

Ke Mei Ou Laboratory Co., Ltd.

E506, 5th Floor, No.39 Keji Middle 2nd Rd, Science & Technology
Park, Nanshan District, Shenzhen, P. R. China
Tel: + 86 755 83642690 Fax: + 86 755 83297077
www.kmolab.com

FCC TEST REPORT


Under :
FCC Part 15, Class B

Prepared For :

Grandstream Networks, Inc

5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China

FCC ID: YZZGXV3672
EUT: IP Camera
Model: GXV3672_HD,GXV3672_FHD_36, GXV3672_HD_36, GXV3672_FHD

May 4, 2014
Issue Date:
Extension Report
Report Type:
<i>Eric Guo</i>
Test Engineer: Eric Guo

Review By: Apollo Liu / Manager

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1. General Information

1.1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

1.2 Testing Laboratory

Ke Mei Ou Laboratory Co., Ltd.

ANSI-ASQ National Accreditation Board/ACLASS ISO/IEC 17025 Accredited Lab for telecommunication standards. The Registration Number is AT-1532. The testing quality system meets with ISO/IEC-17025 requirements, This approval results is accepted by MRA of ILAC.

FCC Test Site Registration Number: 962205

IC Test Site Registration Number: 4986A-2

Internet: www.kmolab.com

1.3 Details of Applicant

Name : Grandstream Networks, Inc

Address : 5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China

1.4 Application Details

Date of Receipt of Application : March 17, 2014

Date of Receipt of Test Item : March 17, 2014

Date of Test : March 17 ~May 9, 2014

1.5 Test Item

Manufacturer : Grandstream Networks, Inc

Address : 5F, Bldg #1, No.2 Kefa Rd., Science & Technology Park, Shenzhen, China

Trade Name : Grandstream

Model No.(Base) : GXV3672_FHD

Model No.(Extension) : GXV3672_HD,GXV3672_FHD_36,GXV3672_HD_36

Description : IP Camera

Note: The one sample for testing only.

Additional Information

Frequency : N/A

Number of Channels : N/A

Power Supply : DC 12.0V/1.0A(Adapter model: SEF1200100A1BB)

DC 12.0V/1.0A(Adapter model: WEF1200100A1BA)

POE 48Vpower (Output DC12V)

Operation Distance : N/A

Resolution : N/A

Remark: The Applicant's statement is as follows:

IP CAMERA, the series products have four models GXV3672_FHD_36, GXV3672_HD_36,GXV3672_FHD and GXV3672_HD. The differences between them are as follows:

1. GXV3672_HD_36&GXV3672_HD is HD digital which use the DSP of DM365-300 and the Sensor of AR0130.

GXV3672_FHD_36& GXV3672_FHD is Full HD digital which use the DSP of DM368-432 and the Sensor of AR0331.

2. GXV3672_HD_36&GXV3672_FHD_36 are 3.6mm fixed lens

GXV3672_HDandGXV3672_FHD are 8.0mm fixed lens

1.6 Test Standards

FCC 15 Subpart B

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

2. Technical Test

2.1 Summary of Test Results

The EUT has been tested according to the following specifications:

FCC 15 Subpart B: 2007, Class B

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107	Conducted Test	PASS	Complies
FCC Part 15, Paragraph 15.109	Radiated Test	PASS	Complies

3. EUT Modifications

No modification by test lab.

4. Conducted Power Line Test

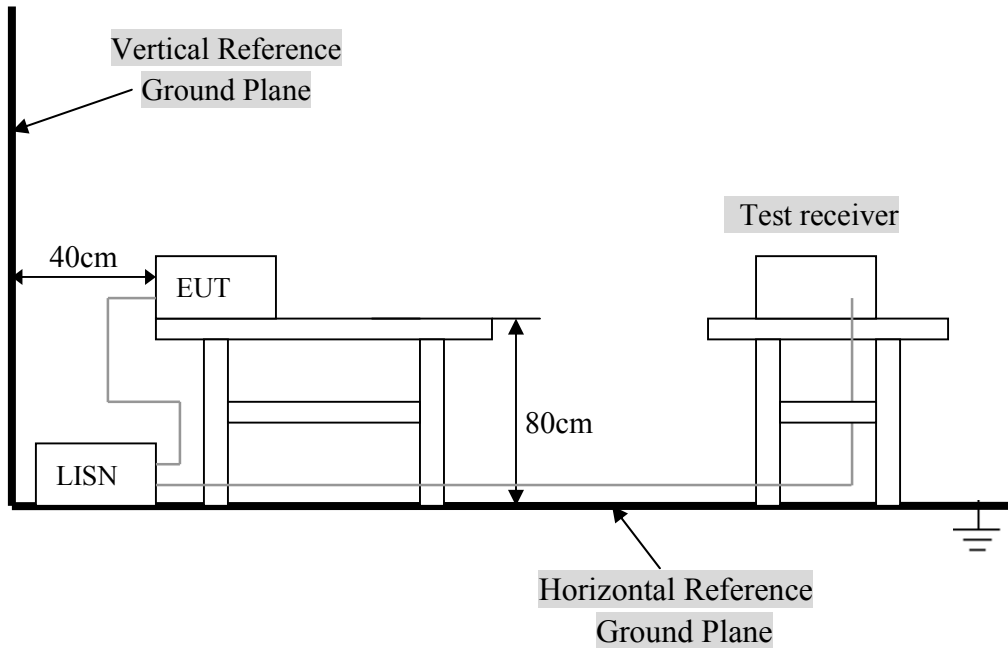
4.1 Test Equipment

Please refer to Section 8 this report.

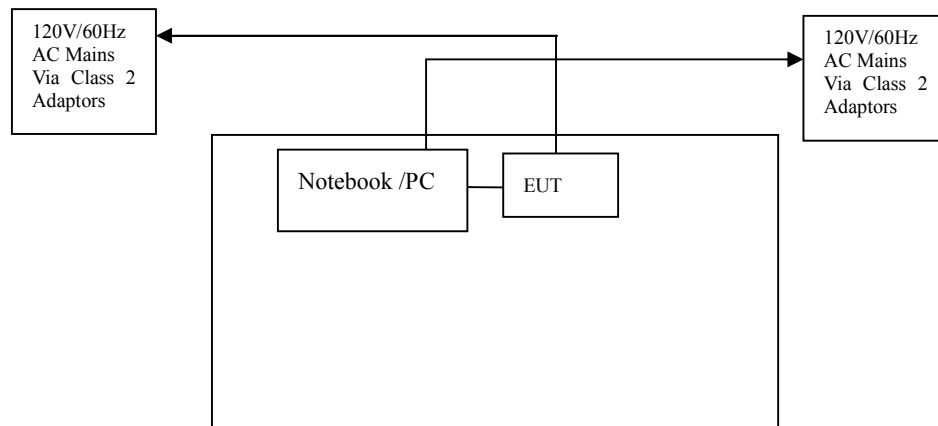
4.2 Test Procedure

The EUT was tested according to ANSI C63.4 - 2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 u-Henry as specified by section 5.1 OF ANSI C63.4 - 2003. cables and peripherals were moved to find the maximum emission levels for each frequency.

4.3 Test Setup



For the actual test configuration, Please refer to the related items – Photos of Testing.



4.4 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model #	FCC ID
IP Camera	Grandstream Networks, Inc	GXV3672_FHD	YZZGXV3672

B. Internal Devices

Device	Manufacturer	Model #	FCCID / DoC
N/A			

C. Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ DoC	Cable
Printer	HP	HP930C	DoC	1.5m unshielded power cord 1.2m unshielded data cable.
Modem	GVC	N/A	DoC	1.5m unshielded power cord 1.2m unshielded data cable.
Notebook	DELL	PP10L	DoC	1.5m unshielded power cord
PC	Dell	2400n	DoC	1.5m unshielded power cord

4.5 EUT Operating Condition

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

4.6 Conducted Power Line Emission Limits

Frequency Range (MHz)	Class A QP/AV (dBuV)	Class B QP/AV (dBuV)
0.15 – 0.5	79/66	66 –56/56 –46
0.5 – 5.0	73/60	56/46
5.0 – 30	73/60	60/50

Note: In the above table, the tighter limit applies at the band edges.

4.7 Conducted Power Line Test Result

Product	: IP Camera	Test Mode	: Normal Link / Auto
Test Item	: Conducted Emission Data	Temperature	: 25 °C
Test Voltage	: DC 12V	Humidity	: 56%RH
Test Result	: PASS	Adapter Model	:

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All readings are quasi -peak values with a resolution bandwidth of 9 KHz.

- Temperature : 26 °C
- Humidity : 53 % RH

GXV3672_HD

Adapter model: SEF1200100A1BB

FCC Part 15 Paragraph 15.107							
Frequency (MHz)	Emission (dBuV)		LINE/NEUTRAL	Limit (dBuV)		Margin (dB)	
	QP	AV		QP	AV	QP	AV
0.162	44.81	31.12	Line	65.36	55.36	-20.55	-24.24
0.182	42.01	28.67	Neutral	64.39	54.39	-22.38	-25.72
0.226	39.44	29.13	Line	62.60	52.60	-23.16	-23.47
0.210	39.98	28.62	Neutral	63.21	53.21	-23.23	-24.59
1.334	37.78	26.91	Line	56.00	46.00	-18.22	-19.09
1.334	39.47	28.81	Neutral	56.00	46.00	-16.53	-17.19

Note: NF = No Significant Peak was Found.

GXV3672_FHD

Adapter model: SEF1200100A1BB

FCC Part 15 Paragraph 15.107							
Frequency (MHz)	Emission (dBuV)		LINE/NEUTRAL	Limit (dBuV)		Margin (dB)	
	QP	AV		QP	AV	QP	AV
0.166	46.85	33.11	Line	65.16	55.16	-18.31	-22.05
0.162	47.79	34.42	Neutral	65.36	55.36	-17.57	-20.94
1.326	39.12	27.48	Line	56.00	46.00	-16.88	-18.52
1.318	39.57	28.51	Neutral	56.00	46.00	-16.43	-17.49
5.842	40.08	32.79	Line	60.00	50.00	-19.92	-17.21
5.358	41.38	33.52	Neutral	60.00	50.00	-18.62	-16.48

Note: NF = No Significant Peak was Found.

GXV3672_HD_36

Adapter model: SEF1200100A1BB

FCC Part 15 Paragraph 15.107							
Frequency (MHz)	Emission (dBuV)		LINE/NEUTRAL	Limit (dBuV)		Margin (dB)	
	QP	AV		QP	AV	QP	AV
0.166	46.01	32.12	Line	65.16	55.16	-19.15	-23.04
0.162	47.09	33.58	Neutral	65.36	55.36	-18.27	-21.78
0.194	43.42	29.87	Line	63.86	53.86	-20.44	-23.99
1.334	39.71	28.69	Neutral	56.00	46.00	-16.29	-17.31
5.770	40.58	33.32	Line	60.00	50.00	-19.42	-16.68
5.558	41.12	33.62	Neutral	60.00	50.00	-18.88	-16.38

Note: NF = No Significant Peak was Found.

GXV3672_FHD_36

Adapter model: SEF1200100A1BB

FCC Part 15 Paragraph 15.107							
Frequency (MHz)	Emission (dBuV)		LINE/NEUTRAL	Limit (dBuV)		Margin (dB)	
	QP	AV		QP	AV	QP	AV
0.162	47.25	32.48	Line	65.36	55.36	-18.11	-22.88
0.162	46.92	32.43	Neutral	65.36	55.36	-18.44	-22.93
0.182	44.91	29.73	Line	64.39	54.39	-19.48	-24.66
0.174	45.72	31.41	Neutral	64.77	54.77	-19.05	-23.36
0.190	46.11	31.52	Line	64.04	54.04	-17.93	-22.52
0.182	44.65	29.73	Neutral	64.39	54.39	-19.74	-24.66

Note: NF = No Significant Peak was Found.

Note:

- 1.Uncertainty in conducted emission measured is ± 2 dB.
- 2.The emission levels of other frequencies were very low against the limit.
- 3.All Reading Levels are Quasi-Peak and Average value.
- 4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
- 5.Margin Value = Emission Level - Limit Value.

Conducted Emission

FCC15.107

EUT: IP Camera

M/N: Grandstream

Manufacturer: Grandstream Networks, Inc

Operating Condition: Transmitter

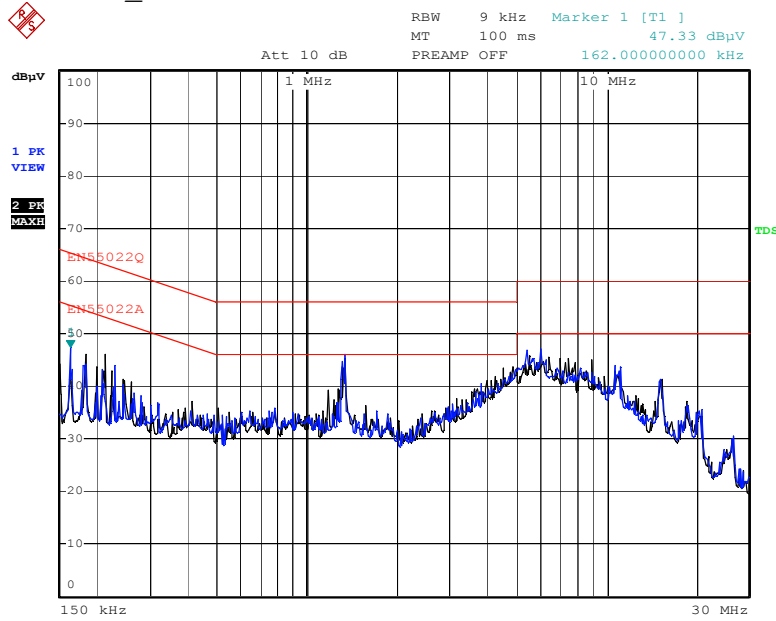
Test Site: Normal

Operator: Eric

Test Specification: LINE&NEUTRAL

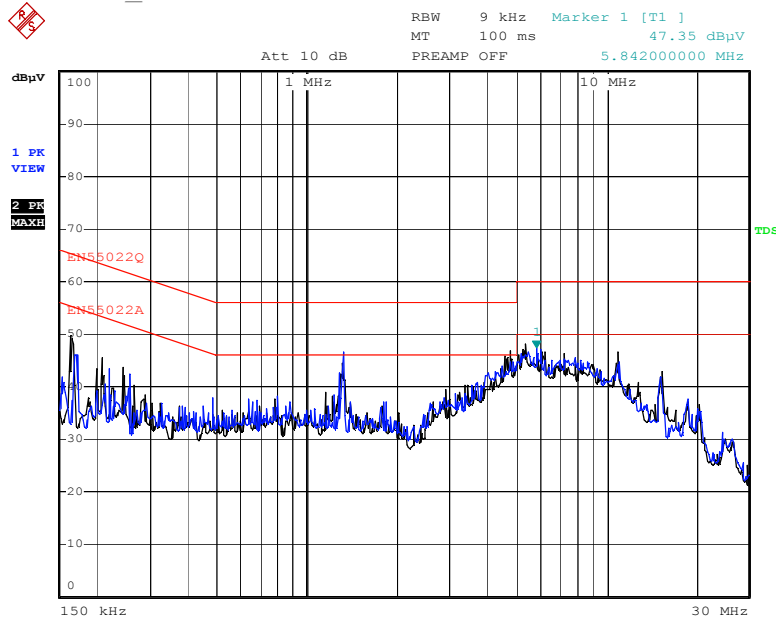
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GXV3672_HD



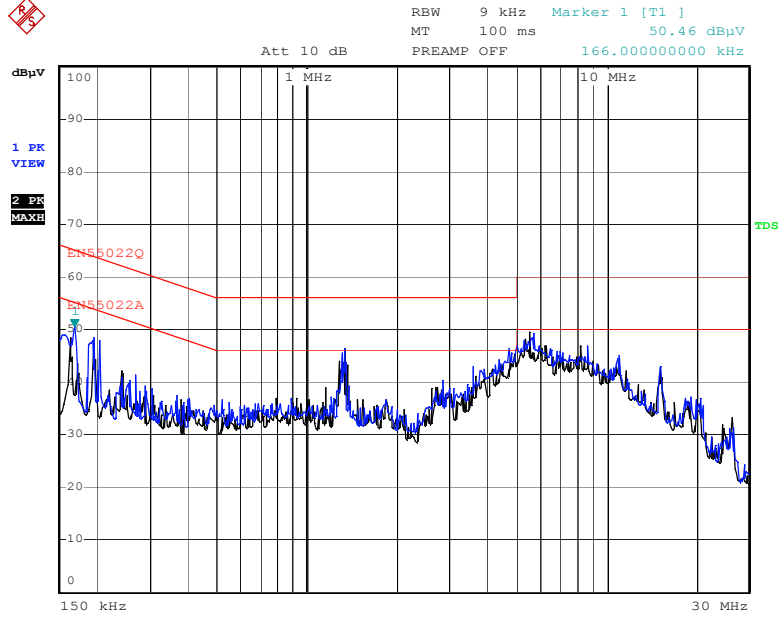
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GXV3672_FHD



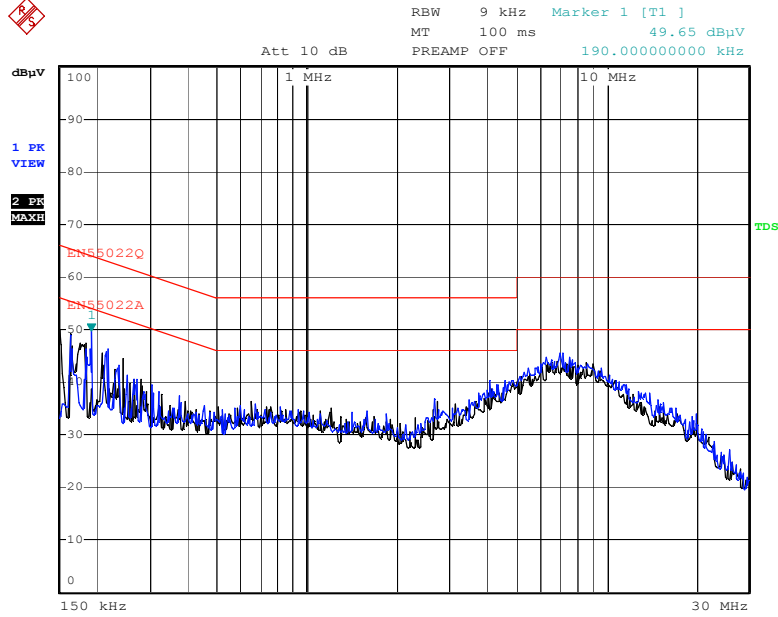
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GXV3672_HD_36



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GXV3672_FHD_36



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5. Radiated Emission Test

5.1 Test Equipment

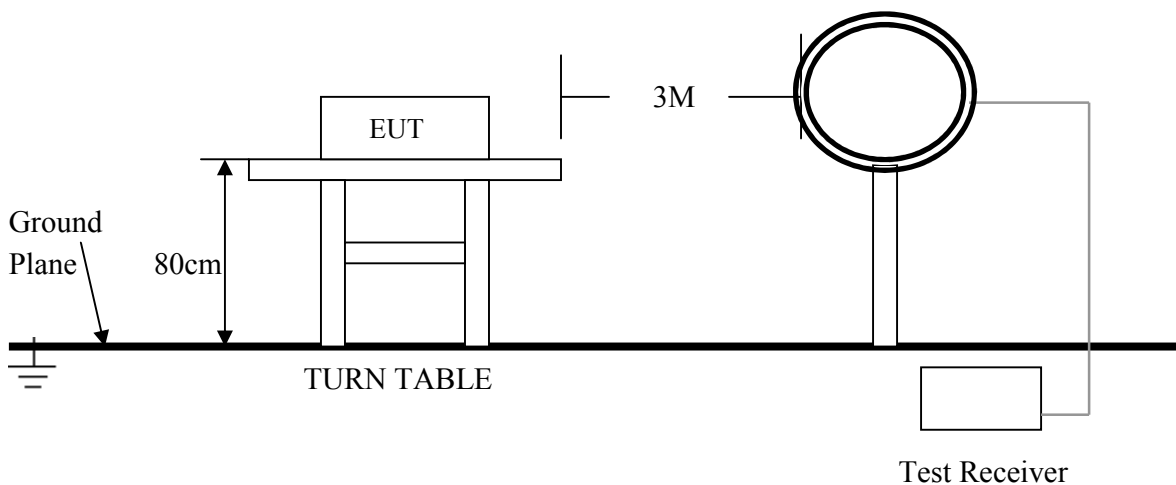
Please refer to Section 8 this report.

5.2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2003.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
3. The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
5. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
6. The antenna polarization : Vertical polarization and Horizontal polarization.

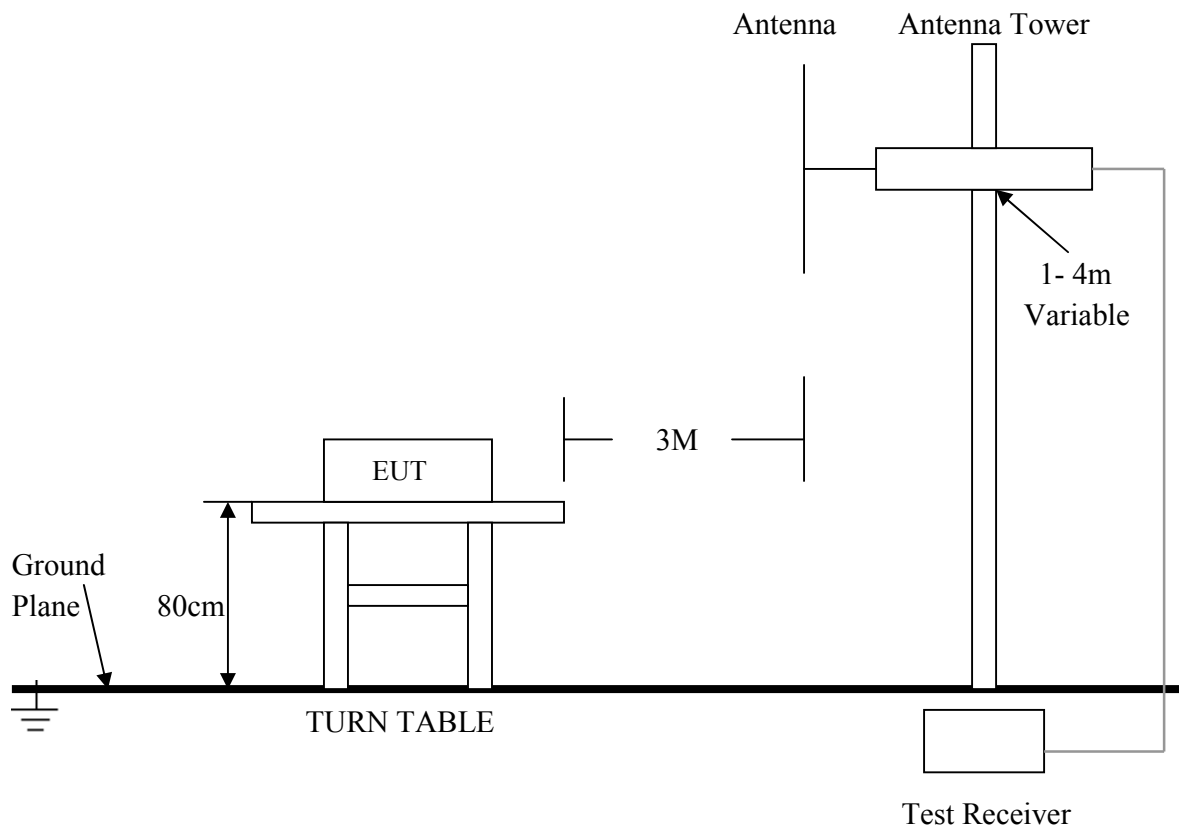
5.3 Radiated Test Setup

For Frequencies below 30 MHz



For the actual test configuration , please refer to the related items – Photos of Testing

For Frequencies above 30 MHz



For the actual test configuration , please refer to the related items – Photos of Testing.

5. 4 Configuration of The EUT

Same as section 4.4 of this report

5. 5 EUT Operating Condition

Same as section 4.5 of this report

5. 6 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.109.

Frequency (MHz)	Distance (m)	Field Strength (dBuV/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
Above 960	3	54.0

Note:

1. In the emission tables above, the tighter limit applies at the band edges.
2. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.
3. The lower limit shall apply at the transition frequencies.

5.7 Radiated Emission Test Result

The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz, peak values with a resolution bandwidth of 1 MHz. Measurements were made at 3 meters.

- Temperature : 29 °C
- Humidity : 56 %RH
- Result : **Passed**

GXV3672_HD

Frequency from 30 MHz to 1 GHz

Adapter model: SEF1200100A1BB

FCC Part 15 Paragraph 15.109				
Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
149.600	36.18	HORIZ	43.5	-7.32
39.400	33.89	VERT	40.0	-6.11
250.000	37.98	HORIZ	46.0	-8.02
77.200	36.95	VERT	40.0	-3.05
300.000	30.91	HORIZ	46.0	-15.09
425.600	26.79	VERT	46.0	-19.21

Note: NF = No Significant Peak was Found.

POE

FCC Part 15 Paragraph 15.109				
Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
275.000	33.27	HORIZ	46.0	-12.73
106.680	27.91	VERT	43.5	-15.59
339.520	35.56	HORIZ	46.0	-10.44
287.480	33.69	VERT	46.0	-12.31
375.000	35.24	HORIZ	46.0	-10.76
340.040	30.91	VERT	46.0	-15.09

Note: NF = No Significant Peak was Found.

Frequency above 1 GHz

Freq. (MHz)	Emission (dBuV/m)		HORIZ / VERT	Limits (dBuV/m)		Margin (dB)	
	PK	AV				PK	AV
2190.000	53.8	38.9	HORZ	74	54	-20.20	-15.10
2439.600	55.5	41.1	VERT	74	54	-18.50	-12.90
2437.200	52.3	38.7	HORZ	74	54	-21.70	-15.30
2542.800	52	38.4	VERT	74	54	-22.00	-15.60
2974.000	58.0	43.8	HORZ	74	54	-16.00	-10.20
2780.000	54.6	40.6	VERT	74	54	-19.40	-13.40

Note: NF = No Significant Peak was Found.

GXV3672_FHD

Frequency from 30 MHz to 1 GHz

Adapter model: SEF1200100A1BB

FCC Part 15 Paragraph 15.109				
Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
141.200	33.58	HORIZ	43.5	-9.92
38.040	35.18	VERT	40.0	-4.82
149.600	35.68	HORIZ	43.5	-7.82
77.200	37.45	VERT	40.0	-2.55
250.000	37.26	HORIZ	46.0	-8.74
250.000	33.65	VERT	46.0	-12.35

Note: NF = No Significant Peak was Found.

POE

FCC Part 15 Paragraph 15.109				
Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
149.600	29.22	HORIZ	43.5	-14.28
125.000	28.89	VERT	43.5	-14.61
340.120	32.11	HORIZ	46.0	-13.89
275.000	33.84	VERT	46.0	-12.16
375.000	34.98	HORIZ	46.0	-11.02
287.520	34.34	VERT	46.0	-11.66

Note: NF = No Significant Peak was Found.

Frequency above 1 GHz

Freq. (MHz)	Emission (dBuV/m)		HORIZ / VERT	Limits (dBuV/m)		Margin (dB)	
	PK	AV				PK	AV
2439.600	55.6	40.8	HORZ	74	54	-18.40	-13.20
2012.400	51.8	36.2	VERT	74	54	-22.20	-17.80
2806.800	54.8	41.1	HORZ	74	54	-19.20	-12.90
2435.200	55.3	42.1	VERT	74	54	-18.70	-11.90
2962.000	57.5	43.7	HORZ	74	54	-16.50	-10.30
2812.000	54.8	41.2	VERT	74	54	-19.20	-12.80

Note: NF = No Significant Peak was Found.

GXV3672_HD_36

Frequency from 30 MHz to 1 GHz

Adapter model: SEF1200100A1BB

FCC Part 15 Paragraph 15.109				
Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
375.000	43.35	HORIZ	46.0	-2.65
81.200	35.42	VERT	40.0	-4.58
470.960	38.78	HORIZ	46.0	-7.22
148.520	32.01	VERT	43.5	-11.49
540.000	43.36	HORIZ	46.0	-2.64
476.960	36.57	VERT	46.0	-9.43

Note: NF = No Significant Peak was Found.

POE

FCC Part 15 Paragraph 15.109				
Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
250.000	37.01	HORIZ	46.0	-8.99
59.760	30.01	VERT	40.0	-9.99
404.960	40.78	HORIZ	46.0	-5.22
345.720	35.47	VERT	46.0	-10.53
470.960	41.22	HORIZ	46.0	-4.78
466.440	36.32	VERT	46.0	-9.68

Note: NF = No Significant Peak was Found.

Frequency above 1 GHz

Freq. (MHz)	Emission (dBuV/m)		HORIZ / VERT	Limits (dBuV/m)		Margin (dB)	
	PK	AV				PK	AV
2145.400	52.18	38.87	HORZ	74	54	-21.82	-15.13
2442.120	55.32	41.02	VERT	74	54	-18.68	-12.98
2445.600	52.32	38.63	HORZ	74	54	-21.68	-15.37
2556.900	52.78	38.22	VERT	74	54	-21.22	-15.78
2961.200	57.51	43.59	HORZ	74	54	-16.49	-10.41
2784.400	54.78	40.41	VERT	74	54	-19.22	-13.59

Note: NF = No Significant Peak was Found.

GXV3672_FHD_36

Frequency from 30 MHz to 1 GHz

Adapter model: SEF1200100A1BB

FCC Part 15 Paragraph 15.109				
Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
275.040	34.28	HORIZ	46.0	-11.72
35.680	31.48	VERT	40.0	-8.52
335.960	37.51	HORIZ	46.0	-8.49
79.760	35.11	VERT	40.0	-4.89
342.080	28.78	HORIZ	46.0	-17.22
148.480	35.78	VERT	43.5	-7.72

Note: NF = No Significant Peak was Found.

POE

FCC Part 15 Paragraph 15.109				
Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
250.000	33.44	HORIZ	46.0	-12.56
60.240	38.31	VERT	40.0	-1.69
270.000	42.01	HORIZ	46.0	-3.99
275.000	35.38	VERT	46.0	-10.62
275.000	36.46	HORIZ	46.0	-9.54
338.960	34.62	VERT	46.0	-11.38

Note: NF = No Significant Peak was Found.

Frequency above 1 GHz

Freq. (MHz)	Emission (dBuV/m)		HORIZ / VERT	Limits (dBuV/m)		Margin(dB)	
	PK	AV				PK	AV
2024.400	50.48	31.61	HORZ	74	54	-23.52	-22.39
2024.400	50.41	31.62	VERT	74	54	-23.59	-22.38
2543.200	46.29	32.58	HORZ	74	54	-27.71	-21.42
2105.200	45.09	31.22	VERT	74	54	-28.91	-22.78
2982.800	48.78	35.28	HORZ	74	54	-25.22	-18.72
2159.200	45.44	31.78	VERT	74	54	-28.56	-22.22

Note: NF = No Significant Peak was Found.

Note:

1. Uncertainty in radiated emission measured is $\pm 4\text{dB}$
2. Any departure from specification : N/A
3. Emission = Reading Level + Probe Factor + Cable Loss.
4. Margin value = Emission level - Limit value.

6. Photo of Testing

6.1 Emission test view

Conducted emission test view



Radiated emission test view





6.2 Photograph - EUT

GXV3672_HD

EUT top view



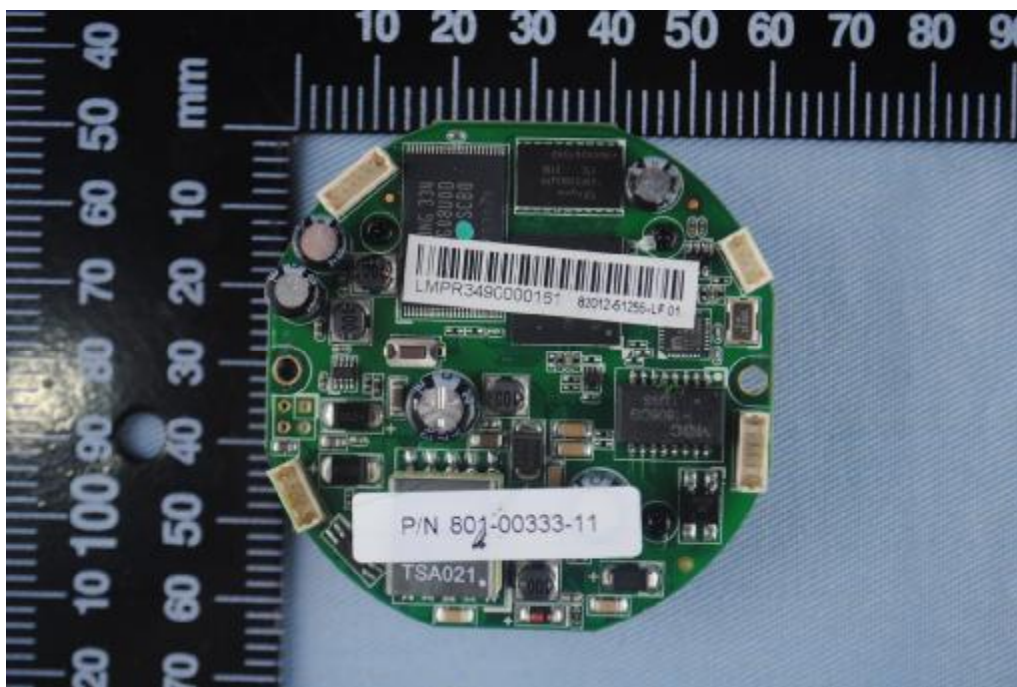
EUT bottom view

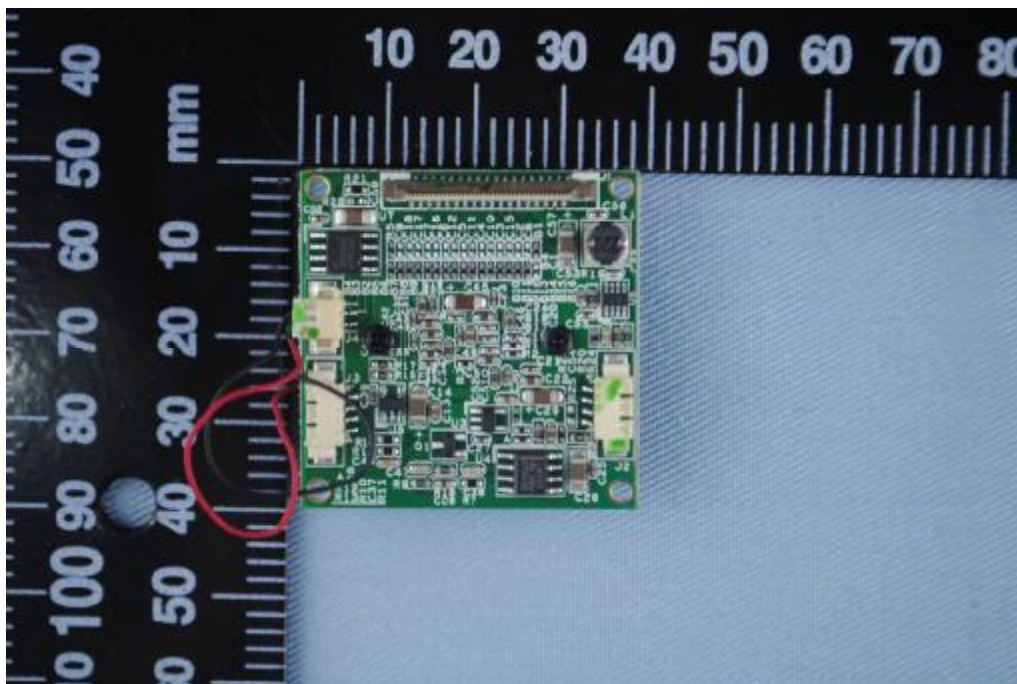


EUT inside whole view

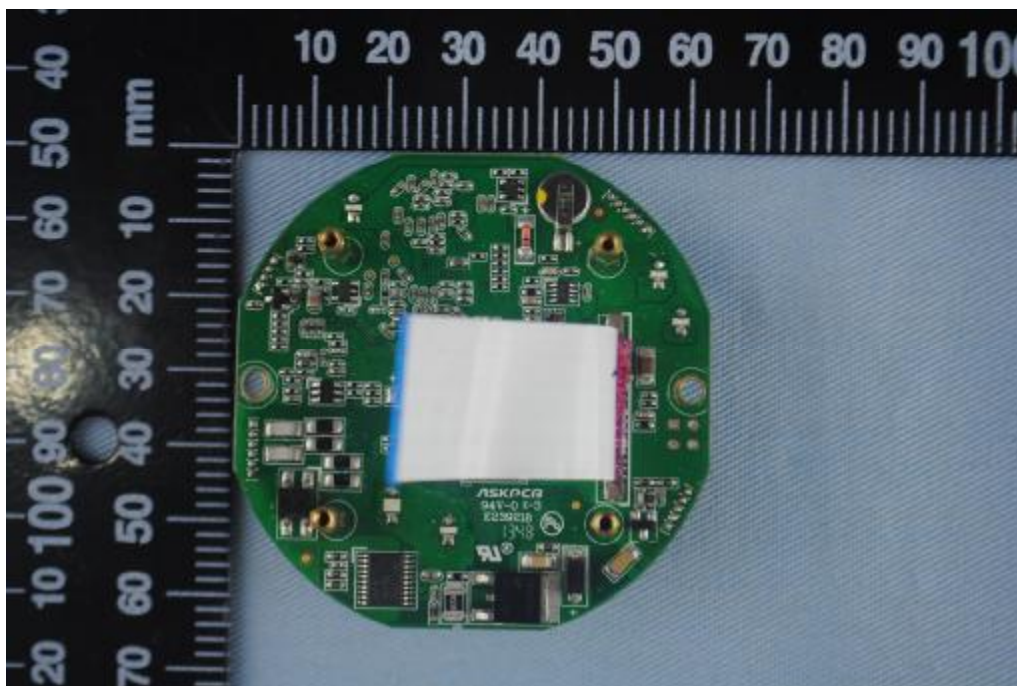


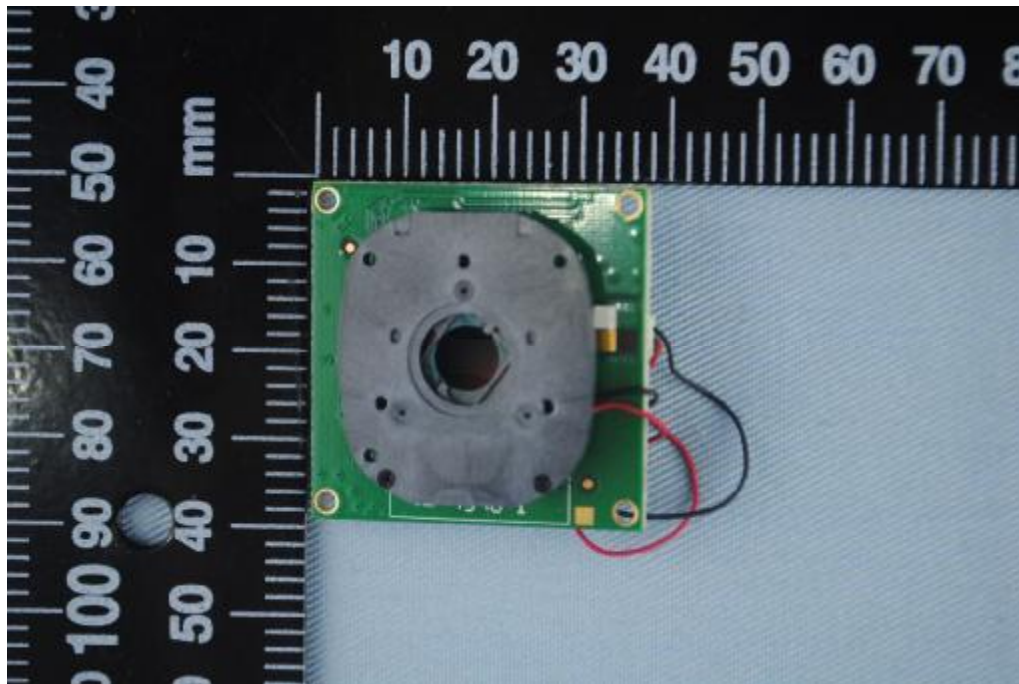
Main & RF board component side





Main & RF board solder side





GXV3672_FHD

EUT top view



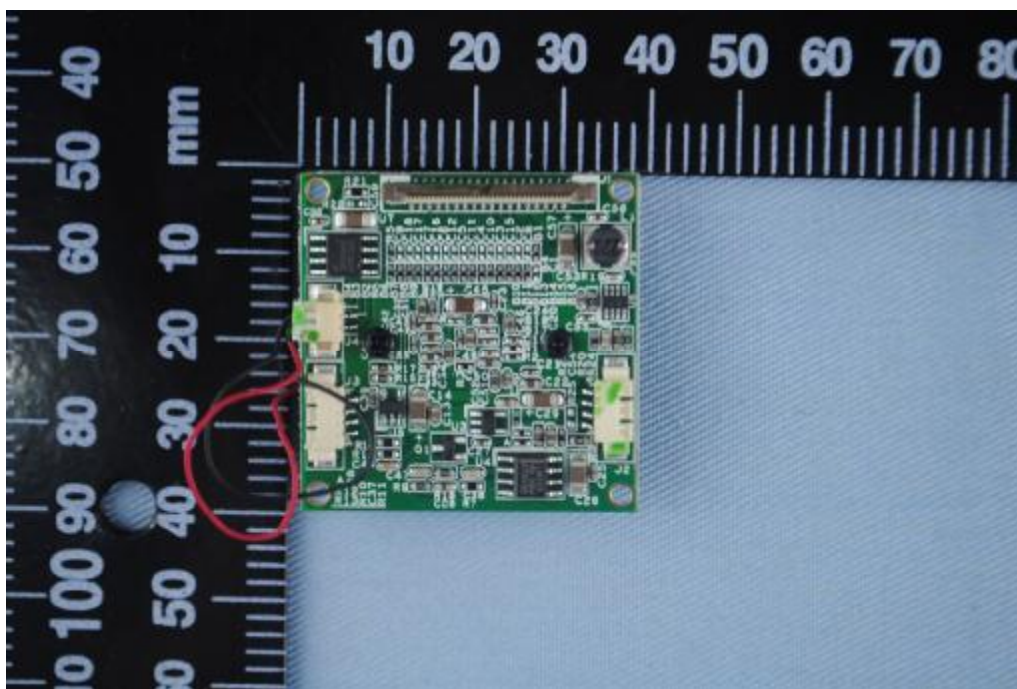
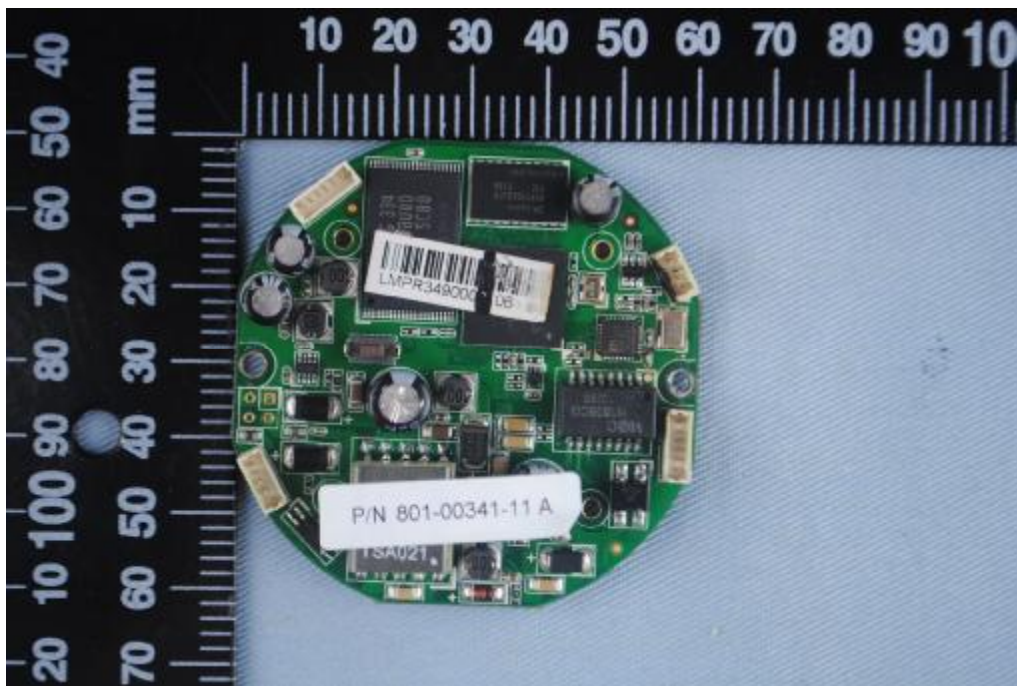
EUT bottom view



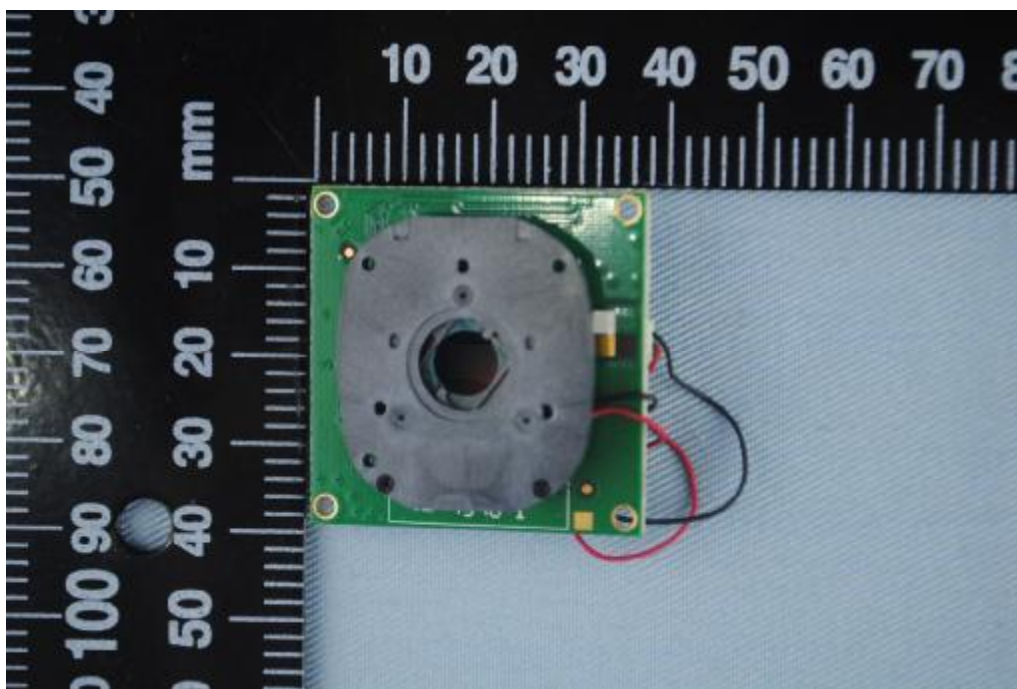
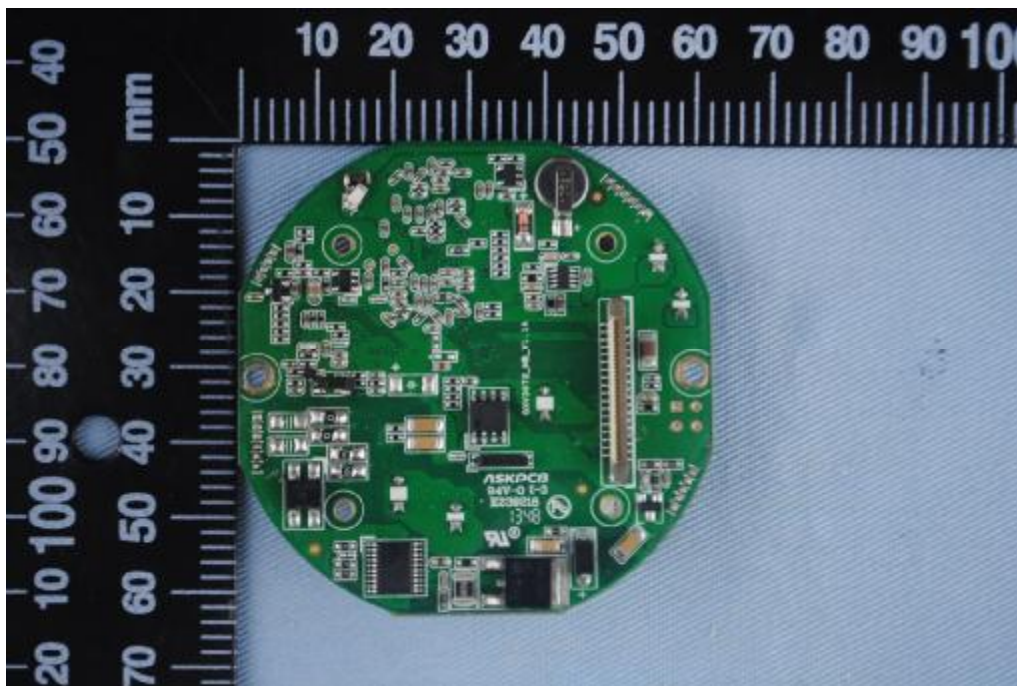
EUT inside whole view



Main & RF board component side



Main & RF board solder side



GXV3672_HD_36

EUT top view



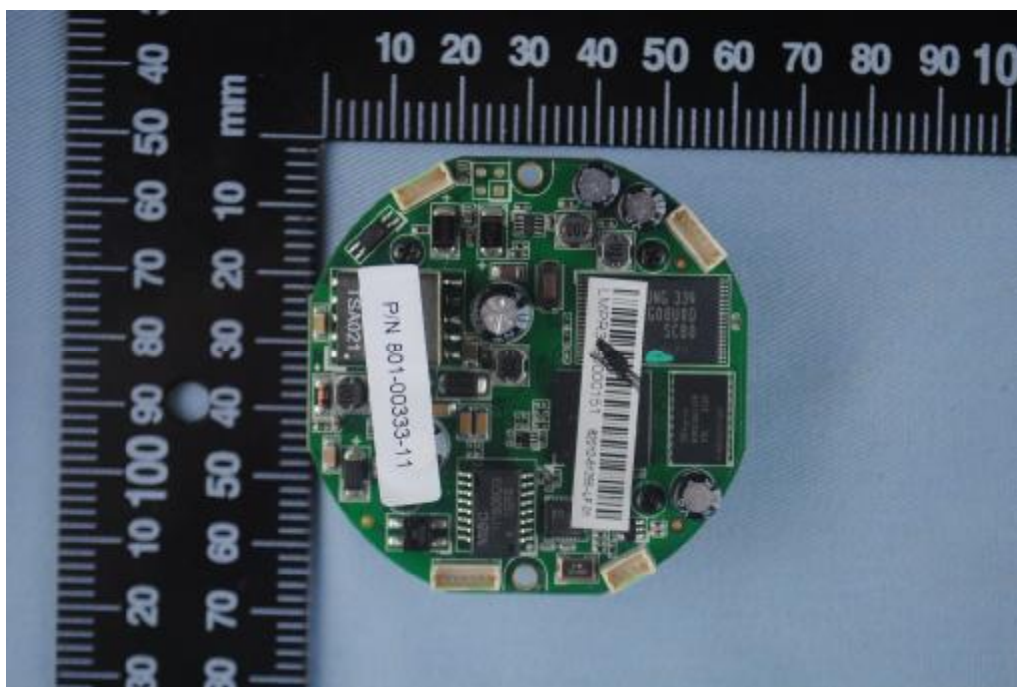
EUT bottom view

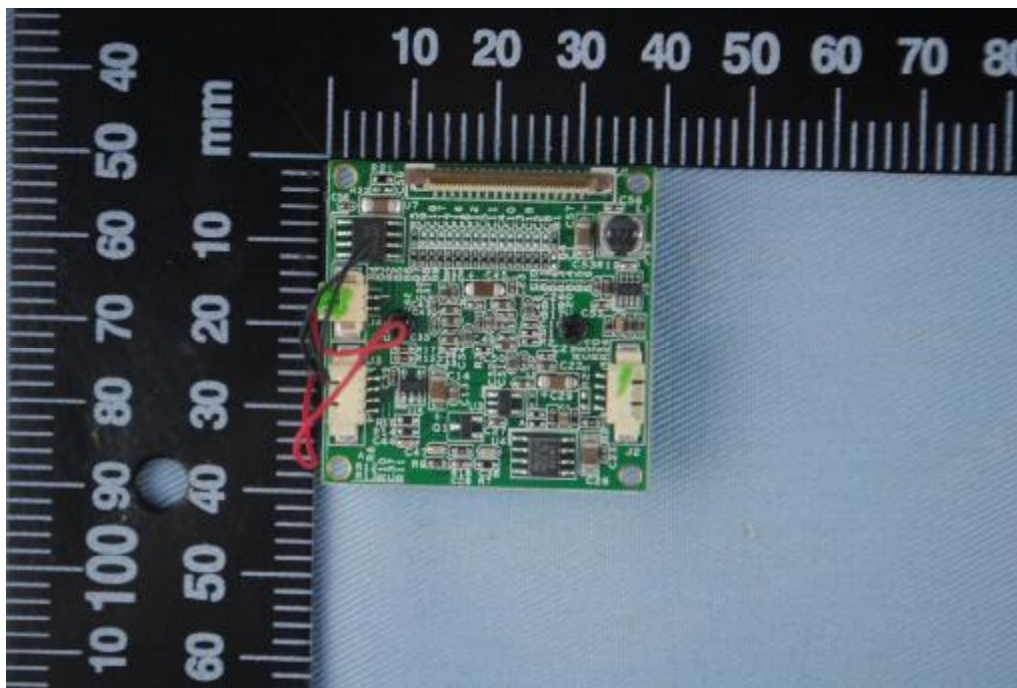


EUT inside whole view

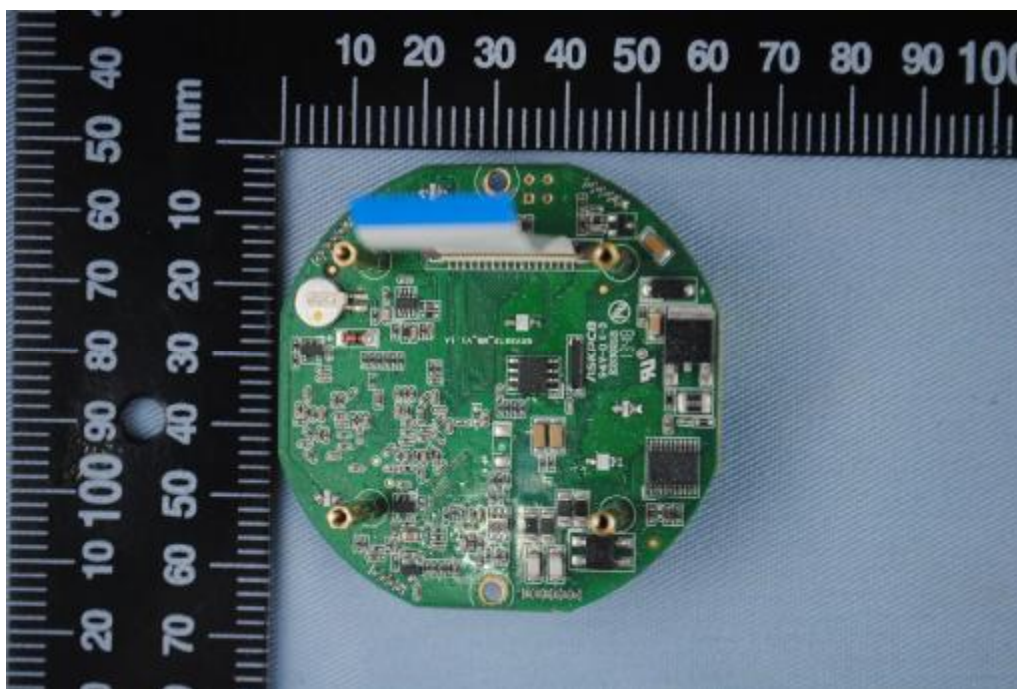


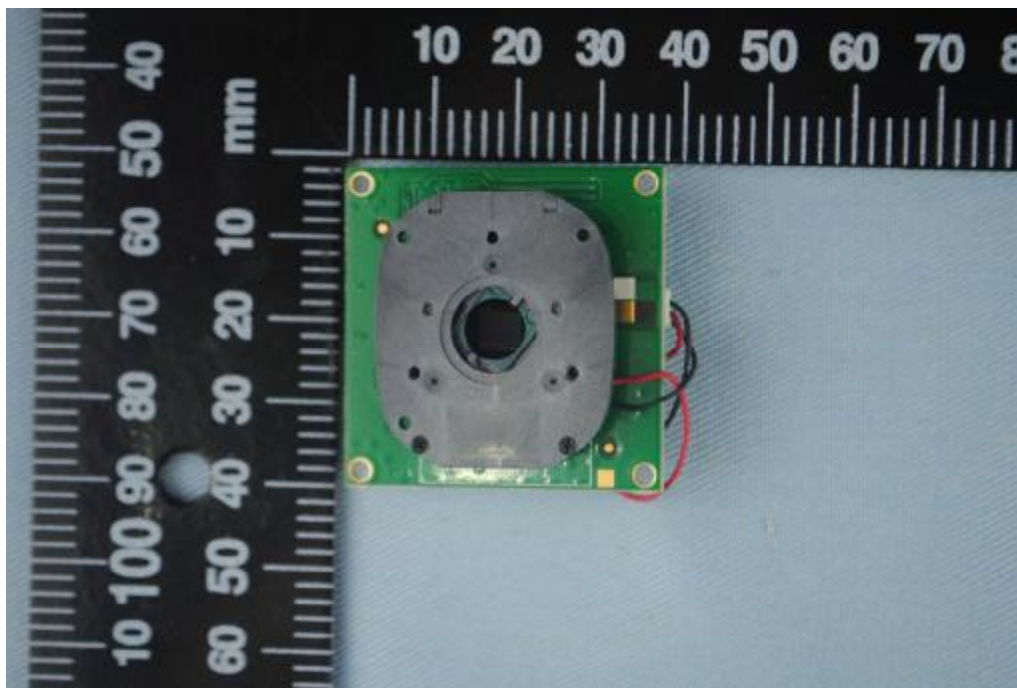
Main & RF board component side





Main & RF board solder side





GXV3672_FHD_36

EUT top view



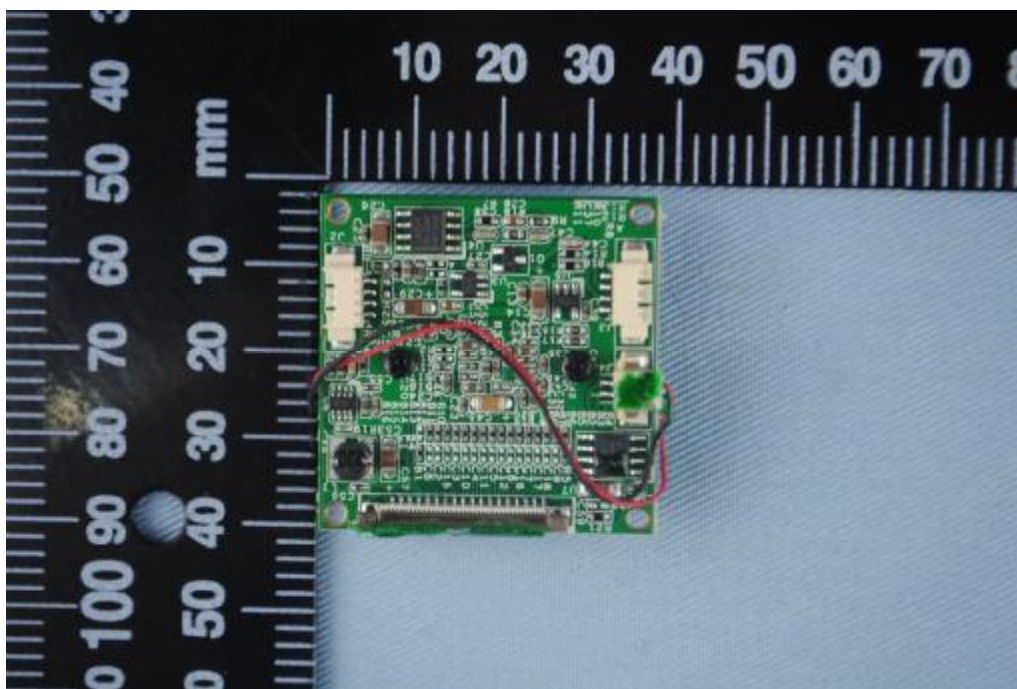
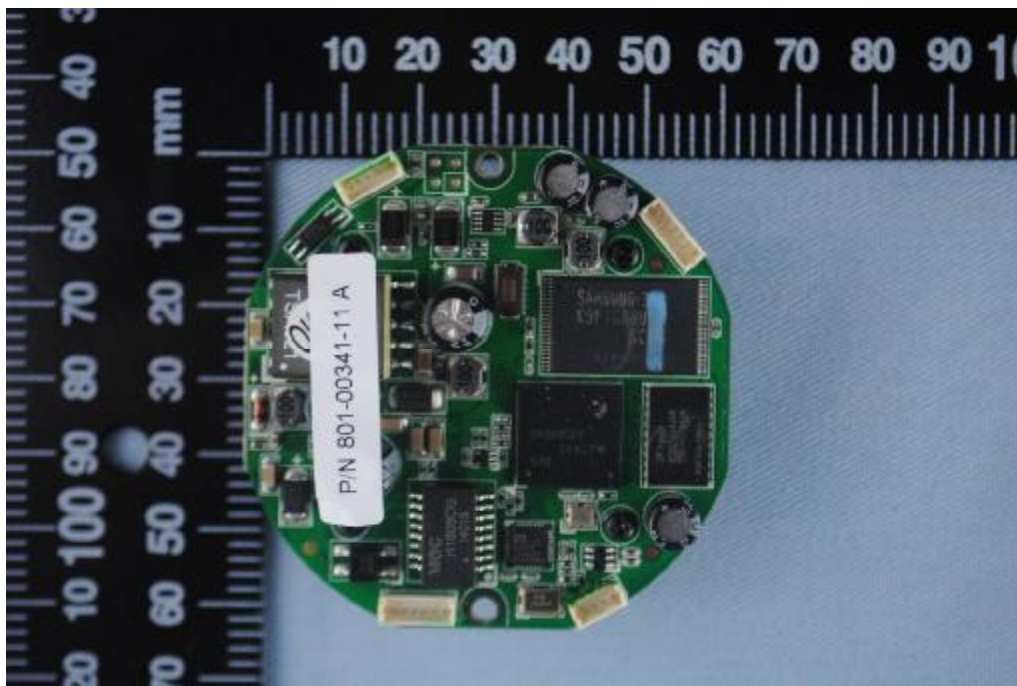
EUT bottom view



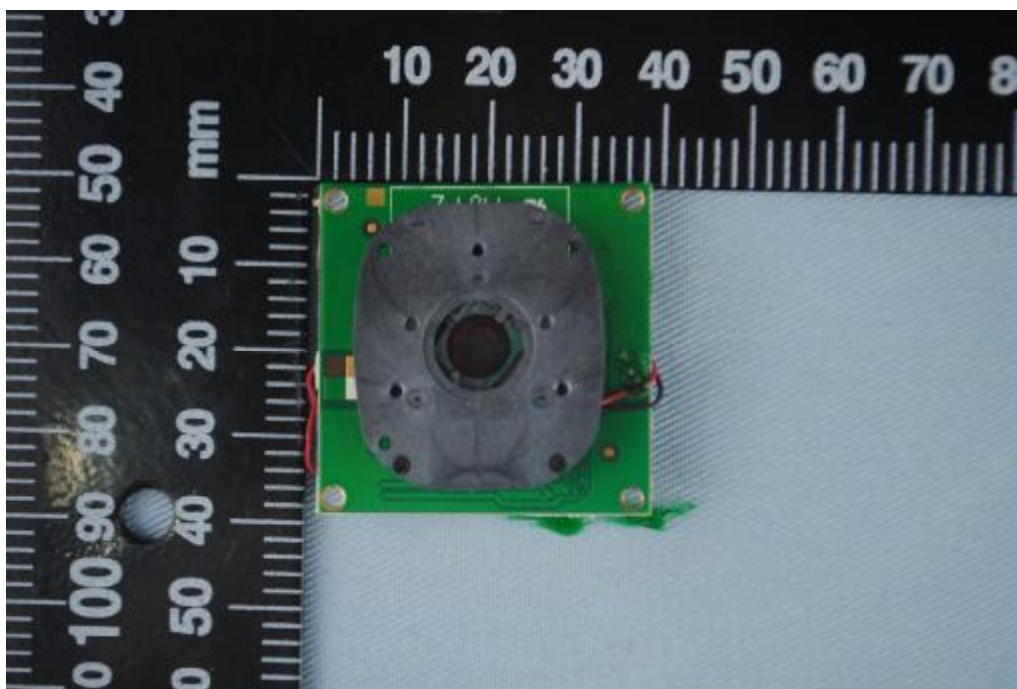
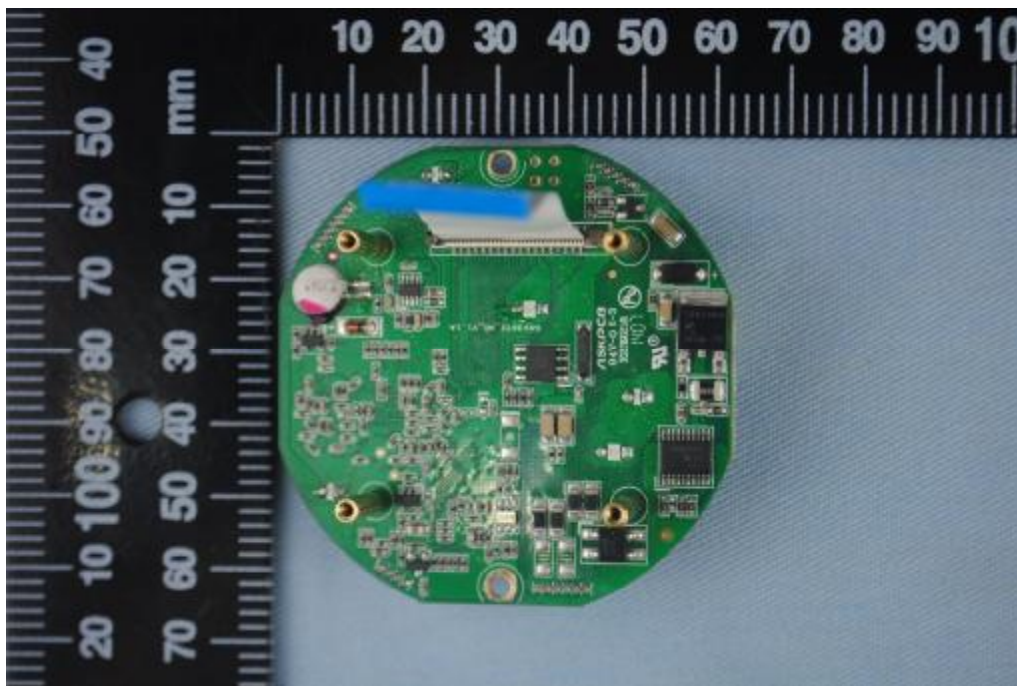
EUT inside whole view



Main & RF board component side



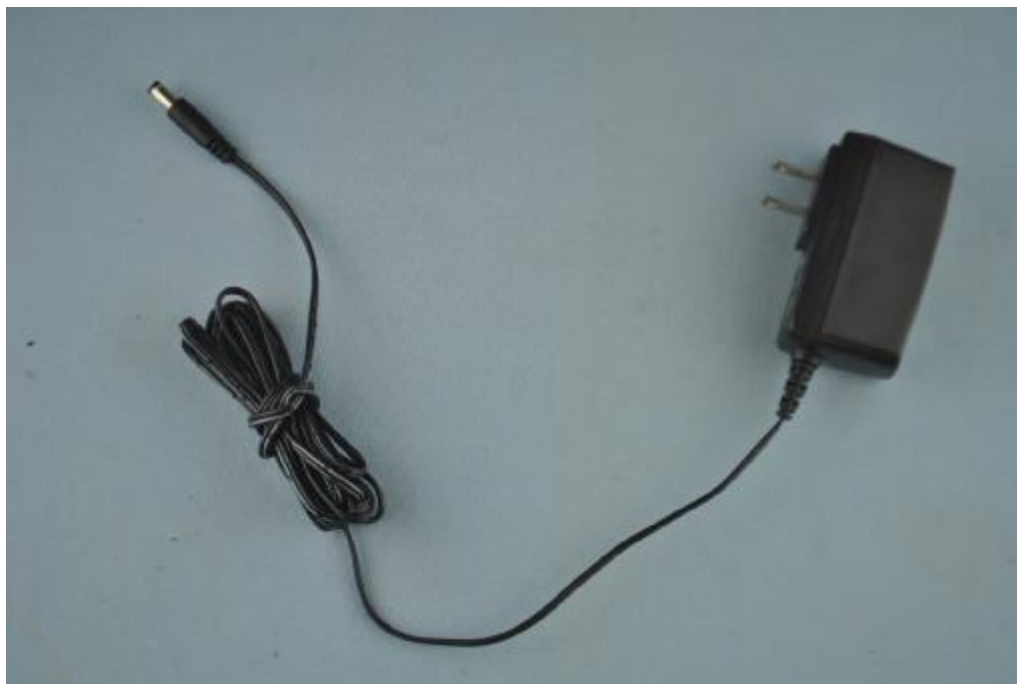
Main & RF board solder side



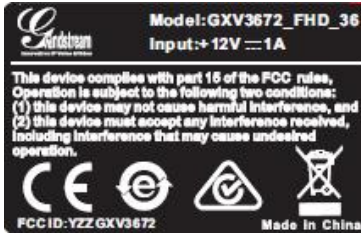
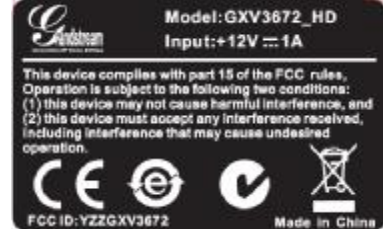
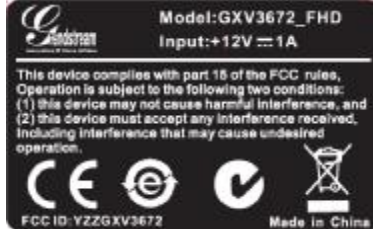
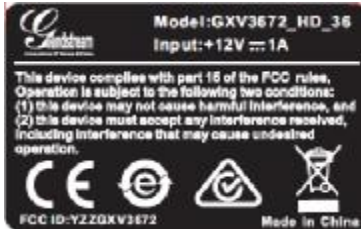
Adapter top view



Adapter side view



7. FCC ID Label

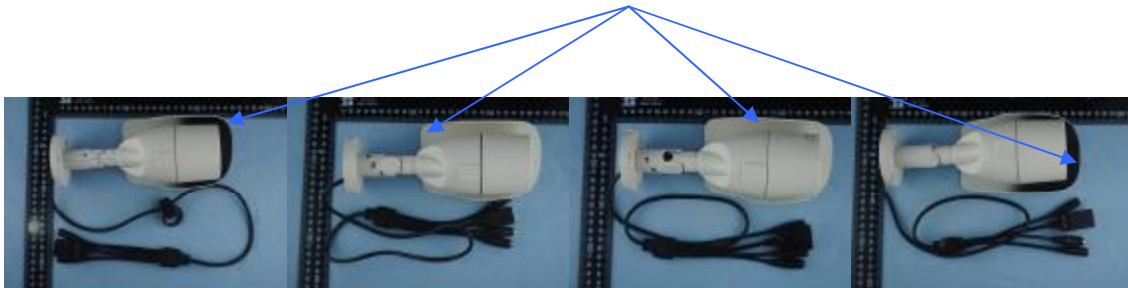


This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The Label must not be a stick-on paper label. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

EUT Bottom View/Proposed FCC Mark Location



8. Test Equipment

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Due Date
Turntable	Innco systems GmbH	CT-0801	KMO-SZ114	NCR
Antenna Tower	Innco systems GmbH	MM4000-PP	KMO-SZ115	NCR
Controller	Innco systems GmbH	CO2000	KMO-SZ116	NCR
Pre-Amplifier	Agilent	87405C	KMO-SZ155	Dec.6, 2014
Pre-Amplifier	Com-Power	PAM-840	KMO-SZ156	Dec.6, 2014
Horn Antenna	Com-Power	AH-840	KMO-SZ157	Dec.6, 2014
EMI Test Receiver	Rohde & Schwarz	ESPI7	KMO-SZ002	June 27, 2014
Spectrum Analyzer	Rohde & Schwarz	FSP40	KMO-SZ003	June 27, 2014
Signal Generator	FLUKE	PM5418+Y/C	KMO-SZ020	May 27, 2014
Loop Antenna	Rohde & Schwarz	HFH2-Z2	KMO-SZ004	Jan. 30, 2015
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	KMO-SZ005	Sep.18, 2014
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	KMO-SZ006	Sep.18, 2014
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	KMO-SZ007	Sep.18, 2014
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	KMO-SZ008	Sep.18, 2014
AMN	Rohde & Schwarz	ESH3-Z5	KMO-SZ009	June 27, 2014
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	KMO-SZ077	Nov.29, 2013
ISN	SCHWARZBECK	NTFM 8158 CAT3	KMO-SZ070	Nov.19, 2014
ISN	SCHWARZBECK	NTFM 8158 CAT5	KMO-SZ071	Nov.19, 2014
ISN	SCHWARZBECK	NTFM 8158 CAT6	KMO-SZ072	Nov.19, 2014
KMO Shielded Room	KMO	KMO-001	KMO-SZ036	NCR
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	KMO-SZ037	Sep.18, 2014
AC Power Source / Analyzer	Agilent	6813B	KMO-SZ166	July 22, 2014
Digital Radio Communication Tester	Rohde & Schwarz	CMD60	KMO-SZ169	April 10, 2015
Universal Radio Communication Tester	Rohde & Schwarz	CMU200	KMO-SZ170	April 10, 2015
Program Control Telephone Exchanger	Excelltel	CDX8000-M	KMO-SZ221	NCR
3m Anechoic Chamber	KMO	KMO-3AC	KMO-3AC-1	Nov.12, 2016
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb.10, 2015