TEST REPORT

of

FCC Part 15 Subpart C

Full Modular Approval

☒ New Application; ☐ Class I PC; ☐ Class II PC

Product :	**Bluetooth Low Energy module**
Brand:	**iSense Tek**
Model:	**ISBLE1810-x51**
Model Difference:	**N/A**
FCC ID:	**2AI2V-ISBLE1810X5**
FCC Rule Part:	**§15.247, Cat: DTS**
Applicant:	**iSenseTek Technology Inc.**
Address:	**4F-1, No.15, Ln. 360, Sec. 1,Neihu Rd., Neihu Dist., Taipei , Taiwan**

Test Performed by:
International Standards Laboratory
<Lung-Tan LAB>
*Site Registration No.
BSMI: SL2-IN-E-0013; MRA TW1036; TAF: 0997; IC: IC4067B-3;

*Address:
No. 120, Lane 180, Hsin Ho Rd.,
Lung-Tan Dist., Tao Yuan City 325, Taiwan
*Tel : 886-3-407-1718; Fax: 886-3-407-1738

Report No.: **ISL-16LR164FCDTS**
Issue Date : **2016/07/15**

Testing laboratory
0997

Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.
This report MUST not be used to claim product endorsement by TAF, NVLAP or any agency of the Government.
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VERIFICATION OF COMPLIANCE

Applicant:	iSenseTek Technology Inc.
Product Description:	Bluetooth Low Energy module
Brand Name:	iSense Tek
Model No.:	ISBLE1810-x51
Model Difference:	N/A
FCC ID:	2AI2V-ISBLE1810X5
Date of test:	2016/07/04 ~ 2016/07/14
Date of EUT Received:	2016/07/04

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this rport is in compliance with the limits of above standards.

Test By:	Dion Chen	***Date:***	2016/07/15
	Dion Chang / Engineer		
Prepared By:	Gigi yeh	***Date:***	2016/07/15
	Gigi Yeh / Specialist		
Approved By:	Vincent Su	***Date:***	2016/07/15
	Vincent Su / Technical Manager		

Version

Version No.	Date	Description
00	2016/07/15	Initial creation of document

Table of Contents

1 GENERAL INFORMATION

General:

Product Name	Bluetooth Low Energy module
Brand Name	iSense Tek
Model Name	ISBLE1810-x51
Model Difference	N/A
Power Supply	1.8Vdc -3.6Vdc

RF spec.:

Frequency Range:	2402 – 2480MHz
Channel number:	79 channel max
Modulation type:	GFSK
Data Rate:	250kbps, 1Mbps, 2M bps
Tune-up power	3dBm +/- 1.0 dBm
Power Tolerance:	+/- 1dBm
Antenna Designation:	Fixed PCB Ant , 0.5dBi

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.1 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: 2AI2V-ISBLE1810X5** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

1.2 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10: 2013. and RSS-Gen: 2010. Radiated testing was performed at an antenna to EUT distance 3 meters. Radiated testing was performed at an antenna to EUT distance 3 meters.

KDB Document: 558074 D01 DTS Meas Guidance v03r05

1.3 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of **International Standards Laboratory** <Lung-Tan LAB> No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.10: 2013. FCC Registration Number is: TW1036, Canada Registration Number: 4067B-3.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of C63.4: 2014.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR 16-1-1 Quasi-Peak and Average detector mode.

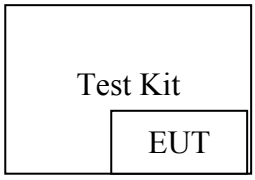
2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8/1.5 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” Is still within the 3dB illumination BW of the measurement antenna. According to the requirements in Section 8 and 13 and Subclause 8.3.1.2 of ANSI C63.10: 2013.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed channel)

Radiated:



AC power line Conduction

Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	NB	Lenovo	X220i	N/A	Non-shield	Non-shield
2	Test Kit	N/A	N/A	N/A	shield	N/A

3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result

5 AC POWER LINE CONDUCTED EMISSION TEST

5.1 Standard Applicable:

According to §15.207 and RSS-Gen §8.8, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

5.2 Measurement Equipment Used:

AC Power Line Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Conduction 04-3 Cable	WOKEN	CFD 300-NL	Conduction 04 -3	07/28/2015	07/27/2016
EMI Receiver 17	Rohde & Schwarz	ESCI 7	100887	09/08/2015	09/07/2016
LISN 18	ROHDE & SCHWARZ	ENV216	101424	02/11/2016	02/10/2017
LISN 19	ROHDE & SCHWARZ	ENV216	101425	03/12/2016	03/11/2017

5.3 EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2009.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

5.4 Measurement Procedure:

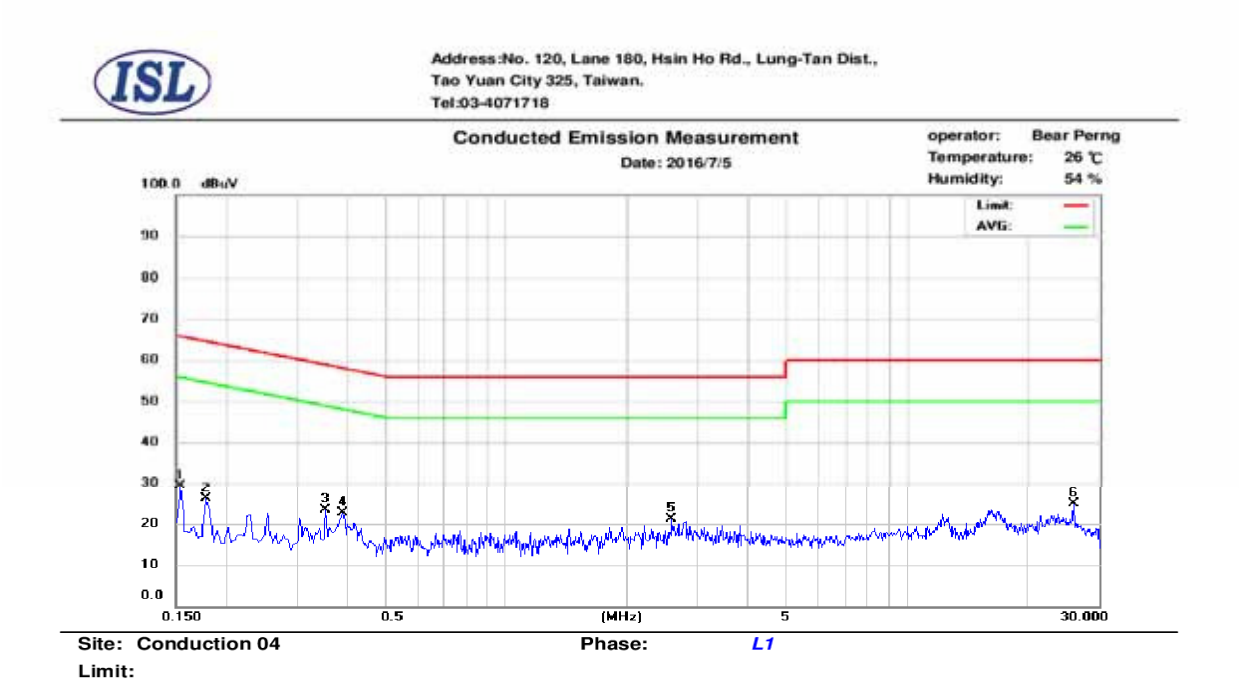
1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.5 Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

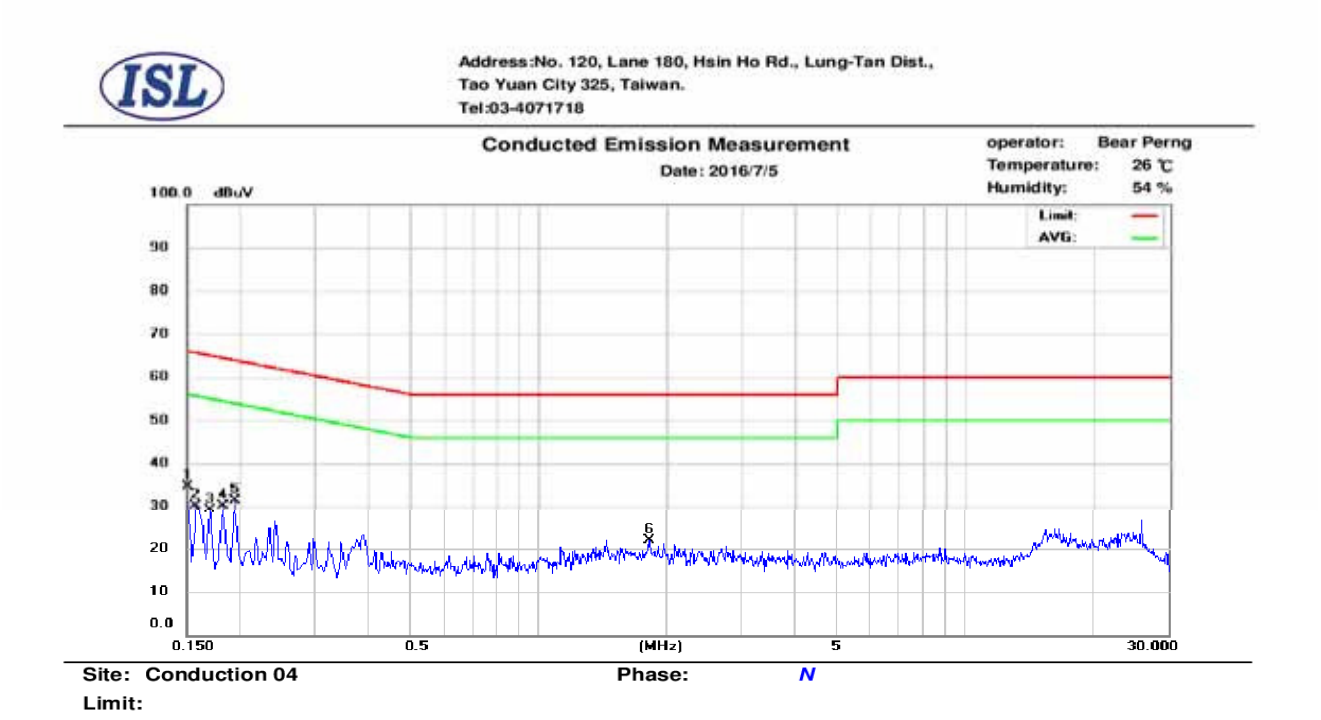
AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation Mode	Test Date:	2016/07/05
Test By:	Dino		



No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.154	17.68	1.80	9.69	27.37	65.78	-38.41	11.49	55.78	-44.29
2	0.178	12.88	0.03	9.69	22.57	64.58	-42.01	9.72	54.58	-44.86
3	0.354	3.85	0.09	9.69	13.54	58.87	-45.33	9.78	48.87	-39.09
4	0.390	11.31	9.73	9.69	21.00	58.06	-37.06	19.42	48.06	-28.64
5	2.586	6.71	2.78	9.77	16.48	56.00	-39.52	12.55	46.00	-33.45
6	25.998	14.20	12.23	10.12	24.32	60.00	-35.68	22.35	50.00	-27.65

Operation Mode:	Operation Mode	Test Date:	2016/07/05
Test By:	Dino		



No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.150	18.72	1.06	9.68	28.40	66.00	-37.60	10.74	56.00	-45.26
2	0.158	17.20	0.31	9.68	26.88	65.57	-38.69	9.99	55.57	-45.58
3	0.170	15.83	0.47	9.68	25.51	64.96	-39.45	10.15	54.96	-44.81
4	0.182	14.29	1.16	9.68	23.97	64.39	-40.42	10.84	54.39	-43.55
5	0.194	11.45	1.33	9.68	21.13	63.86	-42.73	11.01	53.86	-42.85
6	1.822	8.27	4.25	9.73	18.00	56.00	-38.00	13.98	46.00	-32.02

6 PEAK OUTPUT POWER MEASUREMENT

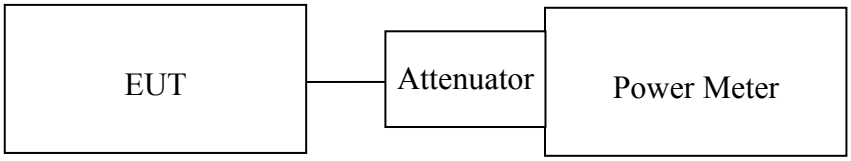
6.1 Standard Applicable:

According to

6.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Power Meter 05	Anritsu	ML2495A	1116010	07/29/2015	07/28/2016
Power Sensor 05	Anritsu	MA2411B	34NKF50	07/29/2015	07/28/2016
Power Sensor 06	DARE	RPR3006W	13I00030SNO33	11/03/2015	11/02/2016
Power Sensor 07	DARE	RPR3006W	13I00030SNO34	11/03/2015	11/02/2016
Temperature Chamber	KSON	THS-B4H100	2287	06/04/2016	06/03/2017
DC Power supply	ABM	8185D	N/A	09/05/2015	09/04/2016
AC Power supply	EXTECH	CFC105W	NA	12/26/2015	12/25/2016
Attenuator	Woken	Watt-65m3502	11051601	NA	NA
Splitter	MCLI	PS4-199	12465	12/26/2015	12/25/2017
Spectrum analyzer	Agilent	N9030A	MY51360021	10/02/2015	10/01/2016

6.3 Test Set-up:



6.4 Measurement Procedure:

Refer to section 9.1.3 and 9.2.3 Peak and Avgerage Conducted Output Power Measurement Procedure of KDB Document: 558074 D01 DTS Meas Guidance v03r05

6.5 Measurement Result:

Test Mode

Frequency (MHz)	Peak Reading Power (dBm)	Cable Loss	Output Power (dBm)	Output Power (W)	Limit (W)
Low	3.37	0.00	3.37	0.00217	1
Mid	3.46	0.00	3.46	0.00222	1
High	3.53	0.00	3.53	0.00225	1

Offset: 0.5dB

7 6dB Bandwidth & 99% Bandwidth

7.1 Standard Applicable:

According to

7.5 Measurement Result:

CH	6dB Bandwidth	Limit (KHZ)

6dB Bandwidth Test Data CH-Low

6dB Bandwidth Test Data CH-Mid

6dB Bandwidth Test Data CH-High

8 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

8.1 Standard Applicable:

According to

8.2.2 Radiated emission:

Chamber 14(966)					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer 21(26.5GHz)	Agilent	N9010A	MY49060537	07/30/2015	07/29/2016
Spectrum Analyzer 20(6.5GHz)	Agilent	E4443A	MY48250315	05/20/2016	05/19/2017
Spectrum Analyzer 22(43GHz)	R&S	FSU43	100143	05/22/2016	05/21/2017
Dipole antenna	SCHWARZBECK	VHAP,30-300	919	12/28/2015	12/27/2017
Dipole antenna	SCHWARZBECK	UHAP,300-1000	1195	12/28/2015	12/27/2017
Loop Antenna9K-30M	A.H.SYSTEM	SAS-564	294	06/17/2015	06/16/2017
Bilog Antenna30-1G	SCHWARZBECK	VULB9168	644	03/02/2016	03/01/2017
Horn antenna1-18G	ETS	3117	00066665	11/30/2015	11/29/2016
Horn antenna26-40G(05)	Com-power	AH-640	100A	01/21/2015	01/20/2017
Horn antenna18-26G(04)	Com-power	AH-826	081001	07/24/2015	07/23/2017
Preamplifier9-1000M	HP	8447D	NA	03/11/2016	03/10/2017
Preamplifier1-18G	MITEQ	AFS44-00101800-25-10P-44	1329256	07/28/2015	07/27/2016
Preamplifier1-26G	EM	EM01M26G	NA	03/10/2016	03/09/2017
Preamplifier26-40G	MITEQ	JS-26004000-27-5A	818471	07/23/2015	07/22/2017
Cable1-18G	HUBER SUHNER	Sucoflex 106	NA	11/25/2015	11/24/2016
Cable UP to 1G	HUBER SUHNER	RG 214/U	NA	10/02/2015	10/01/2016
SUCOFLEX 1GHz~40GHz cable	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	11/03/2015	11/02/2017
Signal Generator	R&S	SMU200A	102330	03/28/2016	03/27/2017
Signal Generator	Anritsu	MG3692A	20311	11/04/2015	11/03/2016
2.4G Filter	Micro-Tronics	Brm50702	76	12/26/2015	12/25/2016

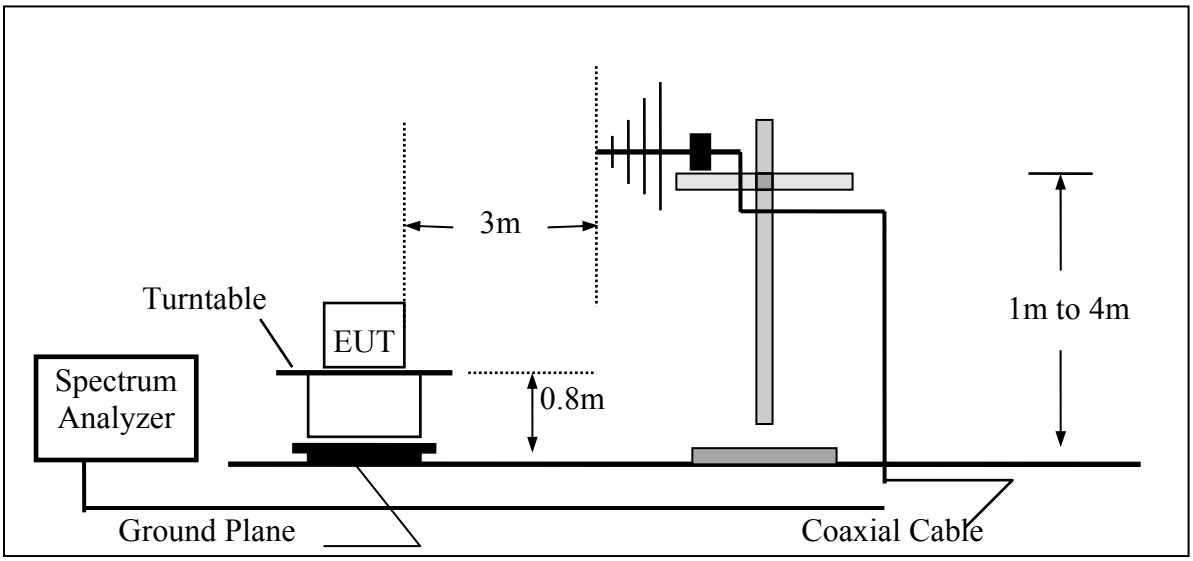
8.3 Test SET-UP:

8.3.1 Conducted Emission at antenna port:

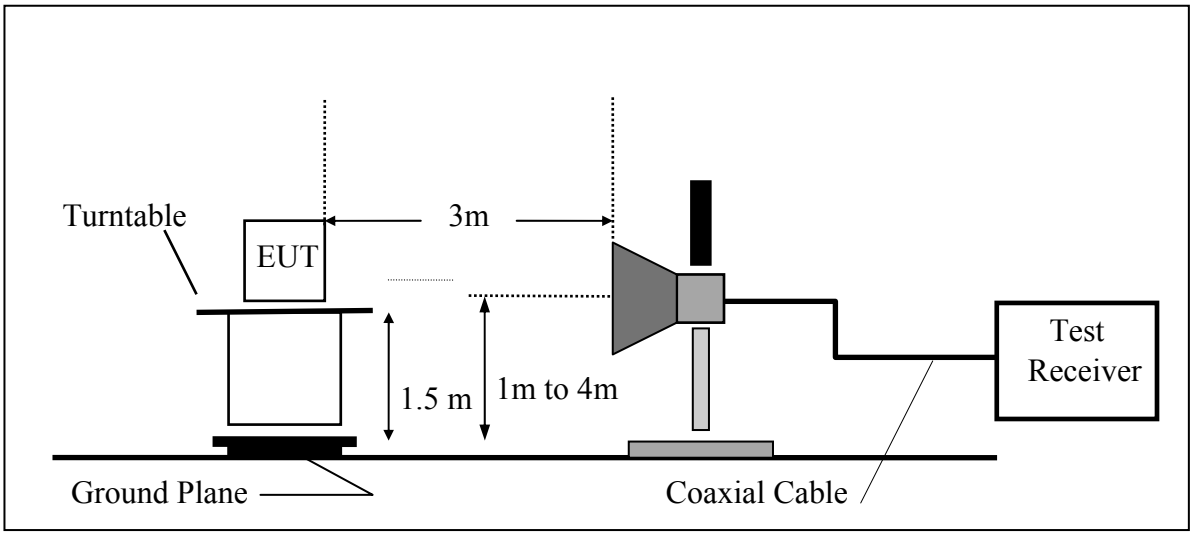
Refer to section 6.3 for details.

8.3.2 Radiated emission:

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



8.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, Sweep = auto
5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
6. Repeat above procedures until all frequency measured were complete.

Refer to section 11 and 12 emissions in restricted and non-estricted frequency bands Measurement Procedure of KDB Document: 558074 D01 DTS Meas Guidance v03r05

The measurement of unwanted emissions at the edge of the authorized frequency bands can be complicated by the leakage of RF energy from the fundamental emission into the RBW pass band. Thus, for measurements at the band edges, a narrower resolution bandwidth (no less than 10 kHz) can be used within the first 1 MHz beyond the fundamental emission, provided that that measured energy is subsequently integrated over the appropriate reference bandwidth (i.e., 100 kHz or 1 MHz). This integration can be performed using the band power function of the spectrum analyzer or by summing the spectral levels (in linear power units) over the appropriate reference bandwidth.

8.5 Field Strength Calculation:

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and EUTy Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

8.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

Band Edges Test Data

Radiated Emission:

Operation Mode	TX CH Low	Test Date	2016/07/11
Fundamental Frequency	2402 MHz	Test By	Dino
Temperature	25		

Operation Mode	TX CH High	Test Date	2016/07/11
Fundamental Frequency	2480 MHz	Test By	Dino
Temperature	25		

9 SPURIOUS RADIATED EMISSION TEST

9.1 Standard Applicable

According to

9.4 Measurement Procedure:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Repeat above procedures until all frequency measured were complete.

Refer to section 11 and 12 emissions in restricted and non-restricted frequency bands Measurement Procedure of KDB Document: 558074 D01 DTS Meas Guidance v03r05

9.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and EUTy Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

9.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

Radiated Spurious Emission Measurement Result: (below 1GHz)

Operation Mode	TX CH Low	Test Date	2016/07/11
Fundamental Frequency	2402MHz	Test By	Dino
Temperature	25		

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH Mid	Test Date	2016/07/11
Fundamental Frequency	2442MHz	Test By	Dino
Temperature	25		

Radiated Spurious Emission Measurement Result (below 1GHz)

Operation Mode	TX CH High	Test Date	2016/07/11
Fundamental Frequency	2480MHz	Test By	Dino
Temperature	25		

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Low	Test Date	2016/07/11
Fundamental Frequency	2402 MHz	Test By	Dino
Temperature	25		

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH Mid	Test Date	2016/07/11
Fundamental Frequency	2442 MHz	Test By	Dino
Temperature	25		

Radiated Spurious Emission Measurement Result (above 1GHz)

Operation Mode	TX CH High	Test Date	2016/07/11
Fundamental Frequency	2480 MHz	Test By	Dino
Temperature	25		

10 Peak Power Spectral Density

10.1 Standard Applicable:

According to

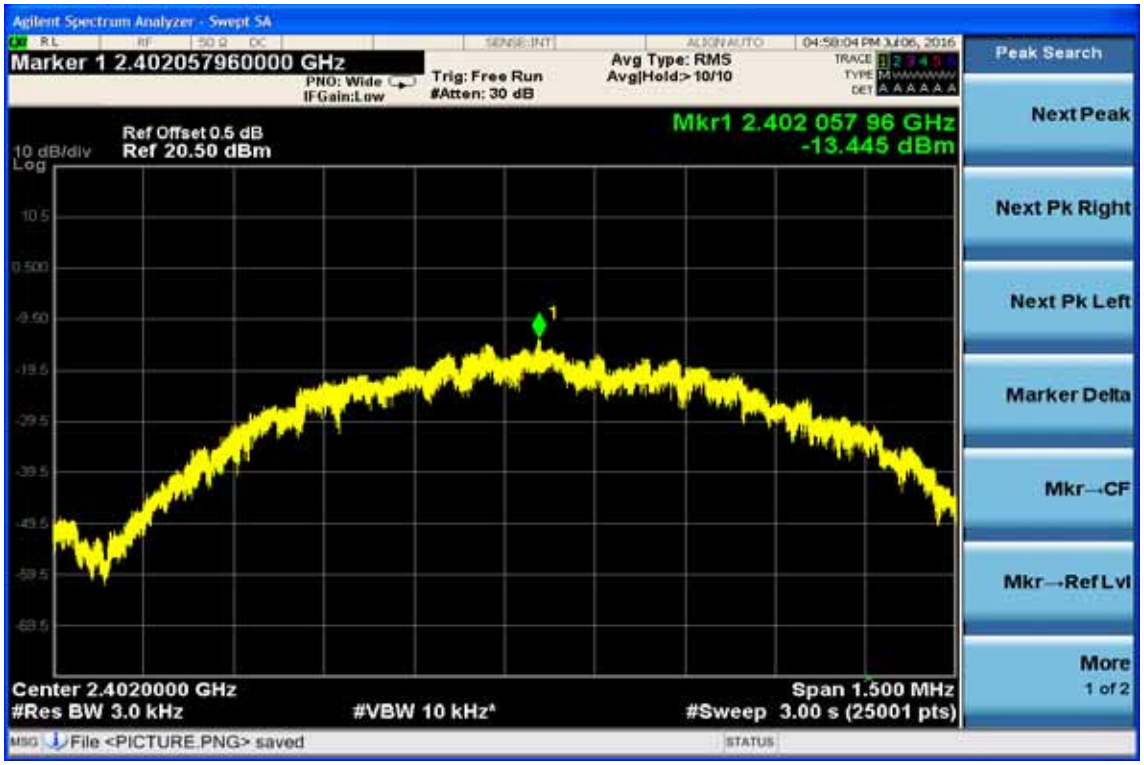
10.5 Measurement Result:

Test mode

Frequency MHz	Power Density Level (dBm)/3KHz	Maximum Limit (dBm)
Low	-13.445	8
Mid	-12.901	8
High	-12.775	8

Test mode

Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

Power Spectral Density Test Plot (CH-High)

11 ANTENNA REQUIREMENT

11.1 Standard Applicable:

According to