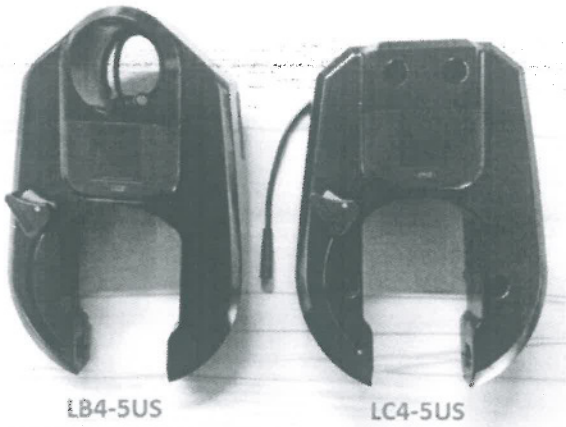


Prüfbericht-Nr.: Test Report No.:	50070787 001	Auftrags-Nr.: Order No.:	154220594	Seite 1 von 27 Page 1 of 27
Kunden-Referenz-Nr.: Client Reference No.:	654233	Auftragsdatum: Order date:	01.03.2017	
Auftraggeber: Client:	MOBIKE (HONGKONG) LIMITED 2/F HONGKONG OFFSHORE CTR 28, AUSTIN AVENUE TST KLN, HONGKONG			
Prüfgegenstand: Test item:	Mobike Lock			
Bezeichnung / Typ-Nr.: Identification / Type No.:	LB4-5US; LC4-5US FCC ID: 2AK4SLBC4-5US			
Auftrags-Inhalt: Order content:	Complete test			
Prüfgrundlage: Test specification:	FCC CFR47 Part 15, Subpart C Section 15.247 ANSI C63.10: 2013 KDB 558074 D01 DTS Meas Guidance v03r05			
Wareneingangsdatum: Date of receipt:	12.09.2016			
Prüfmuster-Nr.: Test sample No.:	A000475161-001			
Prüfzeitraum: Testing period:	01.24.2017 to 02.06.2017			
Ort der Prüfung: Place of testing:	MRT Technology(Suzhou) Co., Ltd.			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
02.07.2017	Elliot Zhang / Senior Project Engineer	02.07.2017	Shi Li / Section Manager	
Datum	Name / Stellung	Unterschrift	Datum	Name / Stellung
Date	Name / Position	Signature	Date	Name / Position
Sonstiges / Other				
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:		Prüfmuster vollständig und unbeschädigt Test item complete and undamaged		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

5.1.2 PEAK OUTPUT POWER

RESULT: Pass

5.1.3 6dB BANDWIDTH

RESULT: Pass

5.1.4 CONDUCTED SPURIOUS EMISSIONS

RESULT: Pass

5.1.5 POWER SPECTRAL DENSITY

RESULT: Pass

5.2.1 CONDUCTED EMISSION

RESULT: N/A

5.3.1 RADIATED SPURIOUS EMISSION

RESULT: Pass

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1. General Remarks

1.1 Complementary Materials

Null.

2. Test Sites

2.1 Test Facilities

MRT Technology (Suzhou) Co., Ltd.

D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

The used test equipment is in accordance with CISPR 16 for measurement of radio interference.

The Federal Communications Commission has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance with the requirements of section 2.948 of the FCC rules. The description of the test facility is listed under FCC registration number 809388.

The Industry Canada has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance. The description of the test facility is listed under chambers filing number 11384A.

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment**Radiated Test Equipments**

Instrument	Manufacturer	Type No.	Asset No.	Cali. Due Date
Spectrum Analyzer	Agilent	E4447A	MY45300136	12.08.2017
EMI Test Receiver	R&S	ESR7	101209	11.03.2017
Preamplifier	Schwarzbeck	BBV 9721	9721-008	04.16.2017
Preamplifier	Agilent	83017A	MY53270040	03.29.2017
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	12.14.2017
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	11.07.2017
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	11.07.2017
Broadband Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170549	01.04.2018
Digital Thermometer & Hygrometer	Minggao	N/A	N/A	11.30.2017

Conducted Test Equipments

Instrument	Manufacturer	Type No.	Asset No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	05.08.2017
USB Wideband Power Sensor	Boonton	55006	8911	05.08.2017
Temperature/Humidity Meter	Yuhuaize	N/A	N/A	12.20.2017

2.3 Traceability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

Table 2: Measurement Uncertainty

Measurement Type	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	±0.39dB
	> 1GHz	±0.68dB
Radiated Emission	30MHz - 1GHz	±5.34dB
	> 1GHz	±5.40dB

3. General Product Information

3.1 Product Function and Intended Use

The EUTs (Equipments Under Test) are smart locks which use the technic of GSM / WCDMA / GPS / Bluetooth 4.0 Low Energy Only. There are two models: LB4-5US and LC4-5US, all of the two models are the same except the corresponding structure due to different installation method.

The aim of this report is to evaluate the RF characteristic of the Bluetooth 4.0 Low Energy Only.

For details refer to the User Manual and Circuit Diagram.

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Description of EUT	
Product Name:	Mobike Lock
Brand Name:	mobike
Model No.:	LB4-5US; LC4-5US
Rated Voltage:	DC 3.7V
Type of Product:	Mobile Device
GSM	
Support Networks:	GPRS, EDGE
Support Bands:	Dual band GSM 850/1900MHz
Frequency Range:	GSM850: Tx: 824-849MHz, Rx: 869-894MHz PCS1900: Tx: 1850-1910MHz, Rx: 1930-1990MHz
Modulation Type:	GMSK, 8PSK
Multislot Class:	GPRS: Class 12 EDGE: Class 12
Mobile Station Class:	GPRS: Class B EDGE: Class B
Antenna Type:	PIFA
Antenna Gain:	1.23 dBi
WCDMA	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Bands:	Dual band UMTS 850/1900
Frequency Range:	CLR850: Tx: 824-849MHz, Rx: 869-894MHz PCS1900: Tx: 1850-1910MHz, Rx: 1930-1990MHz

Modulation Type:	BPSK, QPSK, 16QAM
Category:	WCDMA: up to 384kbps DL/UL HSDPA: Cat.8 HSUPA: Cat.6
Antenna Type:	PIFA
Antenna Gain:	1.23 dBi
BLE	
Frequency Range:	2402 – 2480MHz
Modulation Type:	GFSK
Antenna Type:	Monopole
Antenna Gain:	4.83 dBi

Table 4: RF Channel and Frequency

Support Band	Support Network	Channel Number	Channel Frequency
2.4GHz ISM	Bluetooth Low Energy	37	2402 MHz
		17	2440 MHz
		39	2480 MHz

3.3 Independent Operation Modes

Test Mode	Network	Band	Channel
TM1	Bluetooth Low Energy	2.4GHz ISM	37
TM2			17
TM3			39

Note:

According to the difference between the two models, which will not affect the test result, the Model LB4-5US was chosen for the all tests.

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Bill of Material
- PCB Layout
- Photo Document
- Circuit Diagram
- Instruction Manual
- Rating Label

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All testing were performed according to the procedures in ANSI C63.10: 2013.

4.3 Special Accessories and Auxiliary Equipment

Null.

4.4 Countermeasures to achieve EMC Compliance

Null.

5. Test Results

5.1 Conducted Testing at Antenna Port

5.1.1 Antenna Requirement

RESULT:**Pass**

According to the manufacturer declared, the EUT has one monopole antenna, the directional gain of antenna is 4.83 dBi and the antenna is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Table 5: Antenna Requirement

FCC 15.203 – Antenna Requirement 1	
Requirement:	No antenna other than that furnished by the responsible party shall be used with the device
Results:	Antenna type: Monopole
Verdict:	PASS

FCC 15.204 – Antenna Requirement 2	
Requirement:	An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator.
Results:	Only one integral antenna can be used
Verdict:	PASS

5.1.2 Peak Output Power

RESULT:**Pass**

Date of testing : 01.24.2017
Test standard : FCC Part 15.247(b)(3)
Test procedure : ANSI C63.10: 2013
Clause 9.1 of KDB 558074 D01 v03r05
Limit : FCC Part 15.247(b)(3)
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : TM1 to TM3
Ambient temperature : 25°C
Relative humidity : 52%
Atmospheric pressure : 101kPa

Table 6: Peak Output Power

Mode	Freq. [MHz]	Maximum Peak Conducted Output Power [dBm]	Maximum Average Conducted Output Power [dBm]	Limit [dBm]
BLE	2402	0.42	0.23	30
	2440	0.48	0.27	30
	2480	-0.06	-0.27	30



Figure 2: 6dB Bandwidth, 2440MHz



Figure 3: 6dB Bandwidth, 2480MHz



5.1.4 Conducted Spurious Emissions

RESULT:
Pass

Date of testing : 01.24.2017
 Test standard : FCC Part 15.247(d)
 Test procedure : ANSI C63.10: 2013
 Clause 11&12 of KDB 558074 D01 v03r05
 Limit : FCC Part 15.247(d)
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : TM1 to TM3
 Ambient temperature : 25°C
 Relative humidity : 52%
 Atmospheric pressure : 101kPa

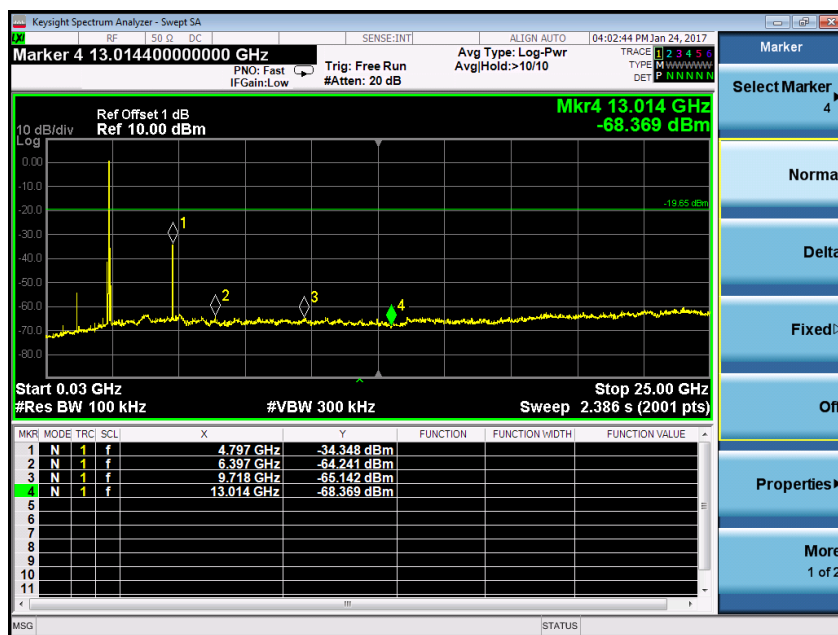
Figure 4: Conducted Spurious Emission, 2402MHz


Figure 5: Conducted Spurious Emission, 2440MHz

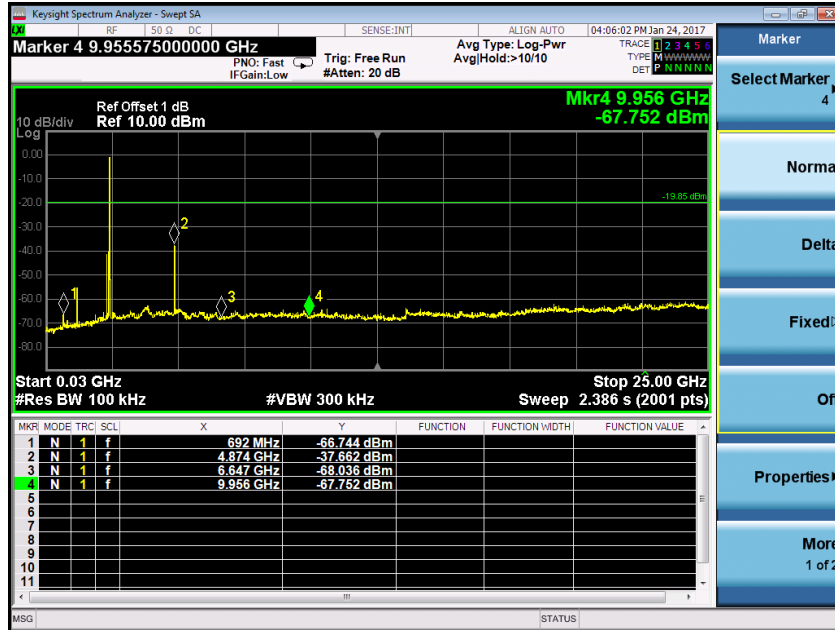
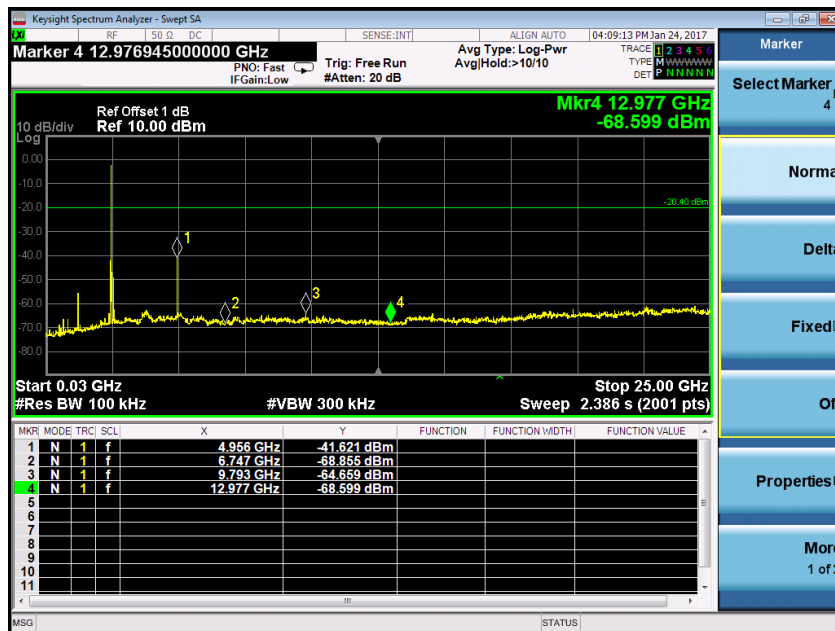
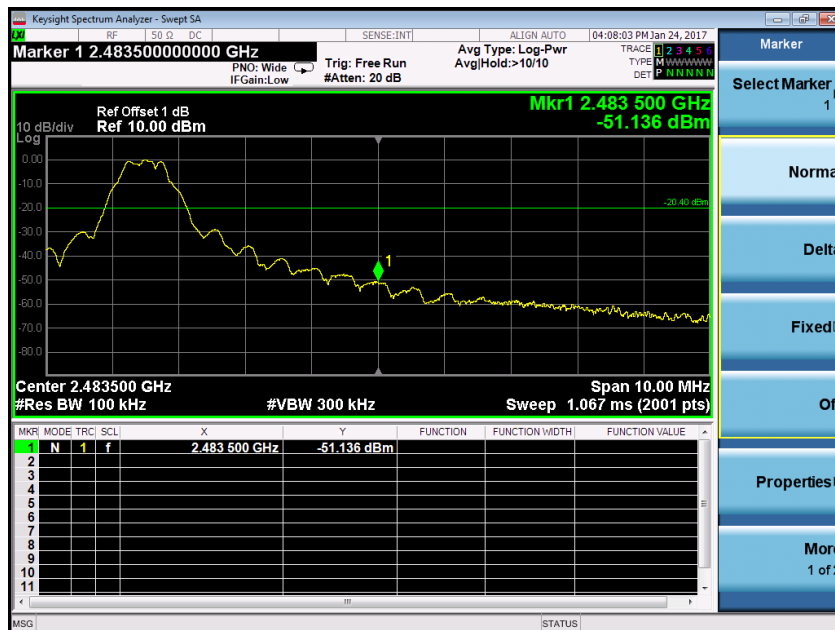


Figure 6: Conducted Spurious Emission, 2480MHz





5.1.5 Power Spectral Density

RESULT:**Pass**

Date of testing : 01.24.2017
Test standard : FCC Part 15.247(e)
Test procedure : ANSI C63.10: 2013
Clause 10 of KDB 558074 D01 v03r05
Limit : FCC Part 15.247(e)
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : TM1 to TM3
Ambient temperature : 25°C
Relative humidity : 52%
Atmospheric pressure : 101kPa

Table 8: Power Spectral Density

Mode	Frequency [MHz]	Result [dBm/3kHz]	Limit [dBm/3kHz]
BLE	2402	-13.678	8
	2440	-13.426	8
	2480	-13.836	8

Figure 9: Power Spectral Density, 2402MHz

Figure 10: Power Spectral Density, 2440MHz


Figure 11: Power Spectral Density, 2480MHz



5.2 Emission in the Frequency Range up to 30MHz

5.2.1 Conducted Emission

RESULT:**N/A**

Date of testing	: N/A
Test standard	: FCC Part 15.207 (a)
Test procedure	: ANSI C63.10: 2013
Limit	: FCC Part 15.207(a)
Kind of test site	: Shielded room

Note:

This test was not performed since the EUT was powered by build-in battery.

5.3 Emission in the Frequency Range above 30MHz

5.3.1 Radiated Spurious Emission

RESULT:**Pass**

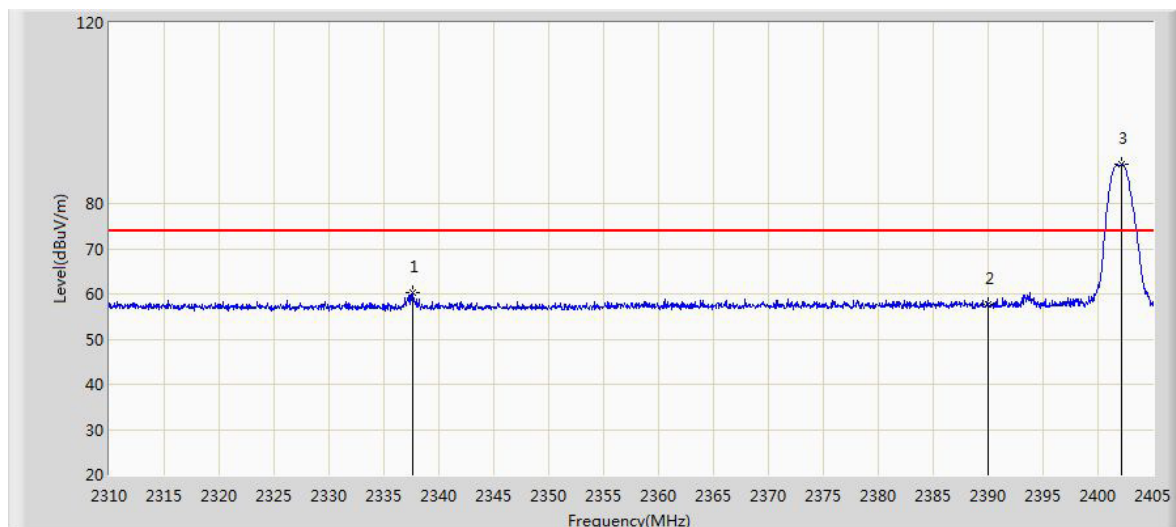
Date of testing	: 02.06.2017
Test standard	: FCC Part 15.247(d)
Test procedure	: ANSI C63.10: 2013 Clause 11&12 of KDB 558074 D01 v03r05
Limit	: FCC Part 15.247(d) FCC Part 15.209(a)
Kind of test site	: 3m Semi-Anechoic Chamber

Test setup

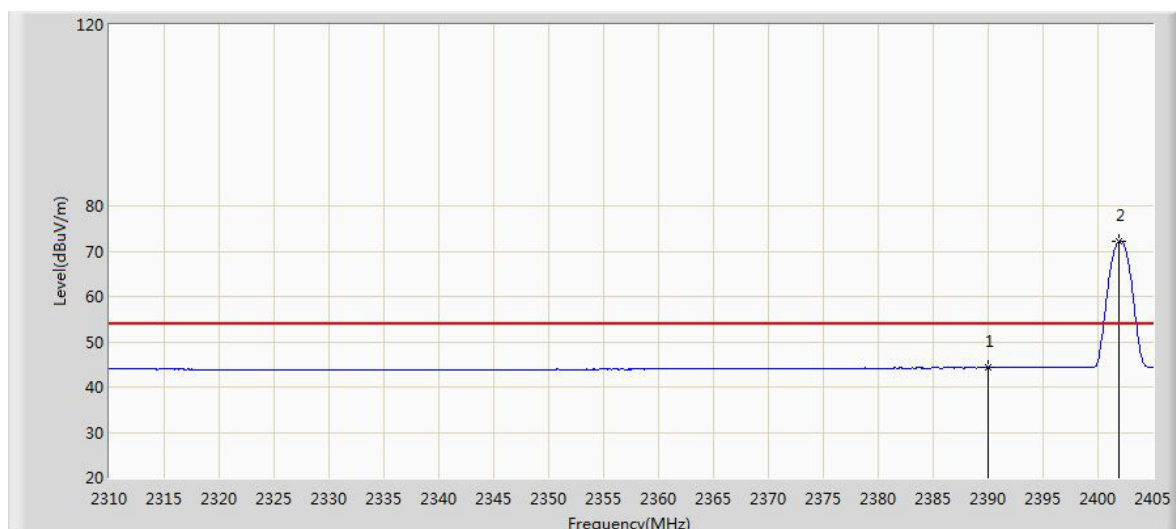
Test Channel	: Low/ Middle/ High
Operation Mode	: TM1 to TM3
Ambient temperature	: 25°C
Relative humidity	: 52%
Atmospheric pressure	: 101kPa

Table 9: Radiated Spurious Emission

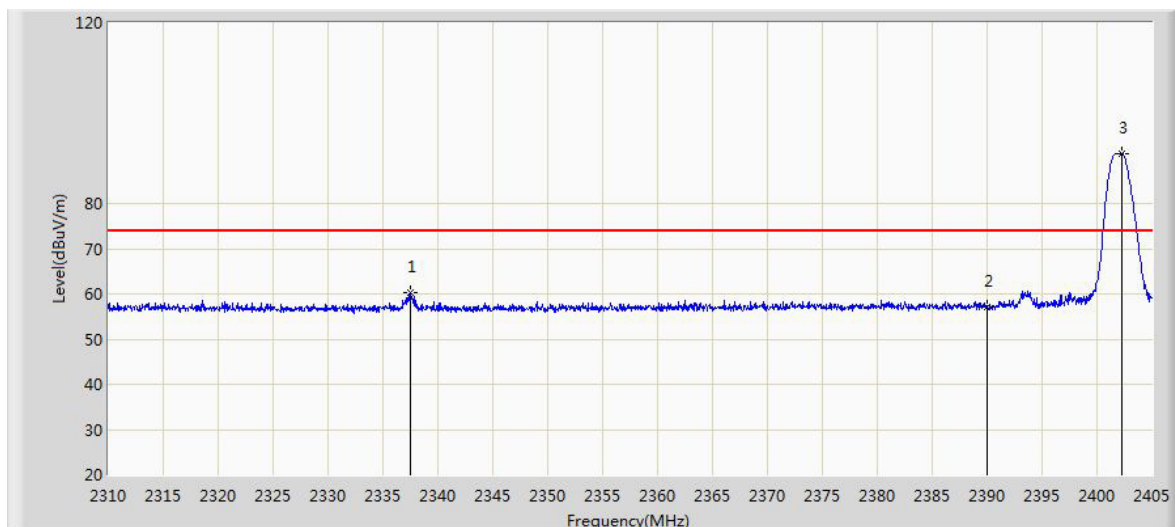
Channel	Freq. [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type	Ant. Pol.
Low	4804.030	38.056	35.360	-15.944	54.000	2.696	AV	H
	4808.000	48.711	46.017	-25.289	74.000	2.694	PK	H
	7205.000	46.190	38.385	-27.810	74.000	7.805	PK	H
	4803.980	39.506	36.810	-14.494	54.000	2.696	AV	V
	4808.000	50.409	47.715	-23.591	74.000	2.694	PK	V
	8038.000	45.606	36.853	-28.394	74.000	8.753	PK	V
Middle	4884.500	42.557	39.872	-31.443	74.000	2.684	PK	H
	8641.500	45.773	36.994	-28.227	74.000	8.779	PK	H
	4876.000	49.148	46.473	-24.852	74.000	2.675	PK	V
	9245.000	46.570	36.367	-27.430	74.000	10.203	PK	V
High	4961.000	44.482	41.570	-29.518	74.000	2.912	PK	H
	9330.000	47.180	36.760	-26.820	74.000	10.420	PK	H
	4960.020	38.575	35.670	-15.425	54.000	2.905	AV	V
	4961.000	48.647	45.735	-25.353	74.000	2.912	PK	V
	10945.000	49.081	36.028	-24.919	74.000	13.053	PK	V

Figure 12: Radiated Restricted Band Edge, 2402MHz, Horizontal, PK

Table 10: Radiated Restricted Band Edge, 2402MHz, Horizontal, PK

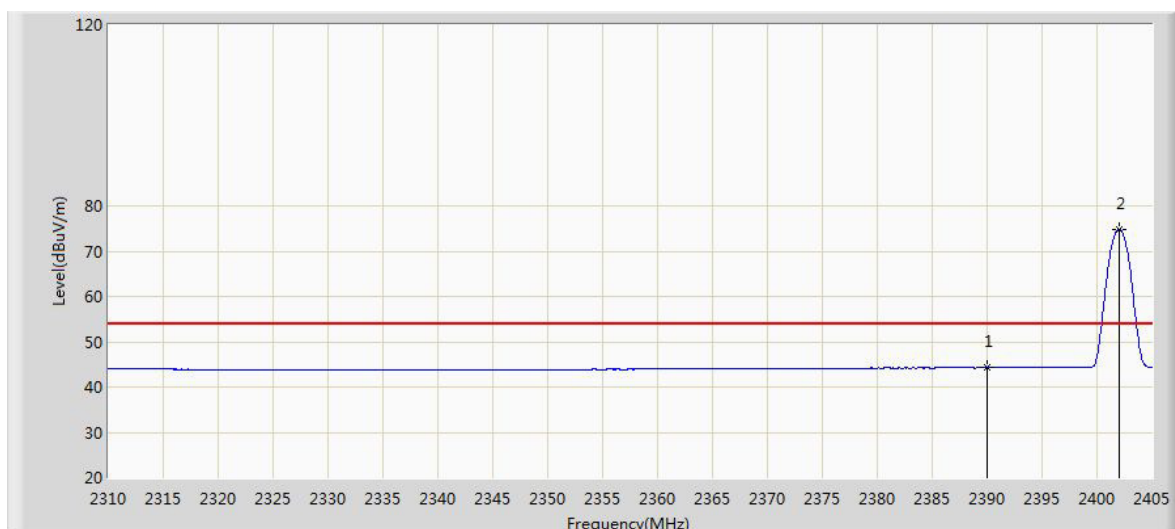
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2337.645	60.391	29.051	-13.609	74.000	31.340	PK
2390.000	57.611	26.408	-16.389	74.000	31.203	PK
2402.198	88.601	57.417	N/A	N/A	31.184	PK

Figure 13: Radiated Restricted Band Edge, 2402MHz, Horizontal, AV

Table 11: Radiated Restricted Band Edge, 2402MHz, Horizontal, AV

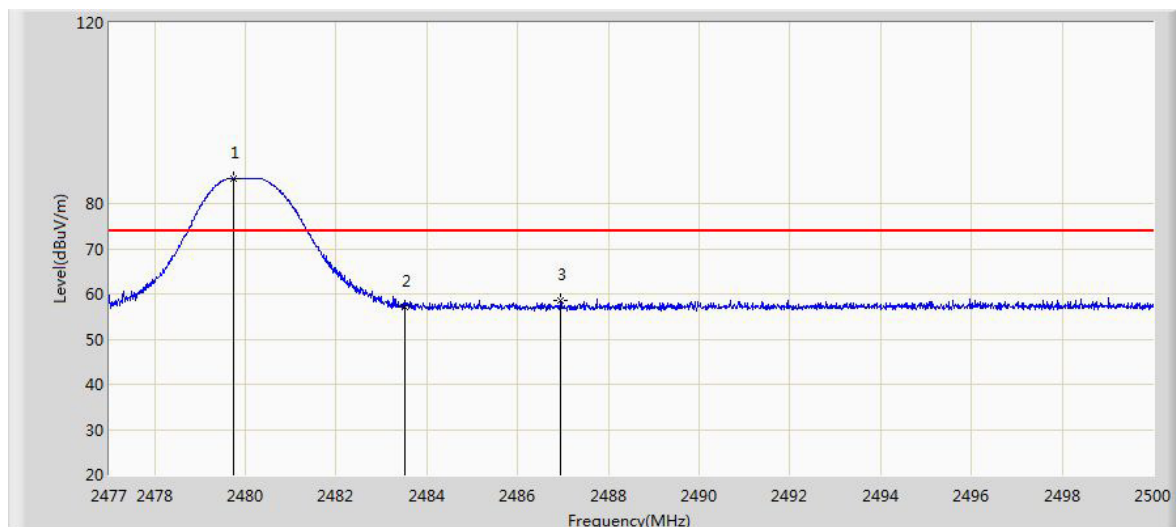
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	44.249	13.046	-9.751	54.000	31.203	AV
2401.960	72.269	41.085	N/A	N/A	31.184	AV

Figure 14: Radiated Restricted Band Edge, 2402MHz, Vertical, PK

Table 12: Radiated Restricted Band Edge, 2402MHz, Vertical, PK

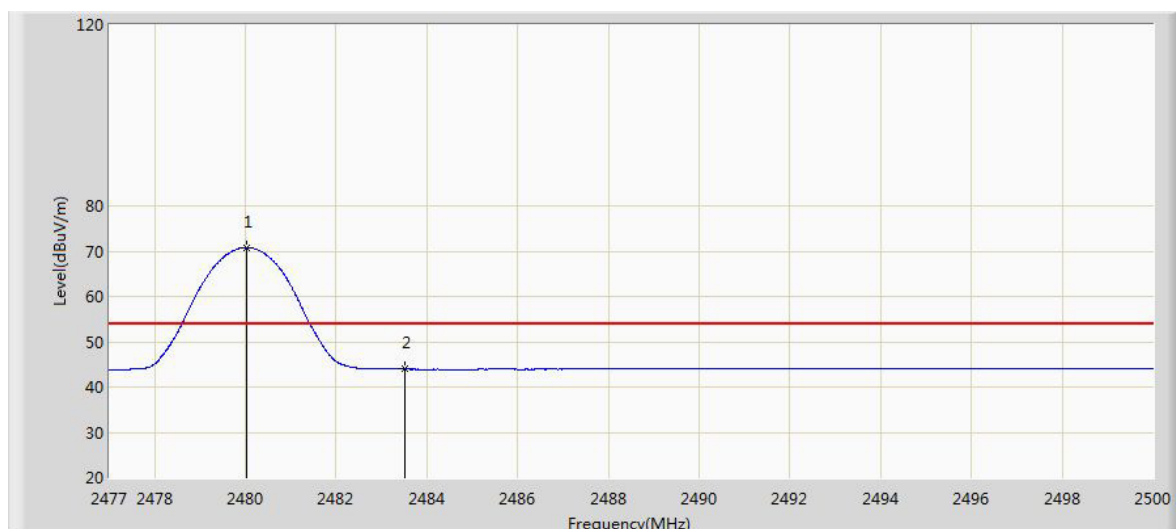
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2337.502	60.296	28.955	-13.704	74.000	31.341	PK
2390.000	57.082	25.879	-16.918	74.000	31.203	PK
2402.245	91.147	59.963	N/A	N/A	31.184	PK

Figure 15: Radiated Restricted Band Edge, 2402MHz, Vertical, AV

Table 13: Radiated Restricted Band Edge, 2402MHz, Vertical, AV

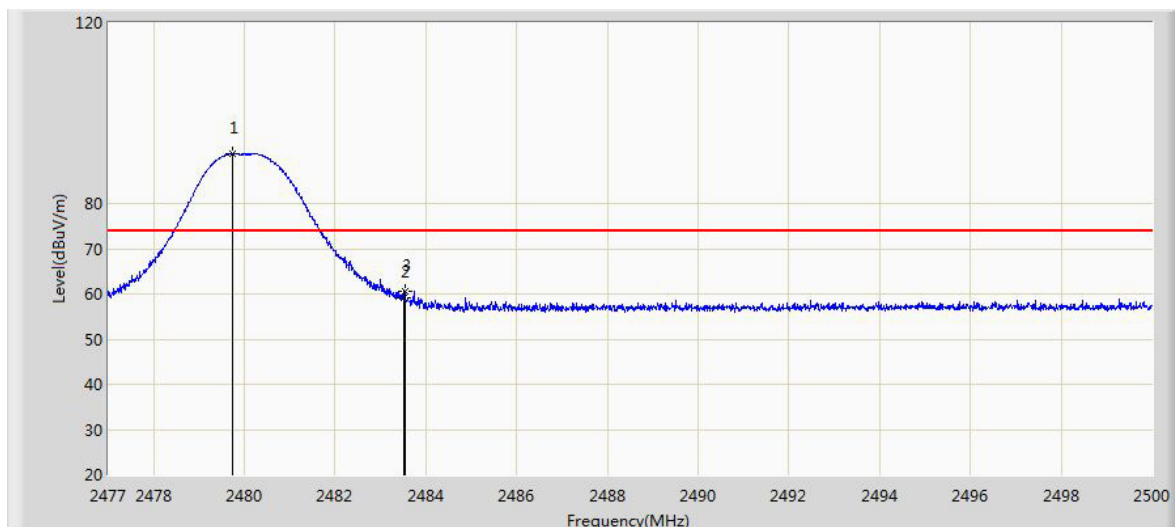
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	44.232	13.029	-9.768	54.000	31.203	AV
2402.008	74.791	43.607	N/A	N/A	31.184	AV

Figure 16: Radiated Restricted Band Edge, 2480MHz, Horizontal, PK

Table 14: Radiated Restricted Band Edge, 2480MHz, Horizontal, PK

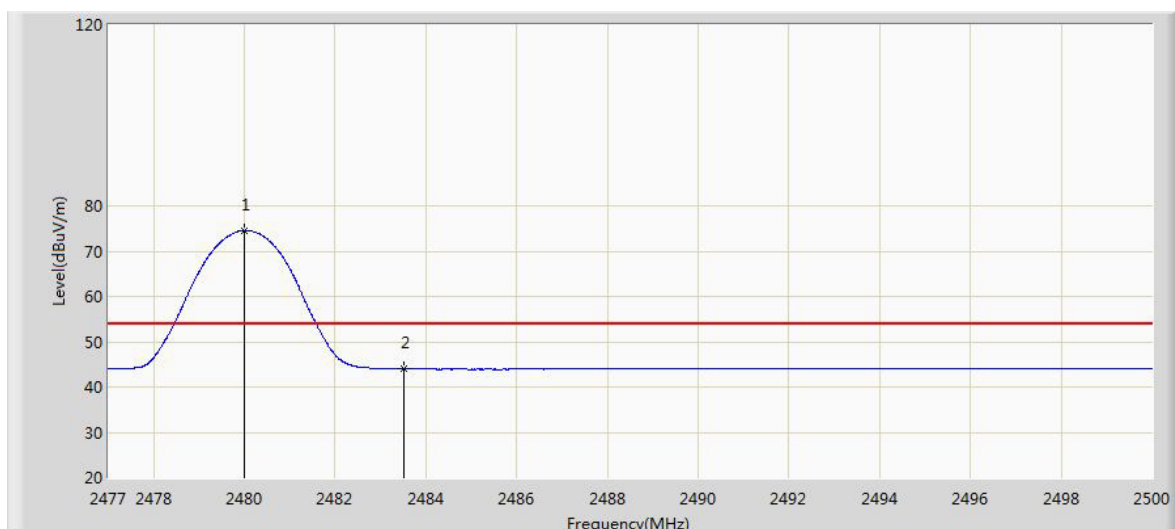
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.749	85.628	54.445	N/A	N/A	31.184	PK
2483.500	57.098	25.905	-16.902	74.000	31.194	PK
2486.948	58.430	27.228	-15.570	74.000	31.203	PK

Figure 17: Radiated Restricted Band Edge, 2480MHz, Horizontal, AV

Table 15: Radiated Restricted Band Edge, 2480MHz, Horizontal, AV

Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2480.024	70.781	39.597	N/A	N/A	31.184	AV
2483.500	43.919	12.726	-10.081	54.000	31.194	AV

Figure 18: Radiated Restricted Band Edge, 2480MHz, Vertical, PK

Table 16: Radiated Restricted Band Edge, 2480MHz, Vertical, PK

Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.737	90.951	59.768	N/A	N/A	31.184	PK
2483.500	59.260	28.067	-14.740	74.000	31.194	PK
2483.532	60.646	29.453	-13.354	74.000	31.194	PK

Figure 19: Radiated Restricted Band Edge, 2480MHz, Vertical, AV

Table 17: Radiated Restricted Band Edge, 2480MHz, Vertical, AV

Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2480.001	74.555	43.371	N/A	N/A	31.184	AV
2483.500	43.987	12.794	-10.013	54.000	31.194	AV

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