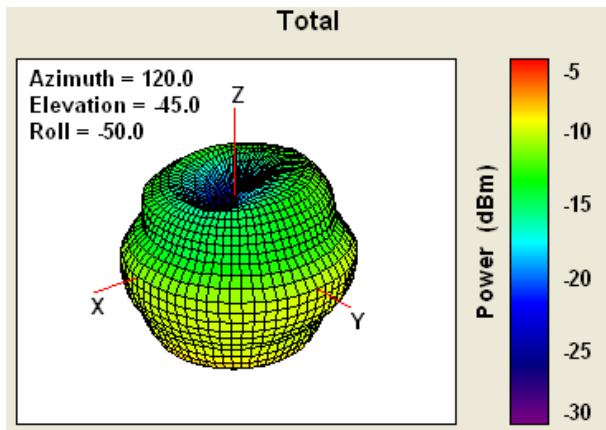
470MHz



670MHz

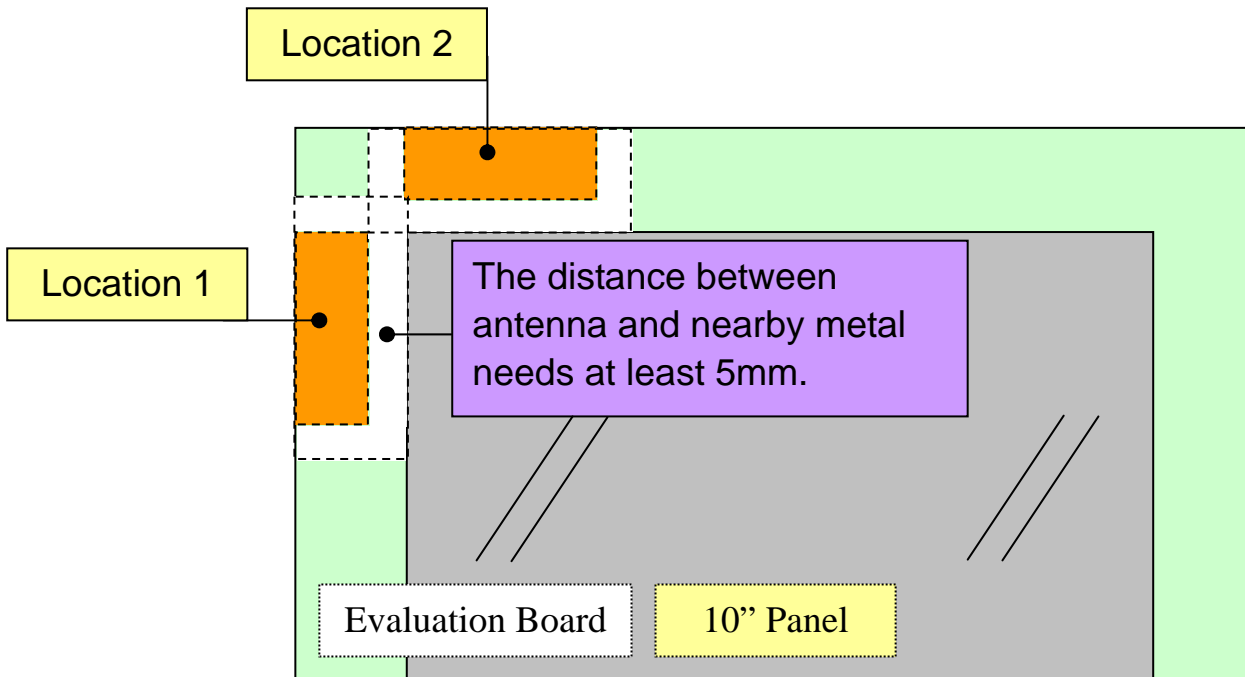


870MHz



The Peak Gain for Different Position and Platform

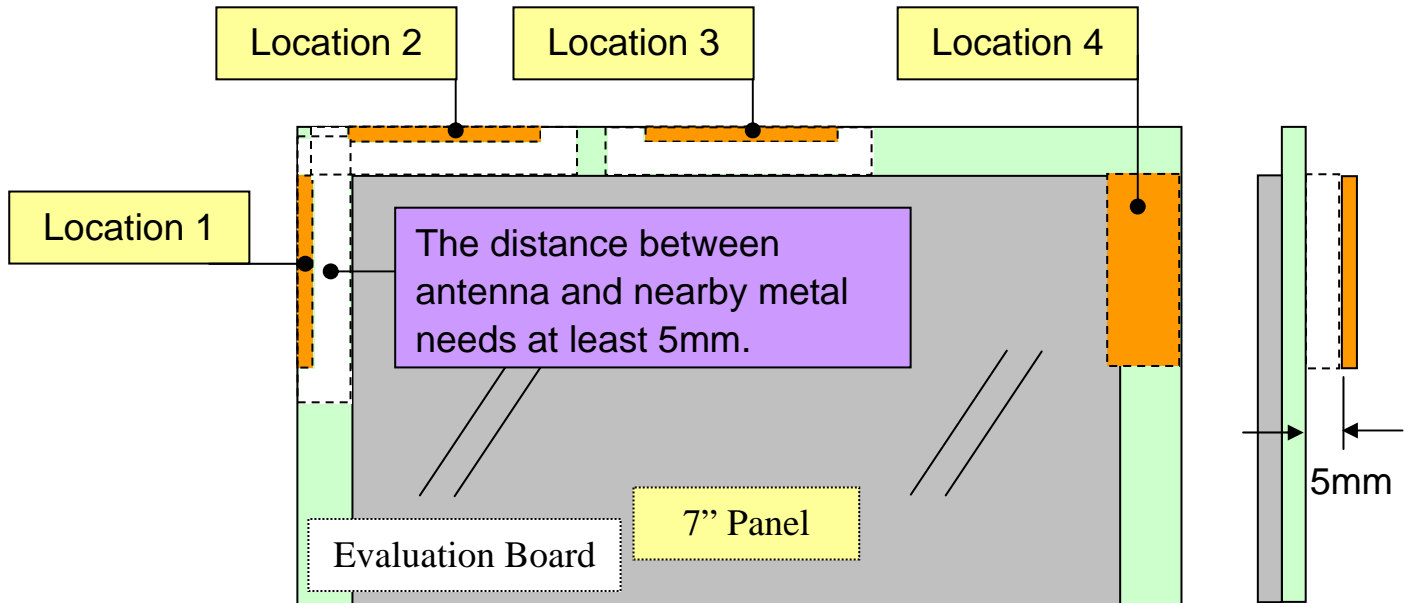
* All electrical characteristic depend on 10" Panel.



Frequency (MHz)	Location 1 Peak Gain (dBi)	Location 2 Peak Gain (dBi)
470	5.40	4.39
520	9.22	9.92
570	12.16	13.11
620	4.46	7.51
670	5.51	9.88
720	8.42	12.75
770	9.73	13.52
820	6.87	10.21
870	10.74	13.50

The Peak Gain for Different Position and Platform

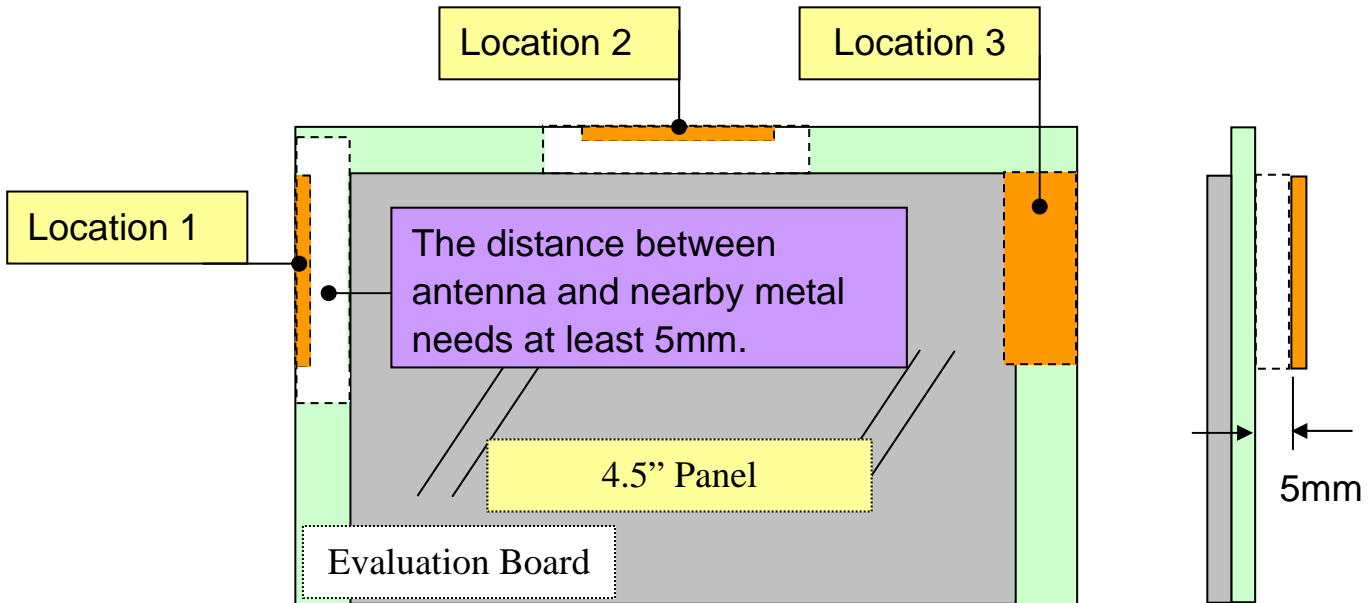
* All electrical characteristic depend on 7" panel.



Frequency (MHz)	Location 1 Peak Gain (dBi)	Location 2 Peak Gain (dBi)	Location 3 Peak Gain (dBi)	Location 4 Peak Gain (dBi)
470	1.87	-0.41	-3.85	0.15
520	8.65	5.54	0.92	6.44
570	12.63	10.59	6.29	12.75
620	9.27	5.41	-1.73	6.84
670	12.29	9.97	2.75	10.40
720	12.38	11.36	7.91	12.82
770	13.66	11.09	8.91	11.35
820	9.10	8.69	6.45	8.36
870	12.16	11.91	11.78	12.31

The Peak Gain for Different Position and Platform

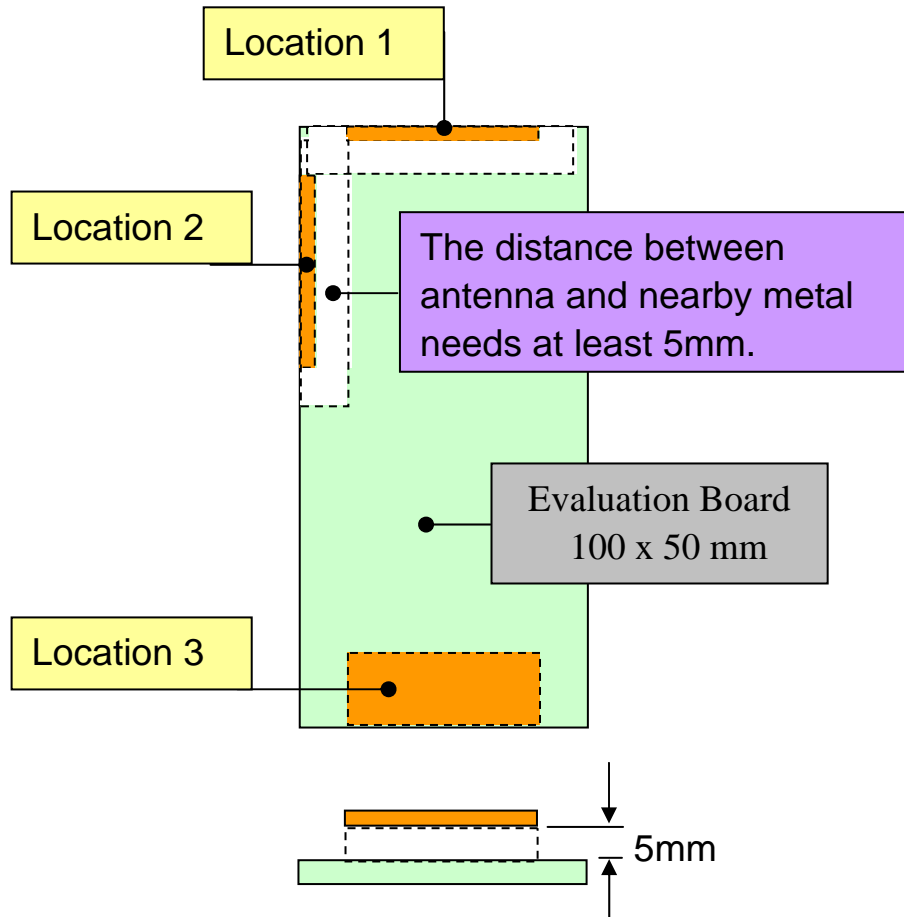
* All electrical characteristic depend on 4.5" panel.



Frequency (MHz)	Location 1 Peak Gain (dBi)	Location 2 Peak Gain (dBi)	Location 3 Peak Gain (dBi)
470	-1.69	-3.16	-3.13
520	4.54	2.35	1.53
570	8.61	7.02	7.29
620	5.37	2.44	1.85
670	8.91	5.77	5.32
720	10.32	8.75	9.53
770	11.37	10.74	8.65
820	7.86	7.14	7.04
870	11.80	11.72	12.36

The Peak Gain for Different Position and Platform

* All electrical characteristic depend on 100 x 50mm evaluation board.



Frequency (MHz)	Location 1 Peak Gain (dBi)	Location 2 Peak Gain (dBi)	Location 3 Peak Gain (dBi)
470	-3.37	-3.57	-4.34
520	1.86	1.65	0.96
570	5.79	7.44	7.17
620	1.77	1.57	0.78
670	5.43	5.56	6.09
720	9.04	8.86	10.14
770	9.74	8.87	11.20
820	4.96	6.03	7.87
870	10.83	11.06	9.85

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