

TEST REPORT

Reference No...... : WTS16S0756267E
FCC ID..... : SJ8ULC58
Applicant..... : RDI Technology (Shenzhen) Co., Ltd.
Address..... : Building C1 Xintang Industrial Park East Baishixia, Fuyong, Baoan,
Shenzhen, Guangdong, China
Manufacturer : The same as above
Address..... : The same as above
Product Name..... : LightCAM
Model No..... : ULC58
Standards..... : FCC CFR47 Part 15 Section 15.247:2015
Date of Receipt sample..... : Jul. 20, 2016
Date of Test..... : Jul. 21 – Aug. 05, 2016
Date of Issue..... : Aug. 15, 2016
Test Result..... : **Pass**

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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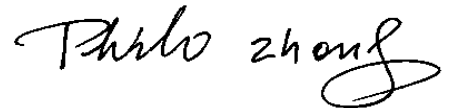
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Approved by:



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3 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS16S0756267E	Jul. 20, 2016	Jul. 21 – Aug. 05, 2016	Aug. 11, 2016	original	-	Replaced
WTS16S0756267E	Jul. 20, 2016	Jul. 21 – Aug. 05, 2016	Aug. 15, 2016	Revision 1	zooming in part view	Valid

4 General Information

4.1 General Description of E.U.T.

Product Name:	LightCAM
Model No.:	ULC58
Model Difference:	N/A
Operation Frequency:	2408MHz ~ 2468MHz, 16 channels in total
The lowest oscillator:	24MHz
Type of modulation:	GFSK
Antenna installation:	External antenna with RP-SMA connector
Antenna gain:	2.0 dBi

4.2 Details of E.U.T.

Technical Data:	DC 9V, 2.0A by adpater
Adapter:	Model: CS18J090200FUF by Csec Input: AC 100-240V, 50/60Hz, 500mA Output: DC 9V, 2.0A

4.3 Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2408	2	2412	3	2416	4	2420
5	2424	6	2428	7	2432	8	2436
9	2440	10	2444	11	2448	12	2452
13	2456	14	2460	15	2464	16	2468

4.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Table 1 Tests Carried Out Under FCC part 15.247

Test mode	Low channel	Middle channel	High channel
Transmitting	2408MHz	2440MHz	2468MHz

Table 2 Tests Carried Out Under FCC part 15.209

Test Item	Test Mode
Radiated Emissions	Transmitting
Conducted Emissions	Transmitting

4.5 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A**

Waltek Services(Shenzhen) Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A, October 15, 2015.

- **FCC Test Site 1#– Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 328995, December 3, 2014.

5 Equipment Used during Test

5.1 Equipments List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	Sep.15,2015	Sep.14,2016
2.	LISN	R&S	ENV216	101215	Sep.15,2015	Sep.14,2016
3.	Cable	Top	TYPE16(3.5M)	-	Sep.15,2015	Sep.14,2016
Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	Sep.15,2015	Sep.14,2016
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.15,2015	Sep.14,2016
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.15,2015	Sep.14,2016
4.	Cable	LARGE	RF300	-	Sep.15,2015	Sep.14,2016
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	Agilent	E7405A	MY45114943	Sep.15,2015	Sep.14,2016
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Sep.15,2015	Sep.14,2016
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.18,2016	Apr.17,2017
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.15,2015	Sep.14,2016
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.18,2016	Apr.17,2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.18,2016	Apr.17,2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.17,2016	Mar.16,2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.09,2016	Apr.08,2017
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	Sep.15,2015	Sep.14,2016
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Sep.15,2015	Sep.14,2016
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Sep.15,2015	Sep.14,2016
4	Cable	HUBER+SUHNER	CBL2	525178	Sep.15,2015	Sep.14,2016

RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Sep.15,2015	Sep.14,2016
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.15,2015	Sep.14,2016
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.15,2015	Sep.14,2016

5.2 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

6 Test Summary

Test Items	Test Requirement	Result
Radiated Emissions	15.205(a) 15.209(a)	C
Conducted Emissions	15.207(a)	C
Bandwidth	15.247(a)(2)	C
Maximum Peak Output Power	15.247(b)(3),(4)	C
Power Spectral Density	15.247(e)	C
Band Edge	15.247(d)	C
Antenna Requirement	15.203	C
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	C
Note: C=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable.		

7 Conducted Emissions

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013;ANSI C63.4:2014
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

7.1 E.U.T. Operation

Operating Environment :

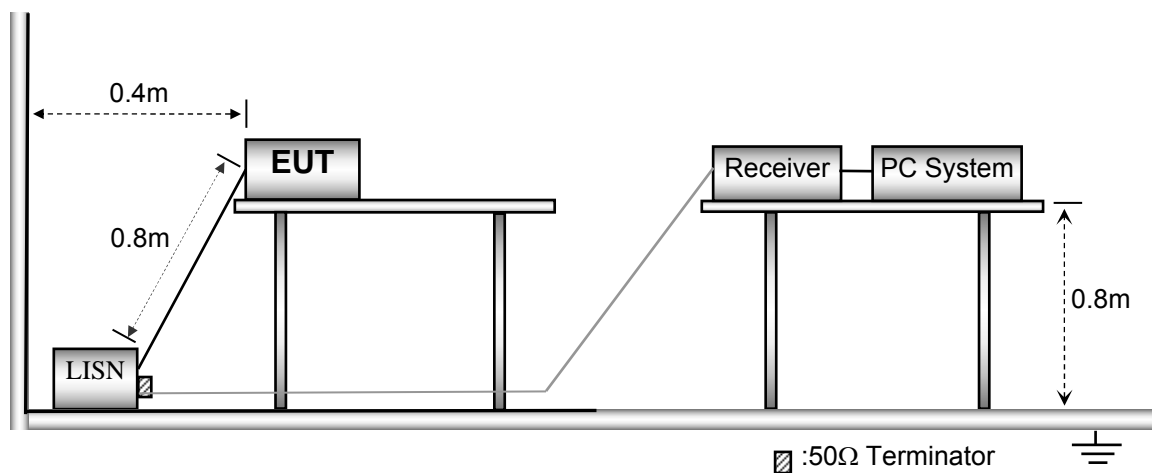
Temperature:	25.5 °C
Humidity:	51 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation :

The test was performed in transmitting mode, the test data were shown in the report.

7.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.

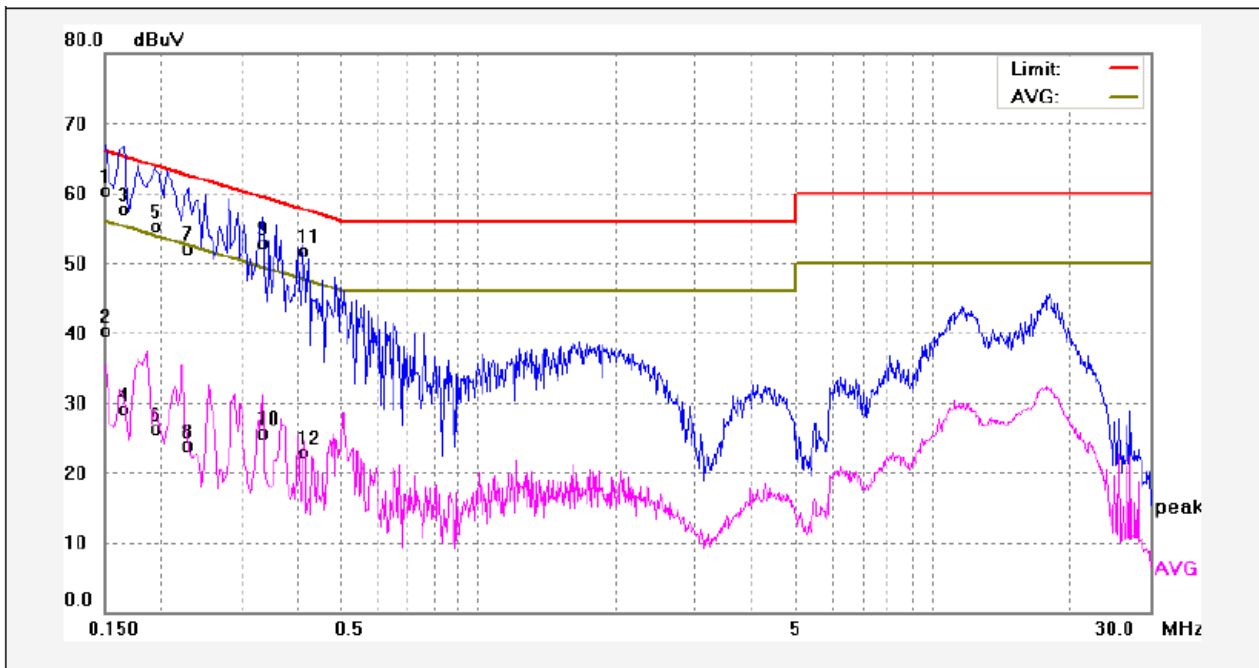


7.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

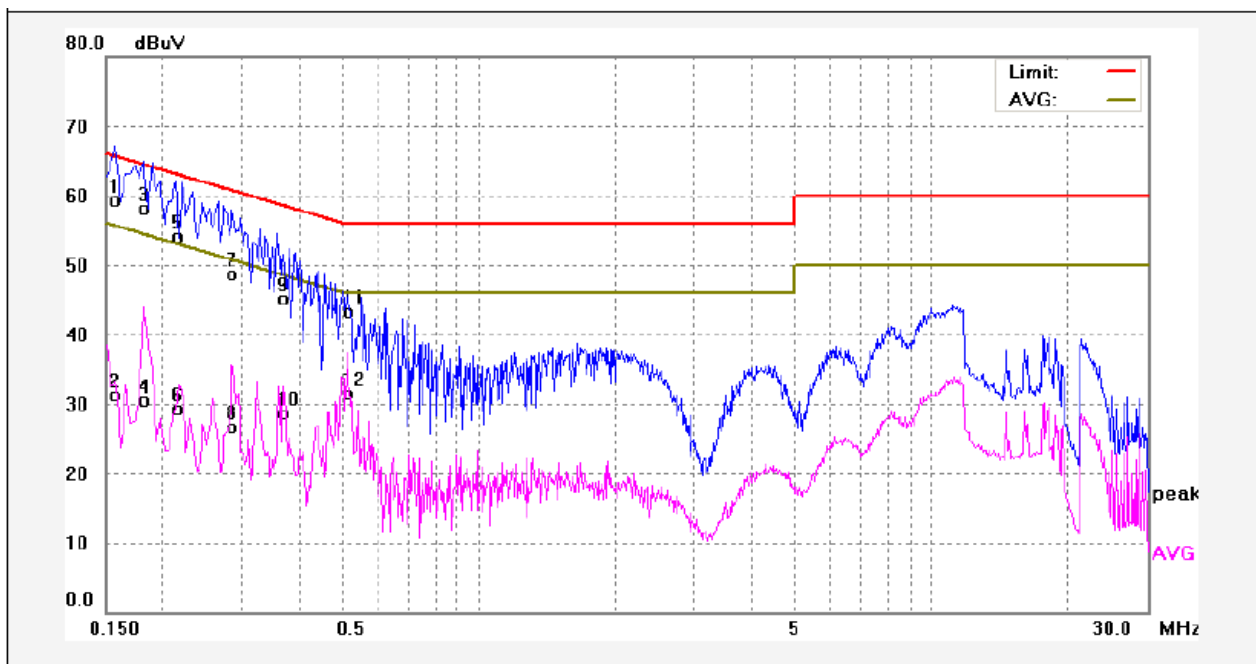
7.4 Conducted Emission Test Result

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	50.55	9.75	60.30	65.99	-5.69	QP	
2	0.1500	30.58	9.75	40.33	55.99	-15.66	AVG	
3	0.1660	47.91	9.74	57.65	65.15	-7.50	QP	
4	0.1660	19.35	9.74	29.09	55.15	-26.06	AVG	
5	0.1940	45.47	9.76	55.23	63.86	-8.63	QP	
6	0.1940	16.62	9.76	26.38	53.86	-27.48	AVG	
7	0.2300	42.39	9.75	52.14	62.45	-10.31	QP	
8	0.2300	14.14	9.75	23.89	52.45	-28.56	AVG	
9	0.3339	43.15	9.75	52.90	59.35	-6.45	QP	
10	0.3339	16.03	9.75	25.78	49.35	-23.57	AVG	
11	0.4100	42.05	9.75	51.80	57.65	-5.85	QP	
12	0.4100	13.20	9.75	22.95	47.65	-24.70	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1580	49.57	9.75	59.32	65.56	-6.24	QP	
2	0.1580	21.63	9.75	31.38	55.56	-24.18	AVG	
3	0.1819	48.43	9.75	58.18	64.39	-6.21	QP	
4	0.1819	20.84	9.75	30.59	54.39	-23.80	AVG	
5	0.2140	44.38	9.75	54.13	63.04	-8.91	QP	
6	0.2140	19.51	9.75	29.26	53.04	-23.78	AVG	
7	0.2860	38.94	9.75	48.69	60.64	-11.95	QP	
8	0.2860	16.93	9.75	26.68	50.64	-23.96	AVG	
9	0.3700	35.29	9.75	45.04	58.50	-13.46	QP	
10	0.3700	19.00	9.75	28.75	48.50	-19.75	AVG	
11	0.5140	33.50	9.76	43.26	56.00	-12.74	QP	
12	0.5140	21.84	9.76	31.60	46.00	-14.40	AVG	

8 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013;ANSI C63. 4:2014

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log ^{(2400/F(kHz))} + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log ^{(24000/F(kHz))} + 40
1.705 ~ 30	30	30	100 * 30	20log ⁽³⁰⁾ + 40
30 ~ 88	100	3	100	20log ⁽¹⁰⁰⁾
88 ~ 216	150	3	150	20log ⁽¹⁵⁰⁾
216 ~ 960	200	3	200	20log ⁽²⁰⁰⁾
Above 960	500	3	500	20log ⁽⁵⁰⁰⁾

8.1 EUT Operation

Operating Environment:

Temperature: 25.5 °C

Humidity: 51 % RH

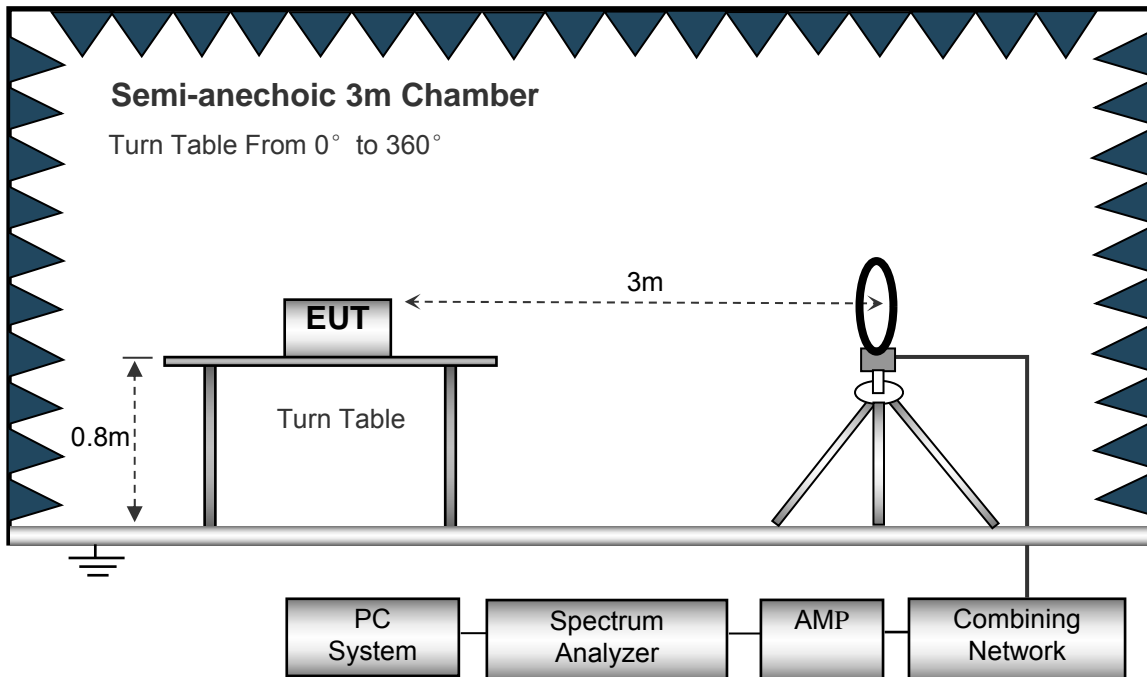
Atmospheric Pressure: 1016 mbar

EUT Operation:

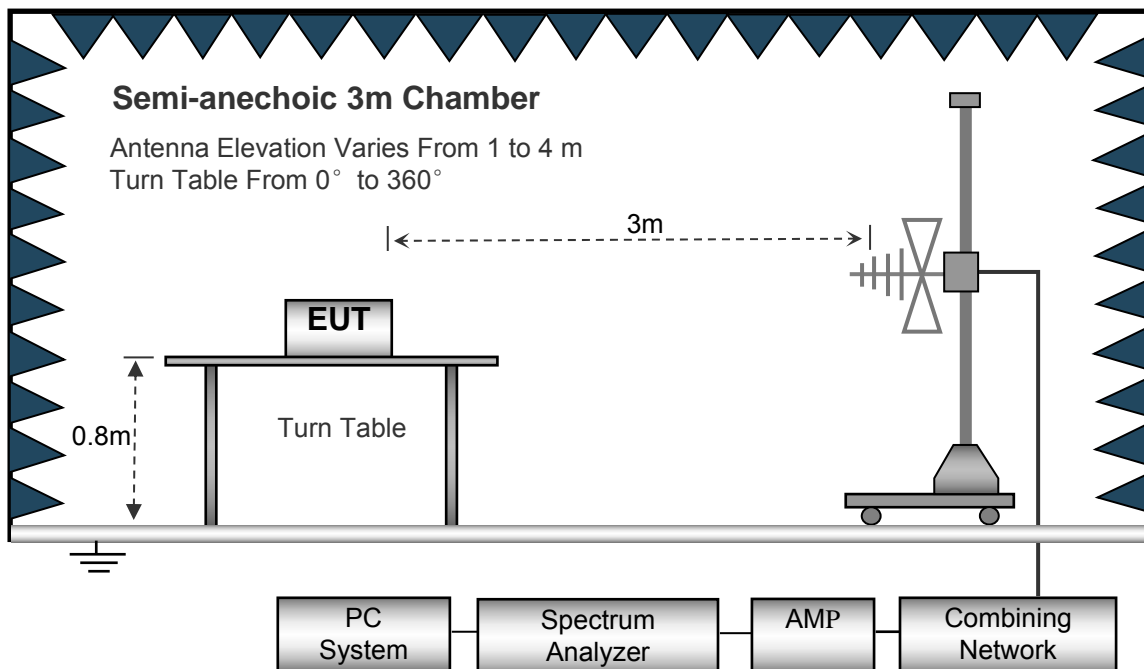
The test was performed in transmitting mode, the test data were shown in the report.

8.2 Test Setup

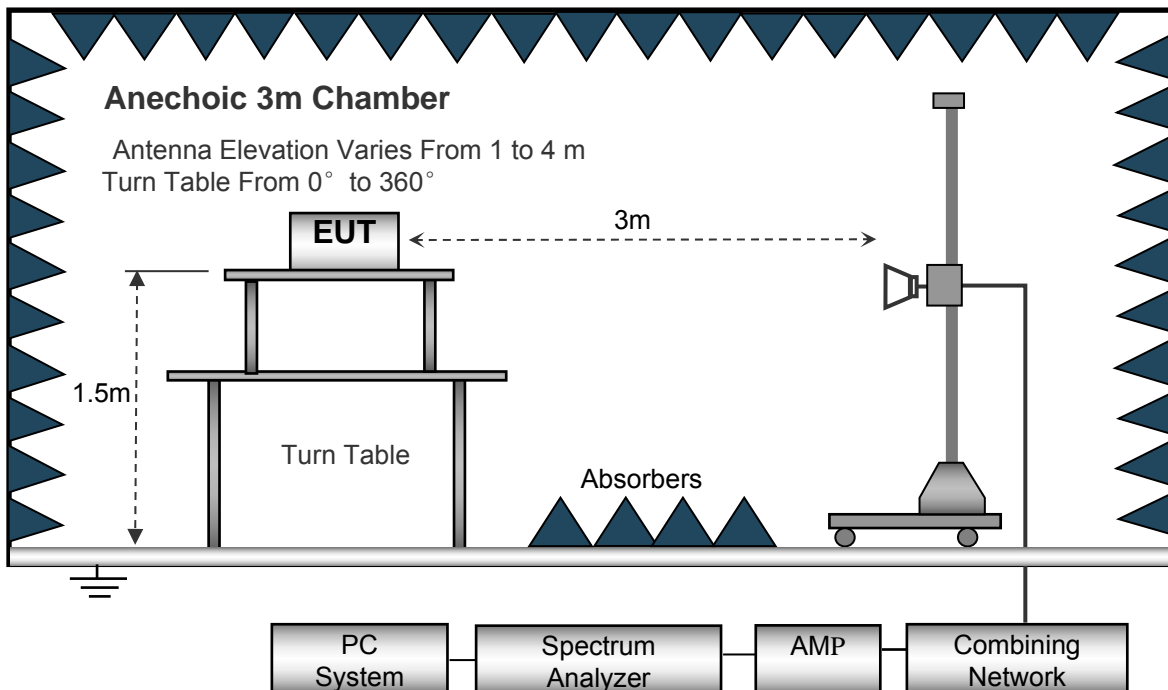
The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10: 2013.
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



8.3 Spectrum Analyzer Setup

Below 30MHz

- Sweep Speed..... Auto
- IF Bandwidth..... 10kHz
- Video Bandwidth..... 10kHz
- Resolution Bandwidth..... 10kHz

30MHz ~ 1GHz

- Sweep Speed..... Auto
- Detector..... PK
- Resolution Bandwidth..... 100kHz
- Video Bandwidth..... 300kHz

Above 1GHz

- Sweep Speed..... Auto
- Detector..... PK
- Resolution Bandwidth..... 1MHz
- Video Bandwidth..... 3MHz
- Detector..... Ave.
- Resolution Bandwidth..... 1MHz
- Video Bandwidth..... 10Hz

8.4 Test Procedure

1. The EUT is placed on a turntable. For below 1GHz, the EUT is 0.8m above ground plane; For above 1GHz, the EUT is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

8.5 Summary of Test Results

Test Frequency: 24MHz~30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency: 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
GFSK Low Channel									
307.02	21.41	QP	80	1.4	H	10.52	31.93	46.00	-14.07
307.02	18.22	QP	130	2.0	V	10.52	28.74	46.00	-17.26
4816.00	50.78	PK	154	2.0	V	-1.06	49.72	74.00	-24.28
4816.00	40.07	Ave	154	2.0	V	-1.06	39.01	54.00	-14.99
7224.00	50.66	PK	205	1.8	H	1.32	51.98	74.00	-22.02
7224.00	43.54	Ave	205	1.8	H	1.32	44.86	54.00	-9.14
2319.58	45.49	PK	279	1.8	V	-13.15	32.34	74.00	-41.66
2319.58	38.62	Ave	279	1.8	V	-13.15	25.47	54.00	-28.53
2354.12	42.09	PK	93	1.7	H	-13.22	28.87	74.00	-45.13
2354.12	38.25	Ave	93	1.7	H	-13.22	25.03	54.00	-28.97
2494.65	42.45	PK	307	1.3	V	-12.94	29.51	74.00	-44.49
2494.65	38.28	Ave	307	1.3	V	-12.94	25.34	54.00	-28.66

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
GFSK Middle Channel									
307.02	20.45	QP	148	1.4	H	10.52	30.97	46.00	-15.03
307.02	19.29	QP	201	1.2	V	10.52	29.81	46.00	-16.19
4880.00	54.81	PK	185	1.7	V	-0.59	54.22	74.00	-19.78
4880.00	40.69	Ave	185	1.7	V	-0.59	40.10	54.00	-13.90
7320.00	52.38	PK	37	1.0	H	2.15	54.53	74.00	-19.47
7320.00	41.67	Ave	37	1.0	H	2.15	43.82	54.00	-10.18
2313.60	45.45	PK	94	1.5	V	-13.26	32.19	74.00	-41.81
2313.60	38.30	Ave	94	1.5	V	-13.26	25.04	54.00	-28.96
2358.68	42.85	PK	265	1.3	H	-13.24	29.61	74.00	-44.39
2358.68	36.70	Ave	265	1.3	H	-13.24	23.46	54.00	-30.54
2498.82	42.09	PK	192	1.6	V	-13.09	29.00	74.00	-45.00
2498.82	36.67	Ave	192	1.6	V	-13.09	23.58	54.00	-30.42

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	Limit	Margin
				Height	Polar				
(MHz)	(dB μ V)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
GFSK High Channel									
307.02	22.15	QP	197	1.6	H	10.52	32.67	46.00	-13.33
307.02	20.89	QP	130	1.6	V	10.52	31.41	46.00	-14.59
4936.00	51.00	PK	103	2.0	V	-0.25	50.75	74.00	-23.25
4936.00	41.21	Ave	103	2.0	V	-0.25	40.96	54.00	-13.04
7404.00	53.02	PK	55	1.3	H	2.75	55.77	74.00	-18.23
7404.00	42.65	Ave	55	1.3	H	2.75	45.40	54.00	-8.60
2344.06	45.24	PK	123	1.4	V	-13.2	32.04	74.00	-41.96
2344.06	38.11	Ave	123	1.4	V	-13.2	24.91	54.00	-29.09
2371.04	42.67	PK	79	1.6	H	-13.53	29.14	74.00	-44.86
2371.04	38.85	Ave	79	1.6	H	-13.53	25.32	54.00	-28.68
2493.85	43.14	PK	340	1.4	V	-13.15	29.99	74.00	-44.01
2493.85	36.80	Ave	340	1.4	V	-13.15	23.65	54.00	-30.35

Test Frequency: 18GHz~25GHz

The measurements were more than 20 dB below the limit and not reported

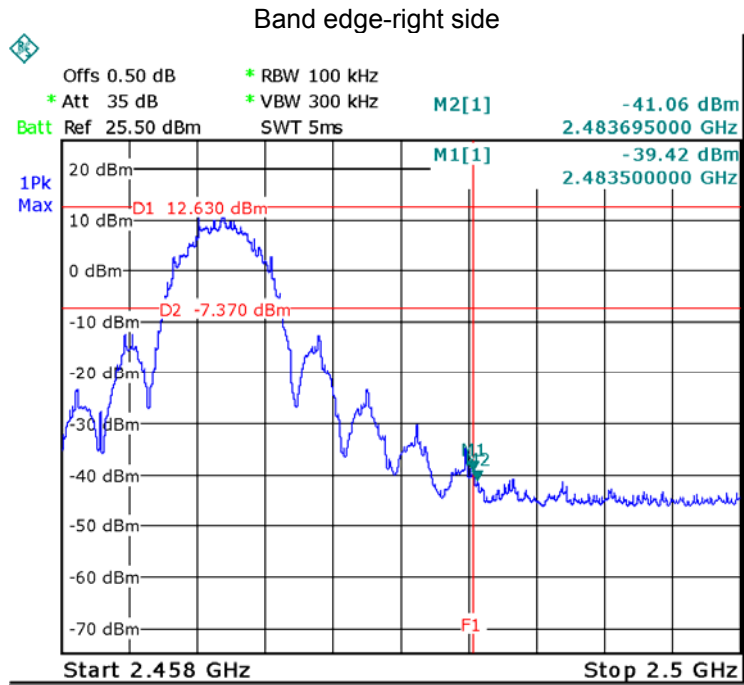
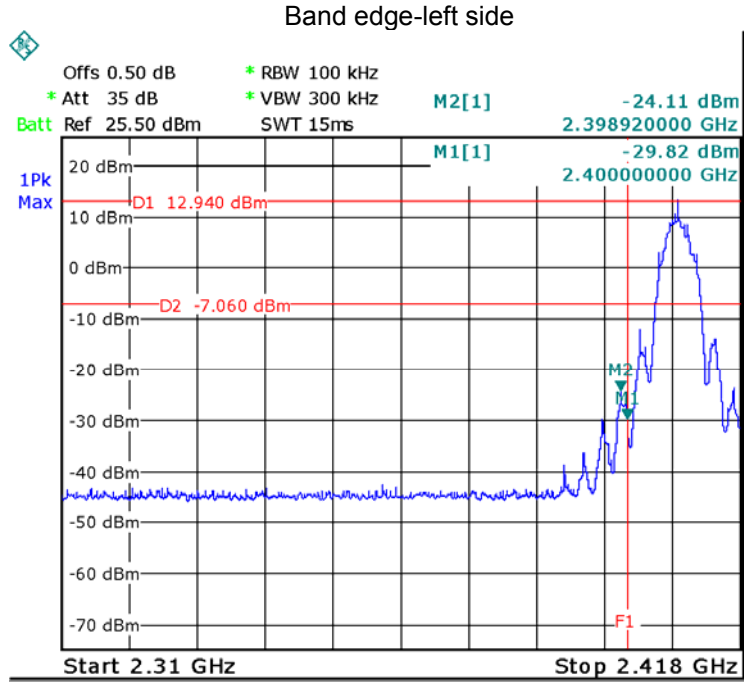
9 Band Edge Measurement

Test Requirement:	Section 15.247(d) In addition, radiated emissions which fall in the restricted bands. as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) and 15.205(c).
Test Method:	KDB558074 D01 DTS Meas Guidance v03r05
Test Limit:	Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
Test Mode:	Transmitting

9.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

9.2 Test Result



10 Bandwidth Measurement

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

KDB558074 D01 DTS Meas Guidance v03r05

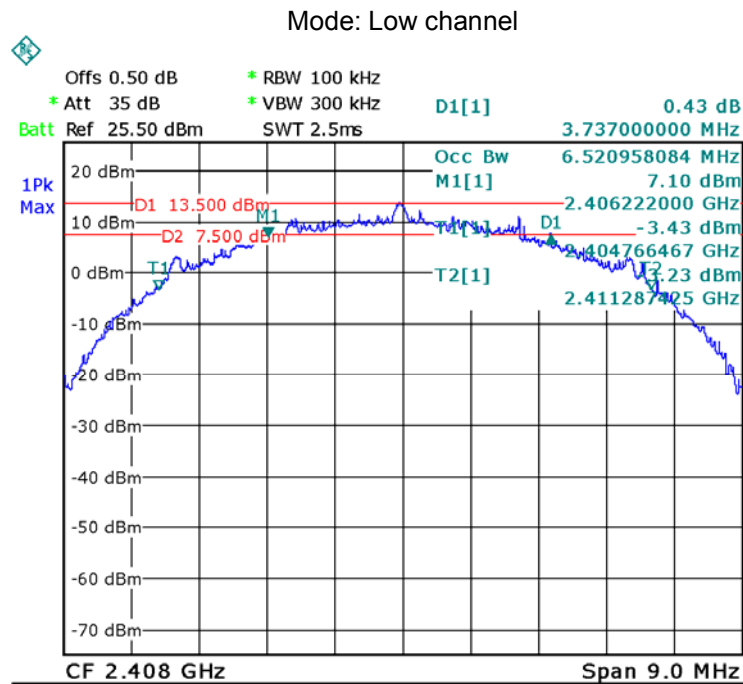
10.1 Test Procedure

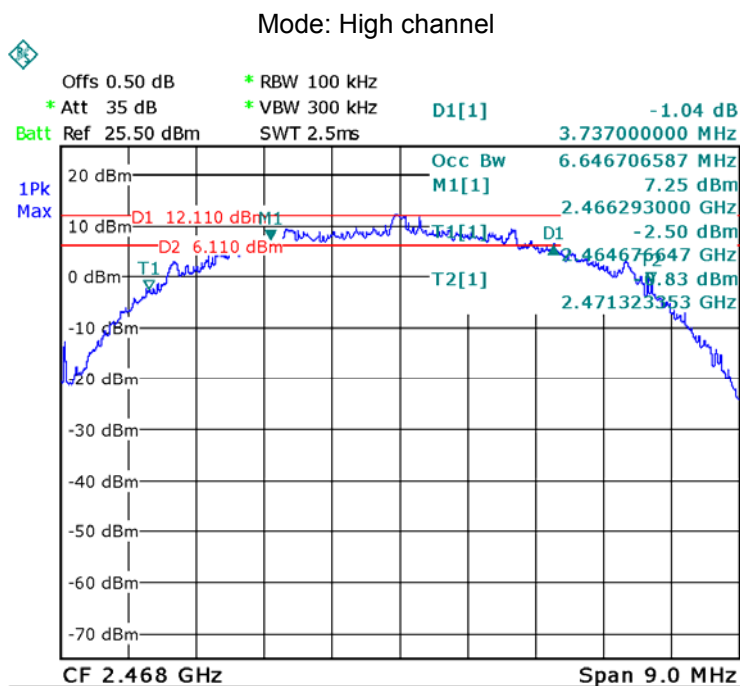
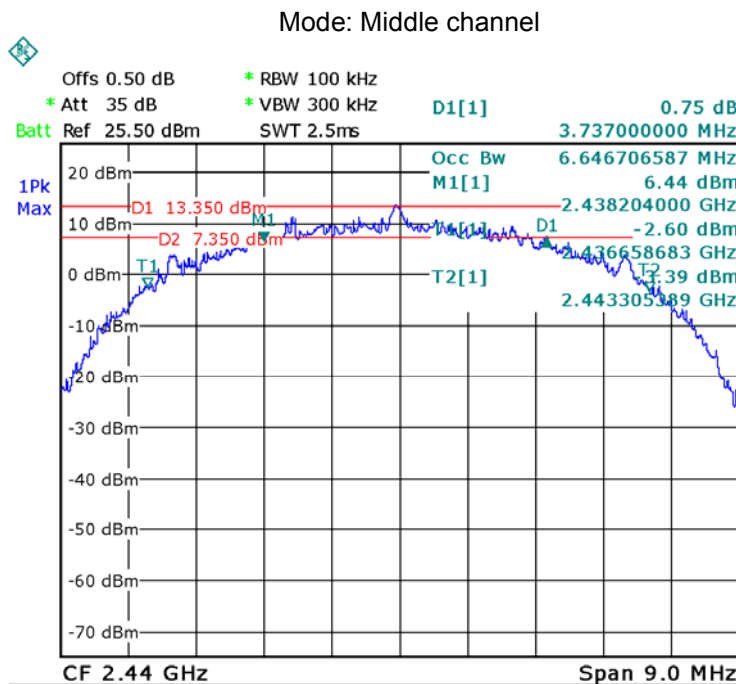
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

10.2 Test Result

Operation mode	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
Low channel	3.737	6.521
Middle channel	3.737	6.647
High channel	3.737	6.647

Test result plot as follows:





11 Maximum Peak Output Power

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

KDB558074 D01 DTS Meas Guidance v03r05

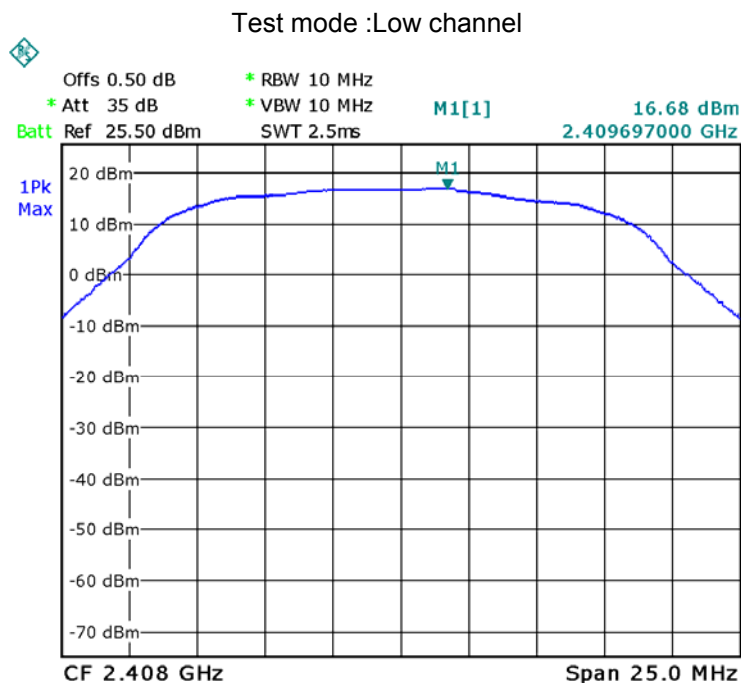
11.1 Test Procedure

KDB558074 D01 DTS Meas Guidance v03r05

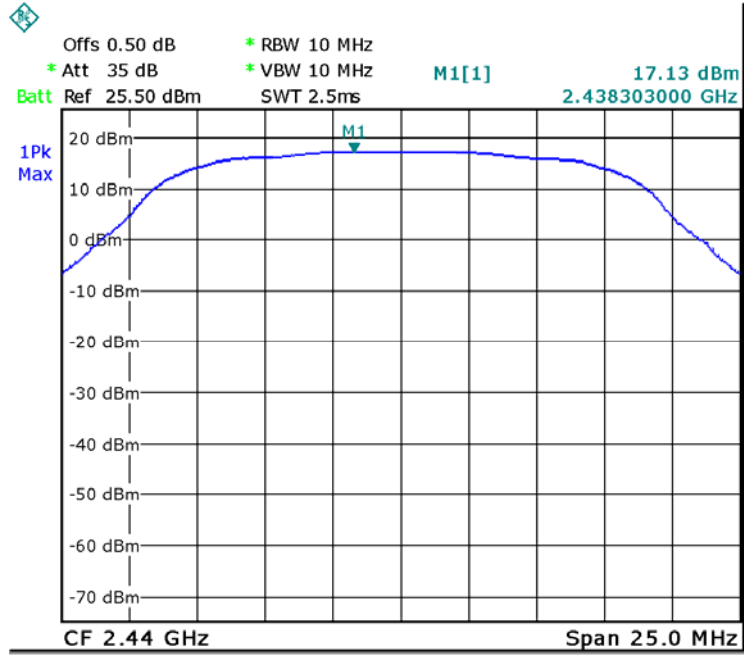
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 10MHz. VBW = 10MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

11.2 Test Result

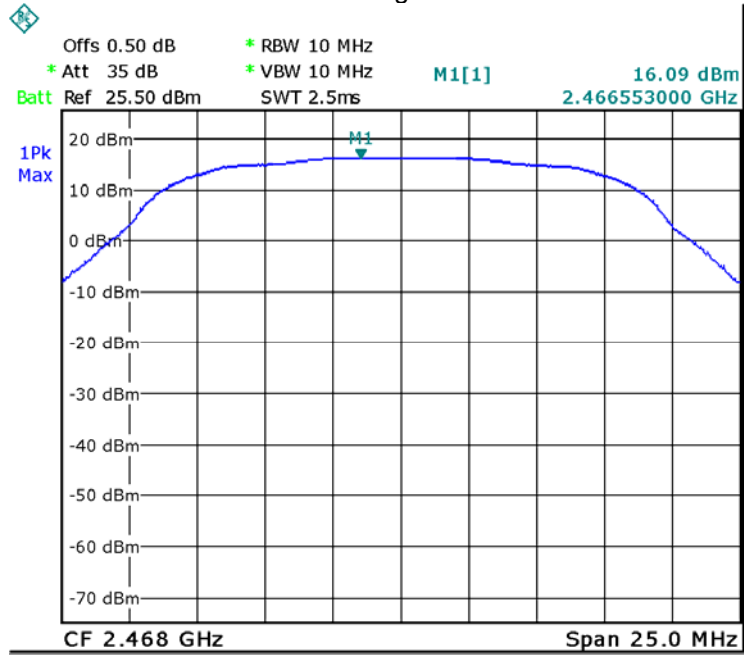
Test Mode	Peak Power(dBm)		
	Low Channel	Middle Channel	High Channel
GFSK	16.68	17.13	16.09



Test mode :Middle channel



Test mode: High channel



12 Power Spectral density

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

KDB558074 D01 DTS Meas Guidance v03r05

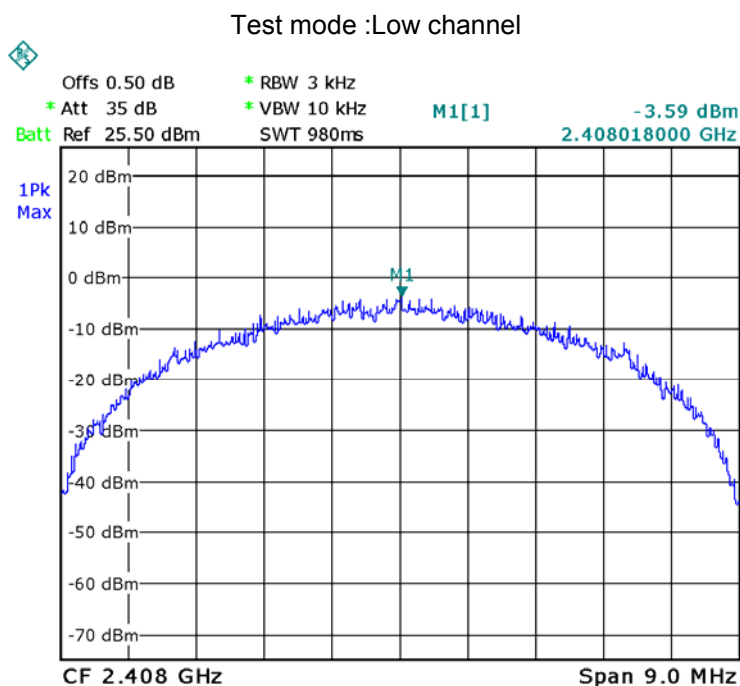
12.1 Test Procedure

KDB558074 D01 DTS Meas Guidance v03r05

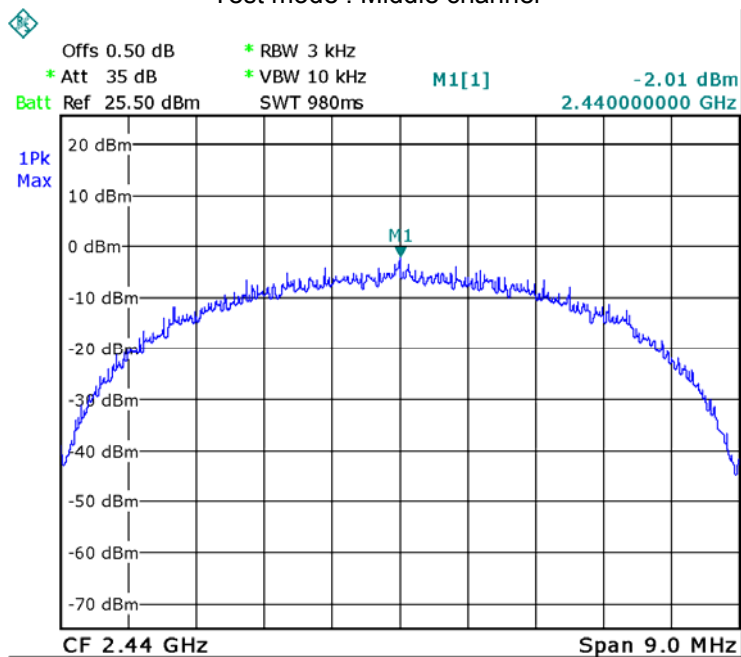
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section
Submit this plot.

12.2 Test Result

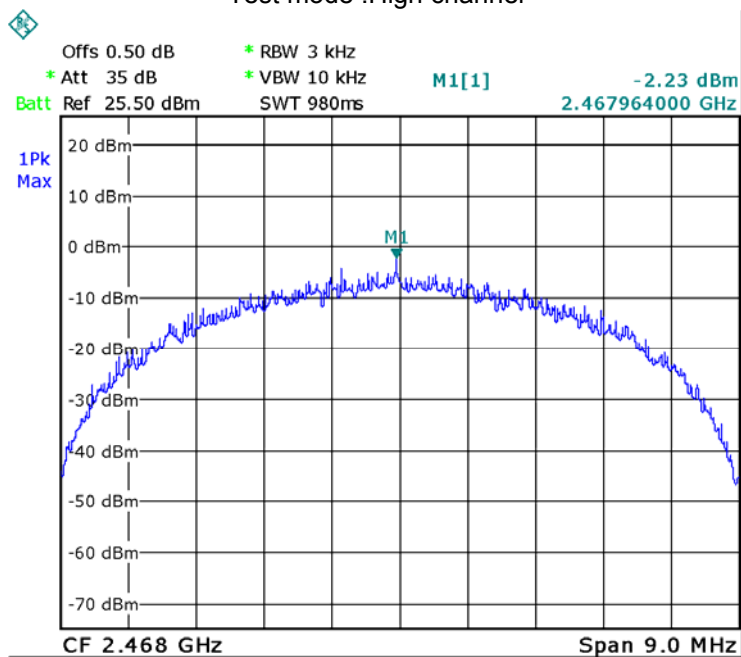
Power Spectral Density		
Low channel	Middle channel	High channel
-3.59	-2.01	-2.23
Limit		
8dBm per 3kHz		



Test mode : Middle channel



Test mode :High channel



13 Antenna Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Result:

The EUT has one External antenna with RP-SMA connector, the gain is 2dBi. meets the requirements of FCC 15.203.



14 RF Exposure

Test Requirement: FCC Part 1.1307

Test Mode: FCC Part 2.1091& 447498 D01 General RF Exposure Guidance v06

14.1 Requirements

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

14.2 The procedures / limit

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

14.3 MPE Calculation Method

$$S = PG^* \text{ Duty factor} / 4\pi R^2$$

P = Peak Power Input to antenna (Watts)

G = Antenna Gain (numeric)

R = distance to the center of radiation of antenna (in meter) = 0.20 m

Note:

1) $P \text{ (Watts)} = (10^{(\text{dBm} / 10)}) / 1000$

2) $G \text{ (Antenna gain in numeric)} = 10^{(\text{Antenna gain in dBi} / 10)}$

3) Duty factor

4) $\pi = 3.142$

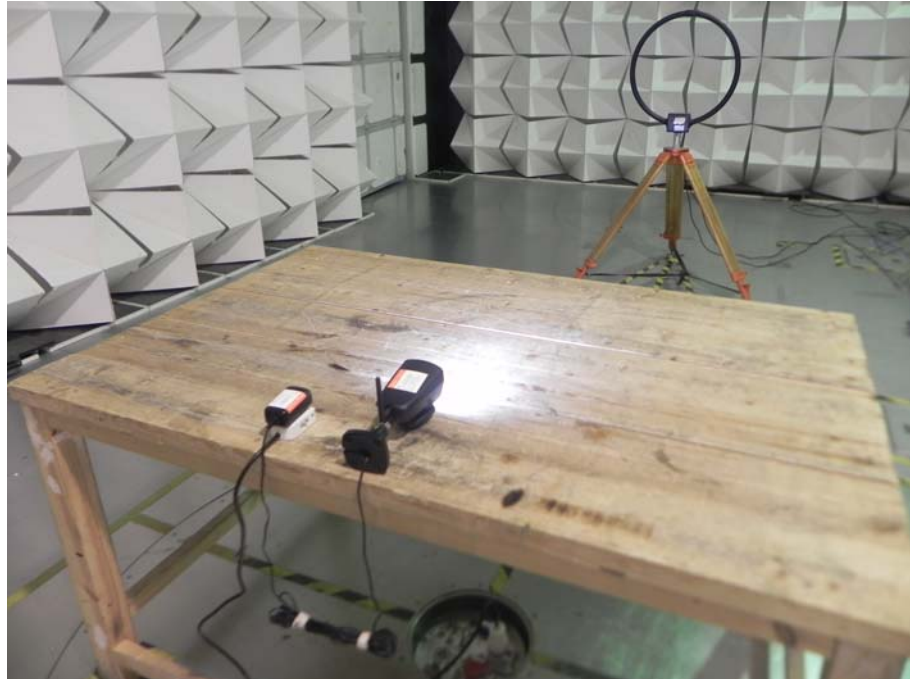
From the peak EUT RF output power, the minimum mobile separation distance, R=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

Antenna Gain (numeric)	Max.Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
1.585	17.13	51.64	0.0163	1.0

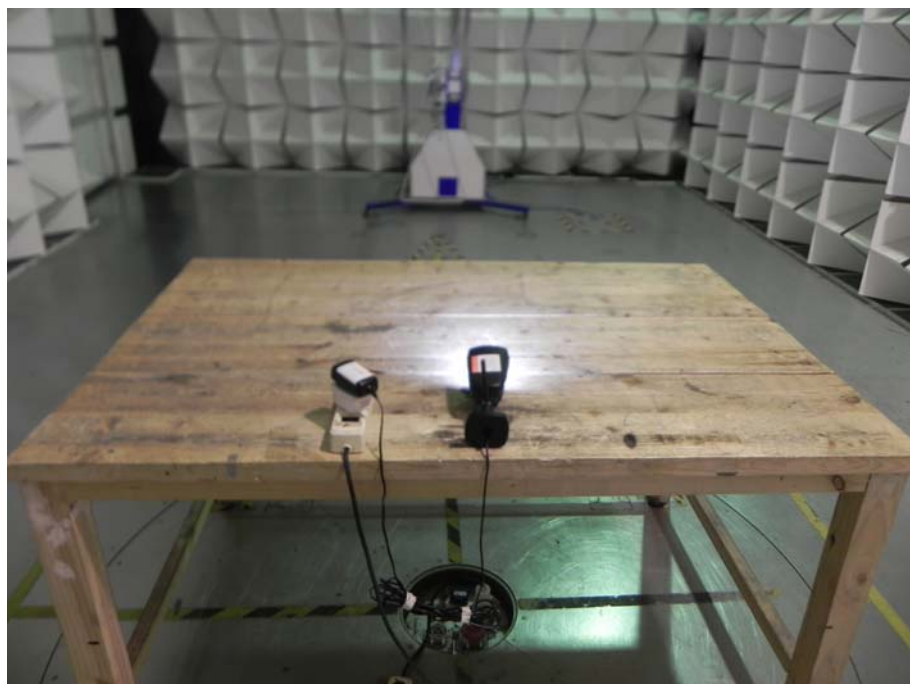
15 Photographs – Model ULC58 Test Setup Photos

15.1 Radiated Emission

Test frequency 24MHz to 30MHz at test site 2#



Test frequency from 30MHz to 1GHz at test site 2#





Test frequency above 1GHz at test site 1#



15.2 Conducted Emission at test site 1#



16 Photographs - Constructional Details

16.1 Model ULC58 – External Photos







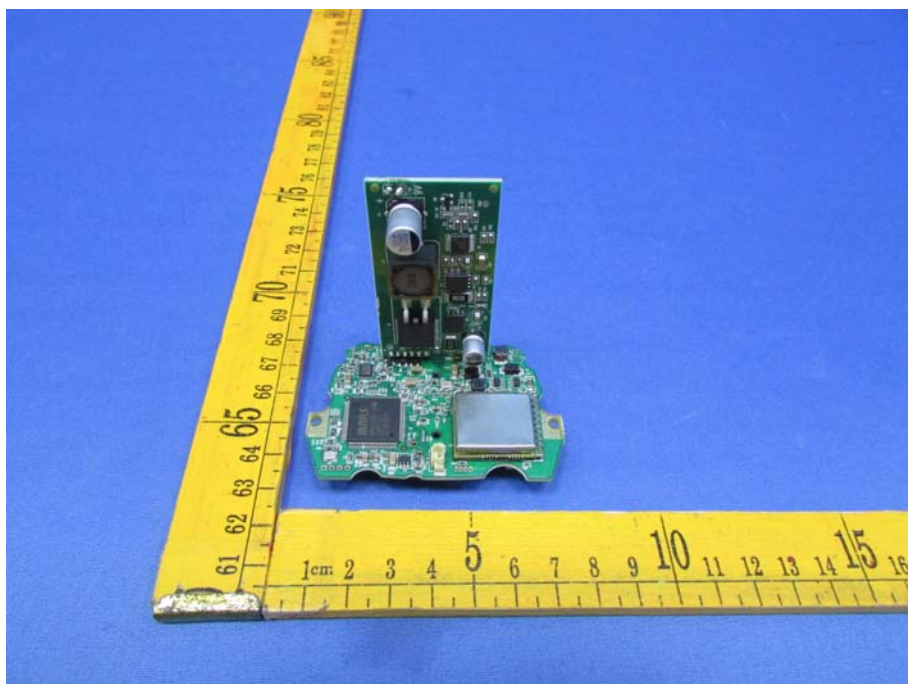




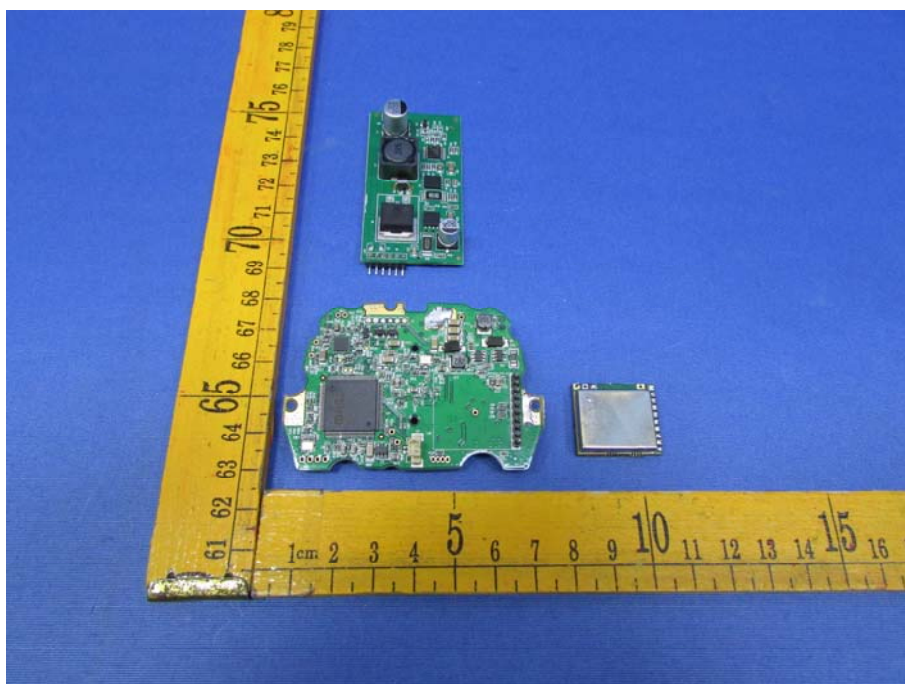


16.2 Model ULC58 - Internal Photos

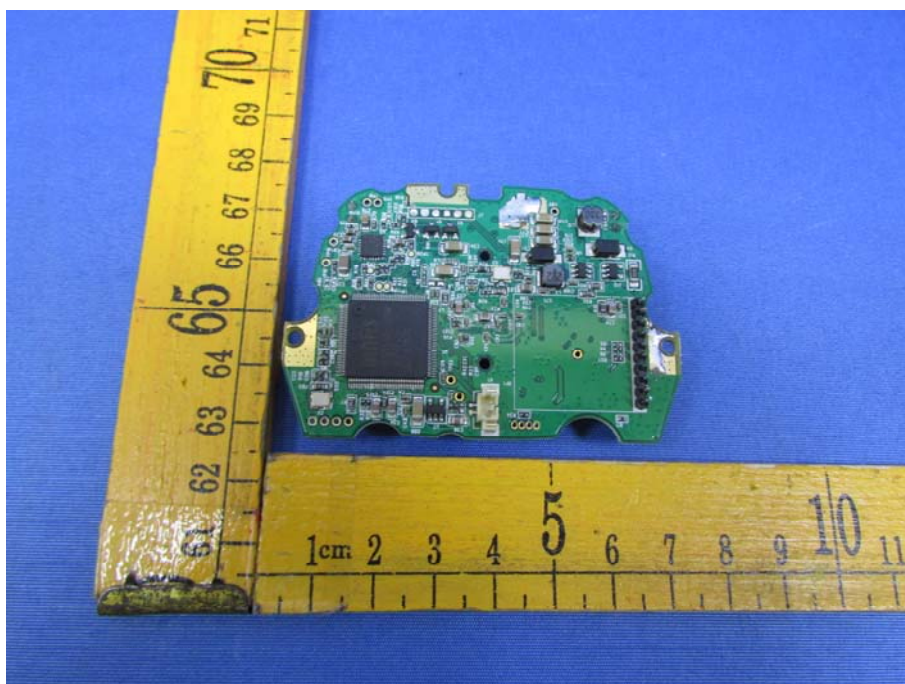




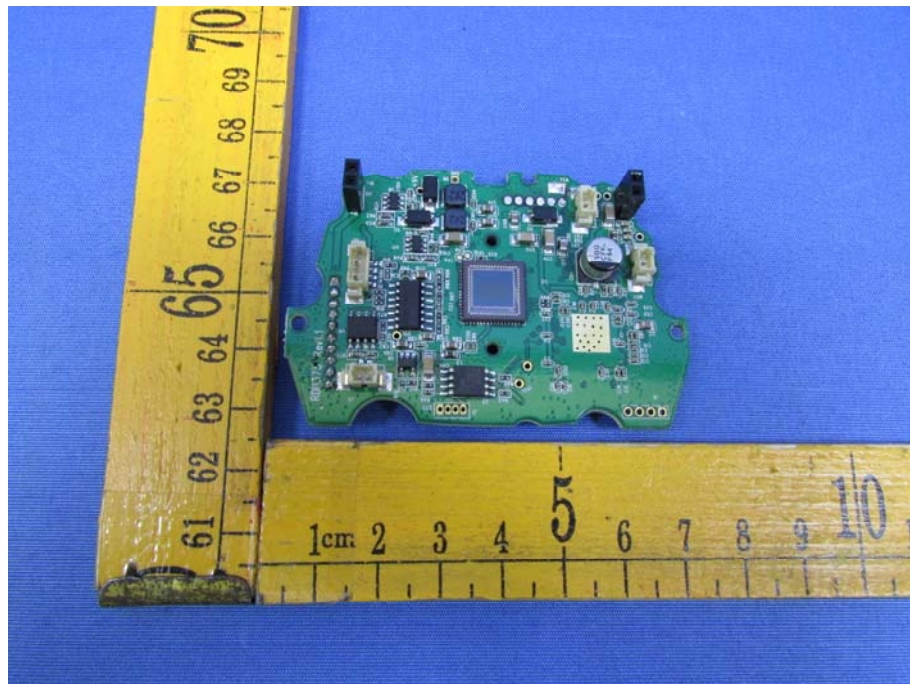
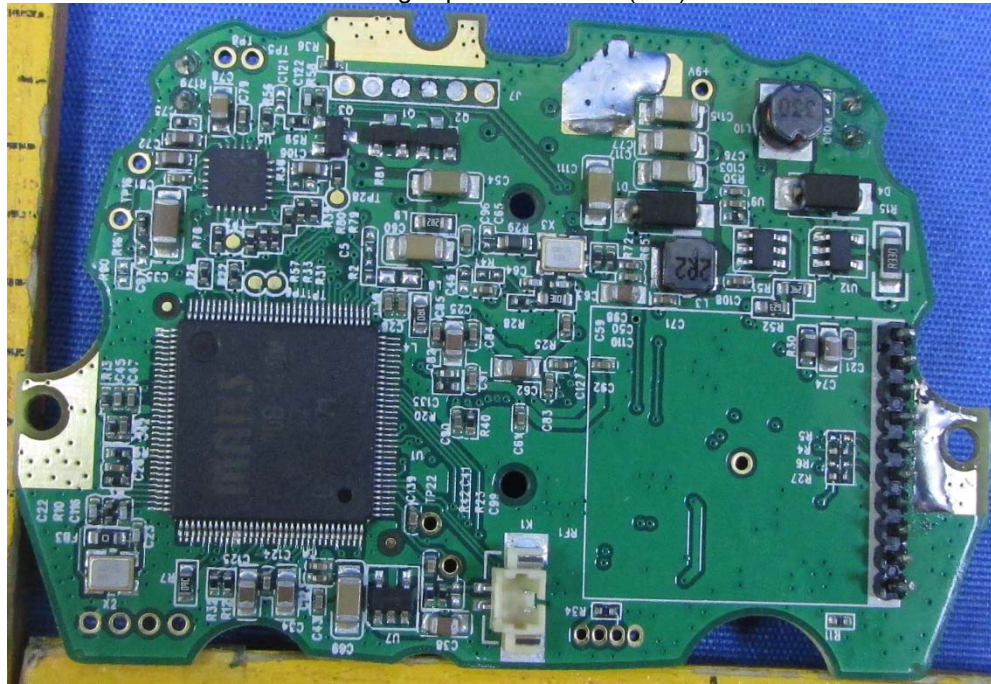
zooming in part view below (add)



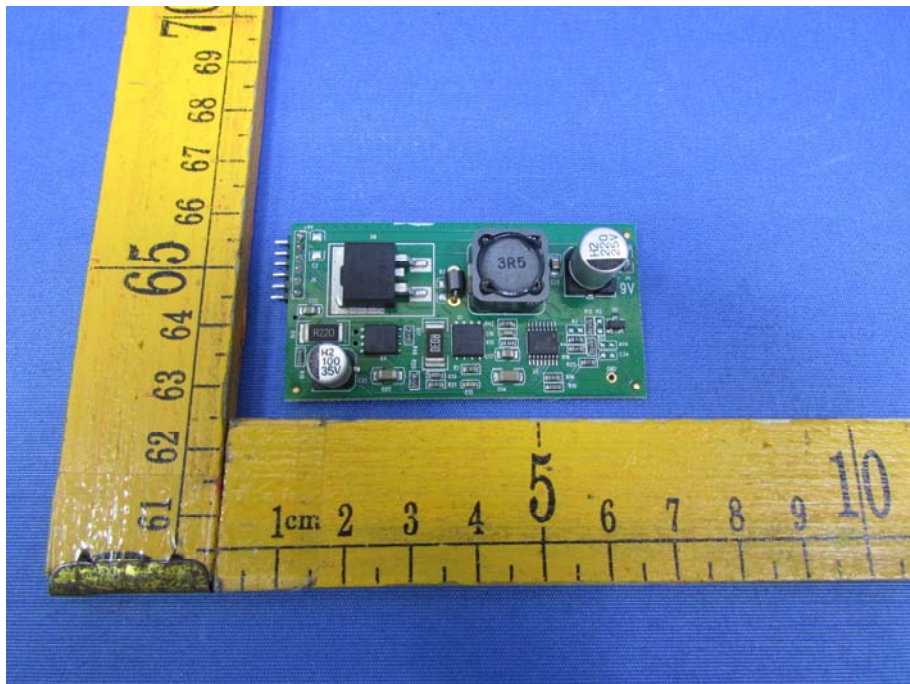
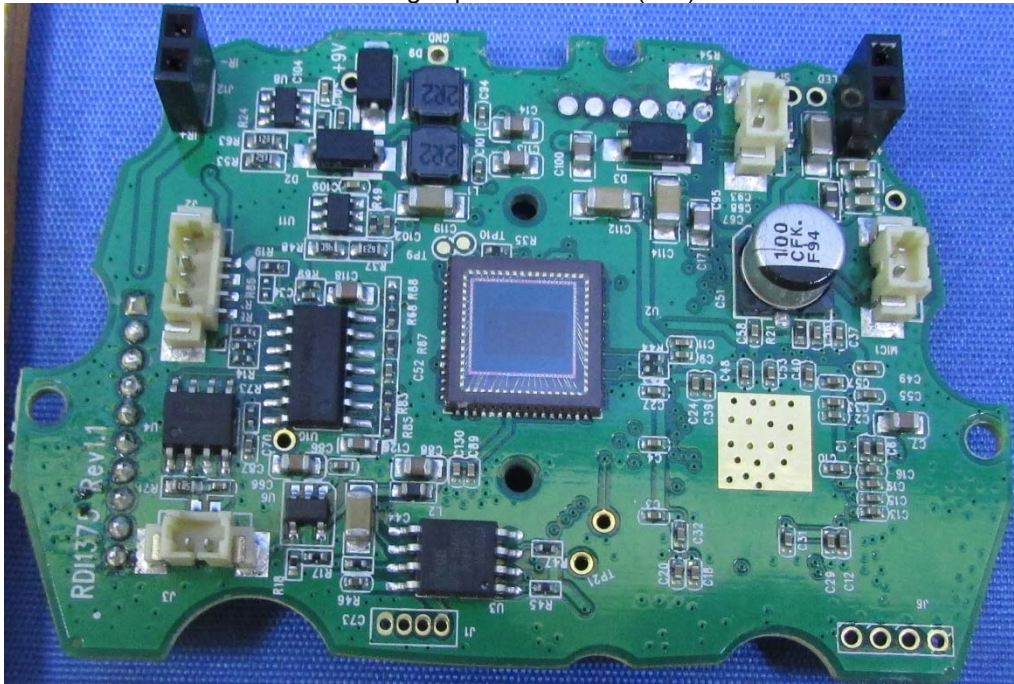
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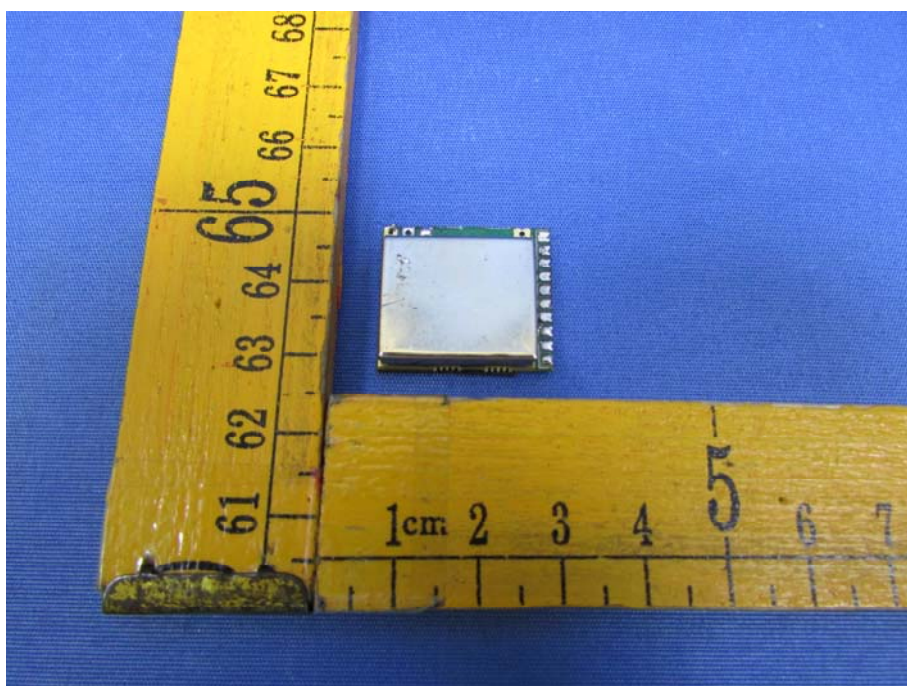
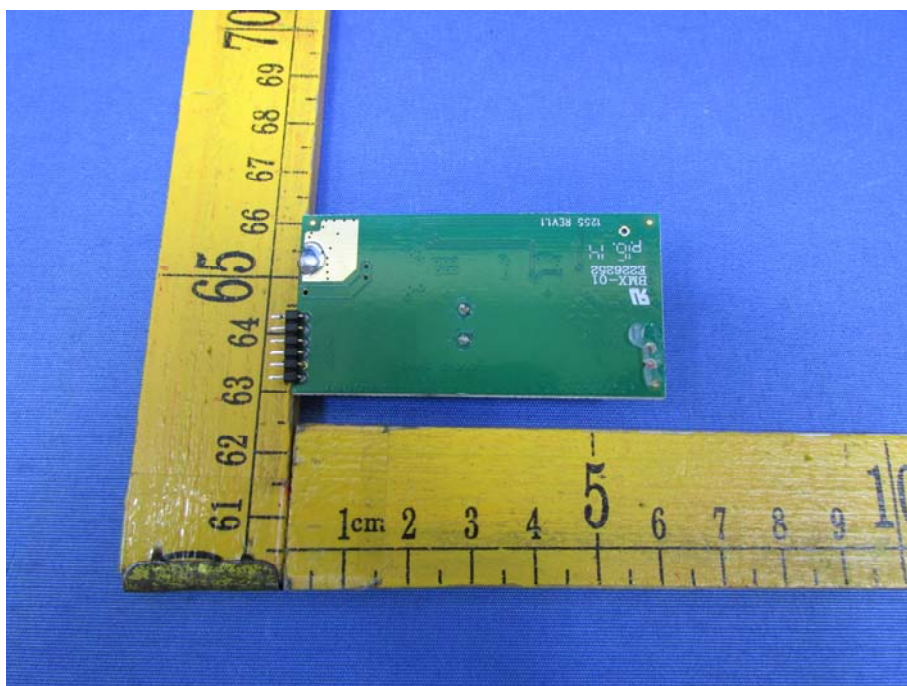


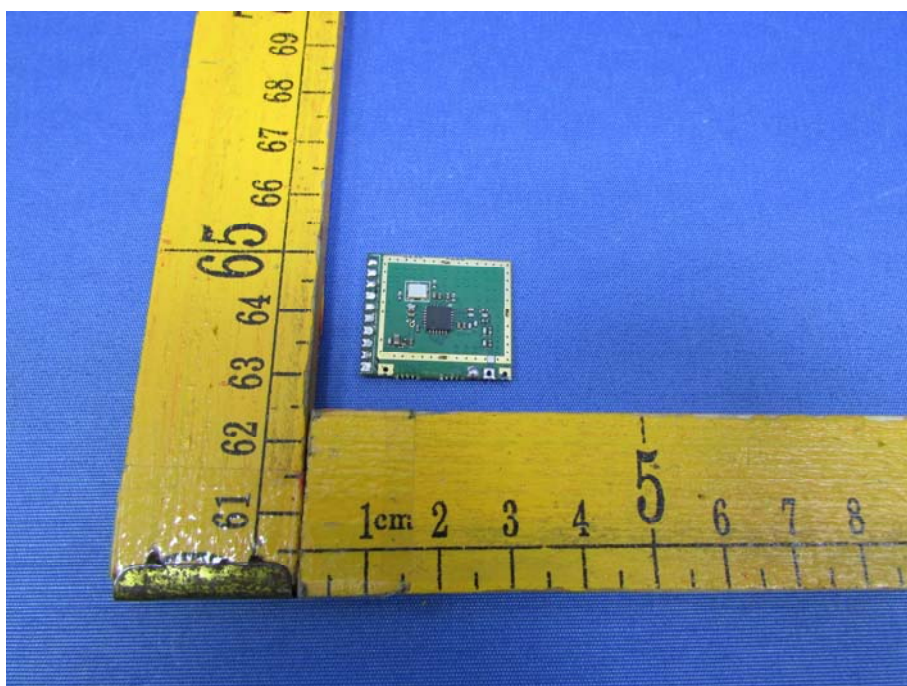
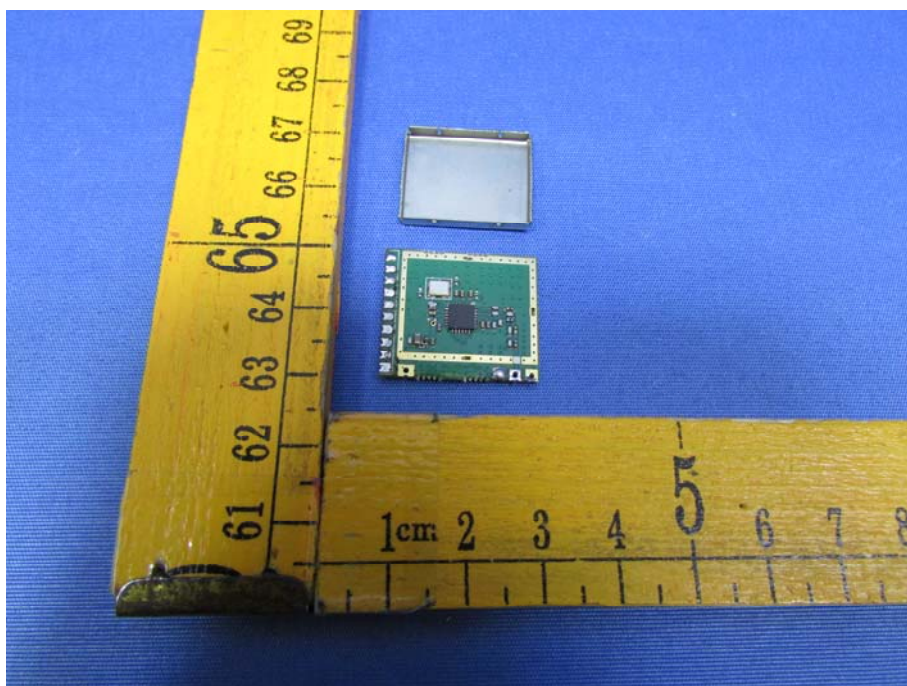
zooming in part view below (add)

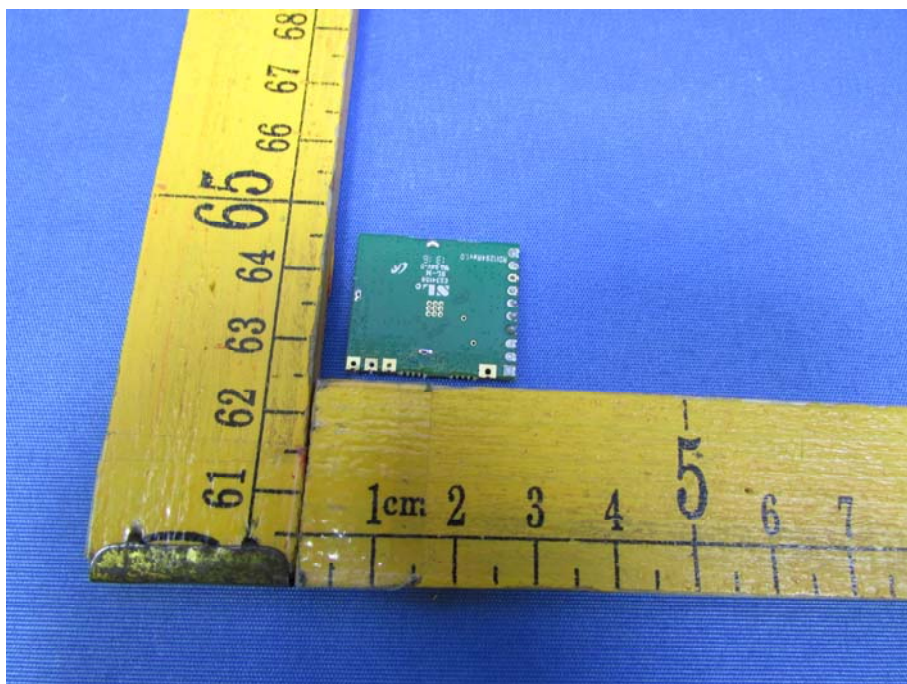
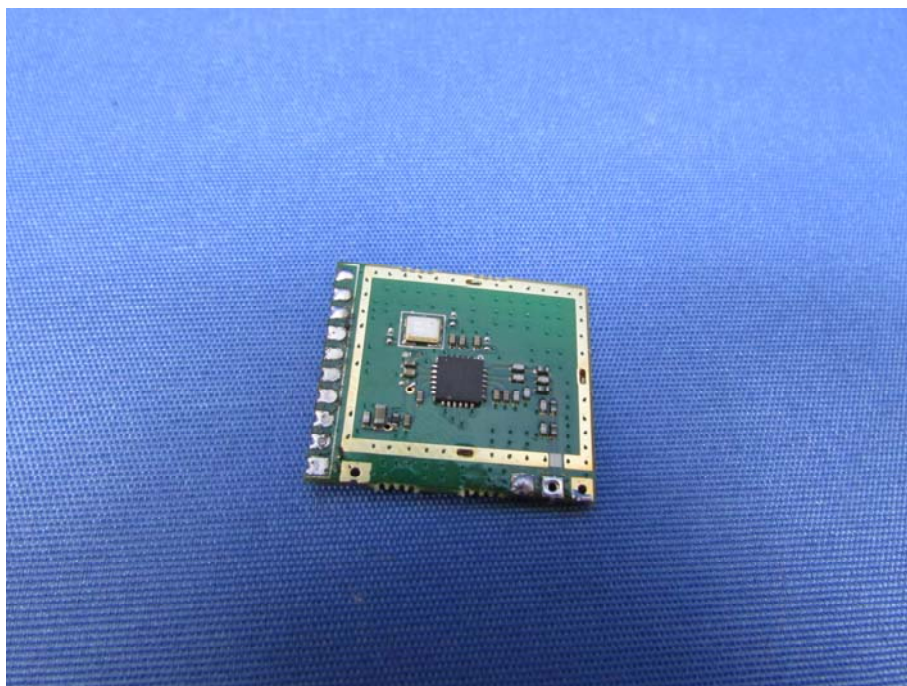


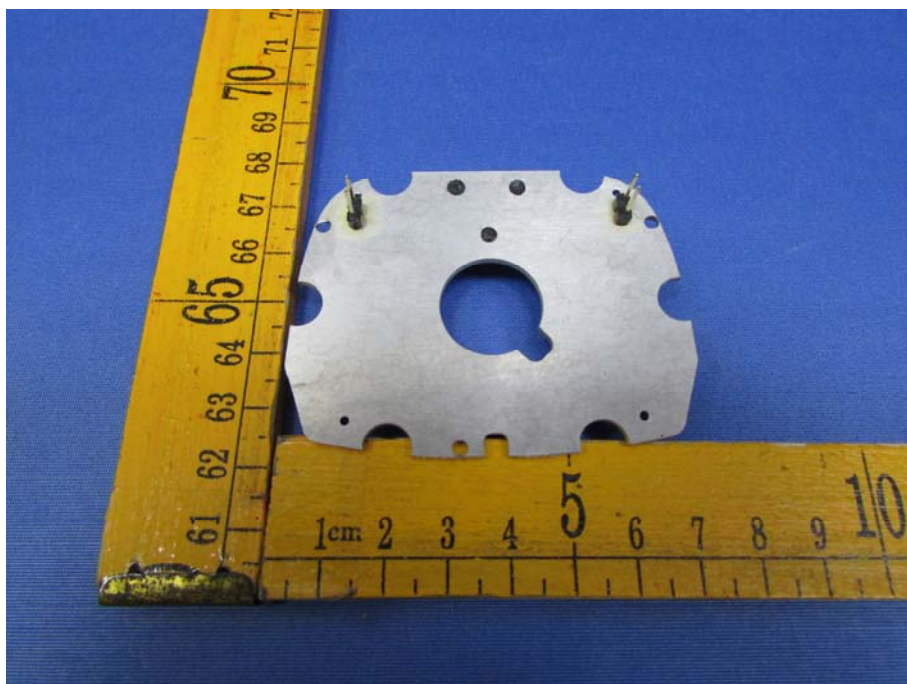
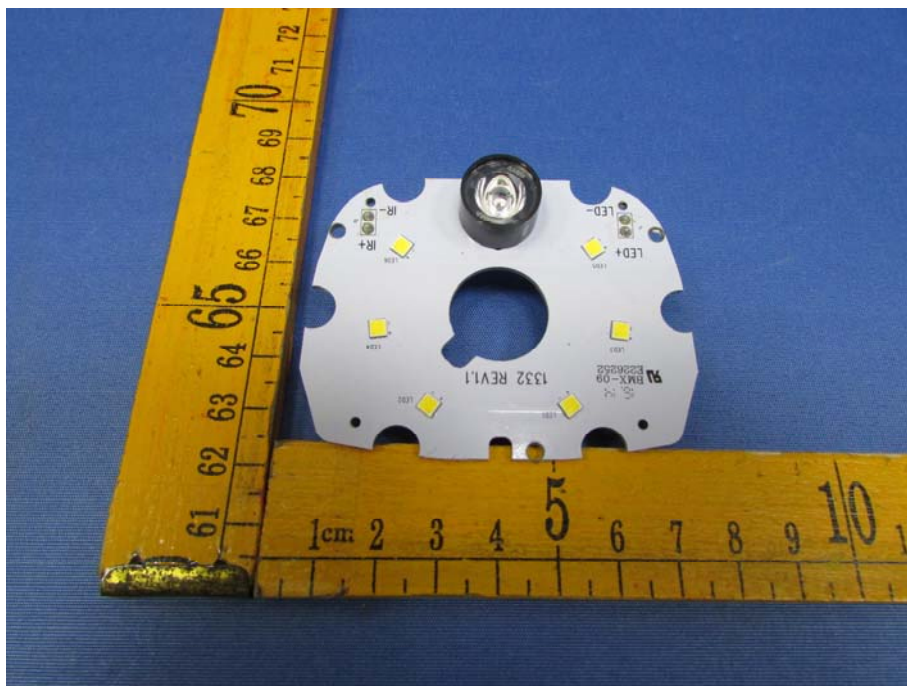
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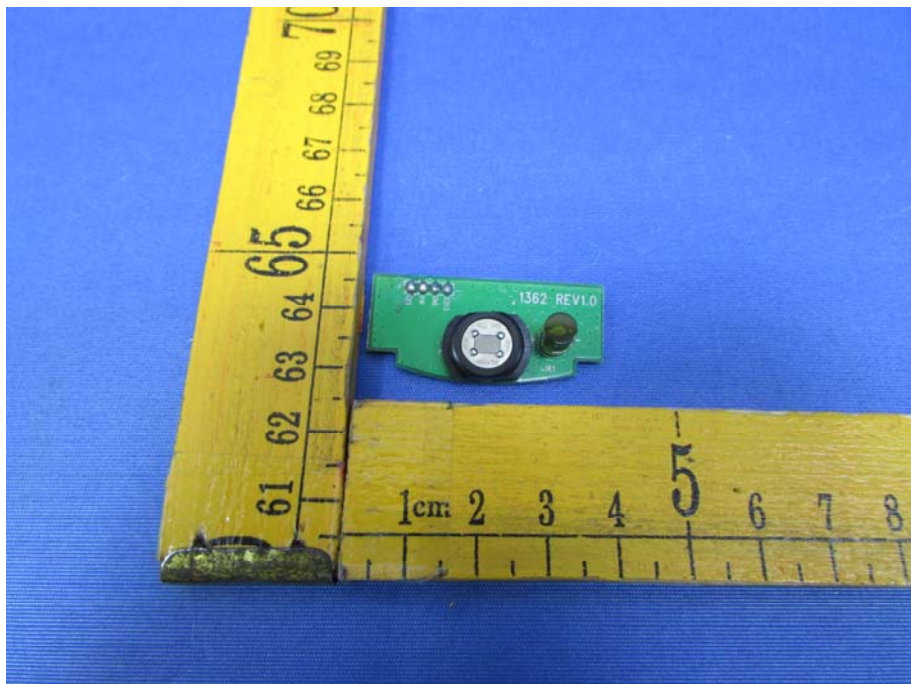
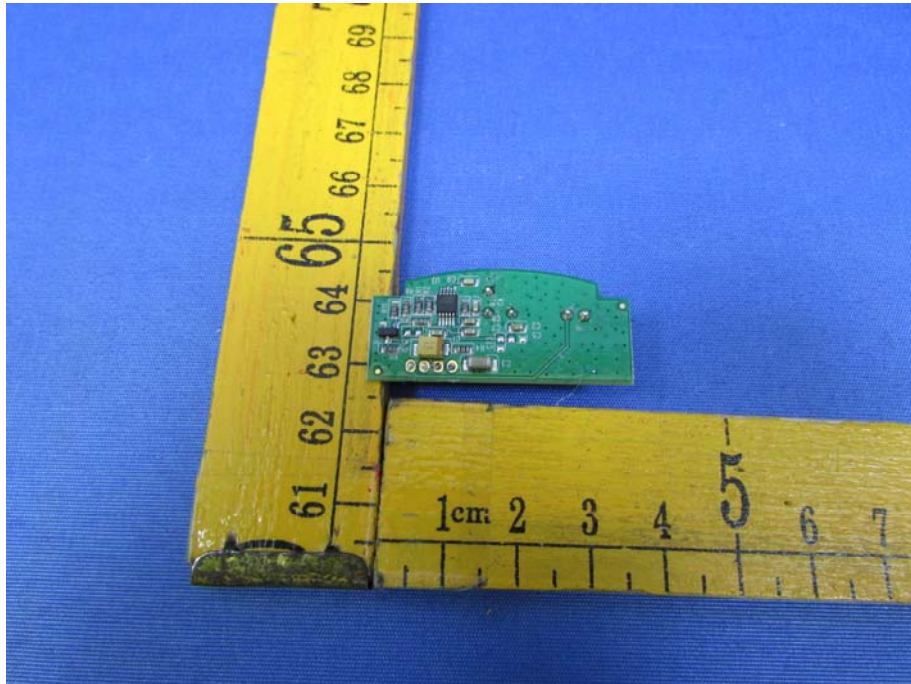












====End of Report====