

Prüfbericht-Nr.: <i>Test Report No.:</i>	50085880 001	Auftrags-Nr.: <i>Order No.:</i>	154243722	Seite 1 von 26 <i>Page 1 of 26</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	52195561	Auftragsdatum: <i>Order date:</i>	04.26.2017	
Auftraggeber: <i>Client:</i>	AXENT Corporation Ltd. 3 Musick, Irvine CA 92618 USA			
Prüfgegenstand: <i>Test item:</i>	Intelligent toilet			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	E322-02 FCC ID: 2AL4GAXENT-ONE-C			
Auftrags-Inhalt: <i>Order content:</i>	Complete test			
Prüfgrundlage: <i>Test specification:</i>	FCC CFR47 Part 15, Subpart C Section 15.249 ANSI C63.10: 2013			
Wareneingangsdatum: <i>Date of receipt:</i>	05.05.2017	Please refer to the External Photos		
Prüfmuster-Nr.: <i>Test sample No.:</i>	A000540881-003			
Prüfzeitraum: <i>Testing period:</i>	11.05.2017 to 20.06.2017			
Ort der Prüfung: <i>Place of testing:</i>	MRT Technology(Suzhou) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von / tested by:		kontrolliert von / reviewed by:		
 11.07.2017 Elliot Zhang / Assistant Project Manager Datum Name / Stellung Unterschrift <i>Date</i> <i>Name / Position</i> <i>Signature</i>		 11.07.2017 Shi Li / Department Manager Datum Name / Stellung Unterschrift <i>Date</i> <i>Name / Position</i> <i>Signature</i>		
Sonstiges / Other				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) Legend: 1 = very good 2 = good 3 = satisfactory P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) 4 = ausreichend 5 = mangelhaft N/A = nicht anwendbar N/T = nicht getestet 4 = sufficient 5 = poor 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>				

Prüfbericht - Nr.: 50085880 001

Test Report No.

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TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT

RESULT: Pass

5.1.2 FIELD STRENGTH OF FUNDAMENTAL

RESULT: Pass

5.1.3 20dB SPECTRUM BANDWIDTH

RESULT: Pass

5.1.4 RADIATED EMISSIONS

RESULT: Pass

5.1.5 CONDUCTED EMISSIONS

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

Conducted Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Due Date
EMI Test Receiver	R&S	ESR7	101209	03.11.2017
Two-Line V-Network	R&S	ENV216	101683	03.11.2017
Two-Line V-Network	R&S	ENV216	101684	03.11.2017
Temperature/Humidity Meter	Yuhuaze	N/A	N/A	20.12.2017

Radiated Emission

Instrument	Manufacturer	Type No.	Serial No.	Cali. Due Date
Spectrum Analyzer	Agilent	E4447A	MY45300136	08.12.2017
EMI Test Receiver	R&S	ESR7	101209	03.11.2017
Preamplifier	Schwarzbeck	BBV 9721	9721-008	16.04.2018
Preamplifier	Agilent	83017A	MY53270040	29.03.2018
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	14.12.2017
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	07.11.2017
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	07.11.2017
Broadband Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170549	04.01.2018
Digital Thermometer & Hygrometer	Minggao	N/A	N/A	07.11.2017

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 EUT (Equipment Under Test) is an intelligent toilet which contains a 2.4GHz wireless modular and a Bluetooth Dual Mode module.

The aim of this report is to evaluate the 2.4GHz wireless modular of the EUT.

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:	Intelligent toilet
Brand Name:	AXENT
Model No.:	E322-02
Rated Voltage:	AC 120V, 60Hz
Bluetooth Classical	
Frequency Range:	2402 – 2480MHz
Modulation Type:	BDR: GFSK EDR: $\pi/4$ -DQPSK; 8DPSK
Antenna Type:	PCB Antenna
Antenna Gain:	1.6dBi
Bluetooth Low Energy	
Frequency Range:	2402 – 2480MHz
Modulation Type:	GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	1.6dBi
2.4GHz Wireless Module	
Frequency Range:	2411MHz
Modulation Type:	FSK
Antenna Type:	PCB
Antenna Gain:	0dBi

3.3 Independent Operation Modes

Test Mode	Frequency [MHz]	Operating Mode
TM1	2411	The EUT was set into continues transmitting mode

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 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:

Pass

Table 4: Antenna Requirement

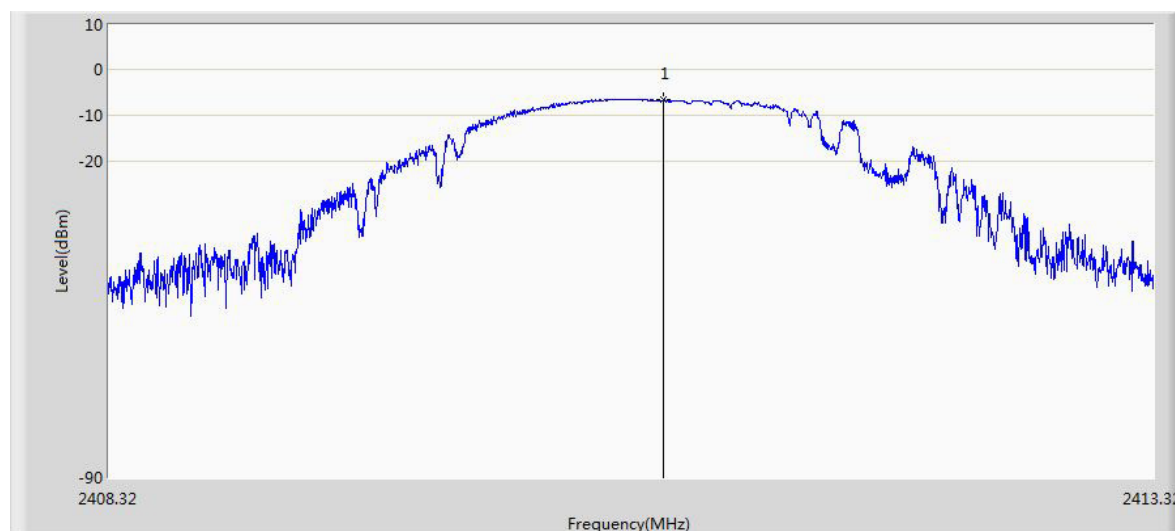
FCC 15.203 – Antenna Requirement 1	
Requirement:	No antenna other than that furnished by the responsible party shall be used with the device. ☒ Use of a permanently attached antenna, or ☐ Use an antenna that uses a unique coupling to the intentional radiator.
Results:	Antenna type: PCB Antenna
Verdict:	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 Field Strength of Fundamental

RESULT:
Pass

Date of testing : 22.05.2017
 Test standard : FCC Part 15.249
 Test procedure : ANSI C63.10: 2013
 Limit : FCC Part 15.249(a) ,(e)
 Kind of test site : 3m Semi-Anechoic Chamber

Figure 1: Field Strength of Fundamental Emissions, Antenna Horizontal

Table 5: Field Strength of Fundamental Emissions, Antenna Horizontal

Frequency [MHz]	Measure Level [dBm]	Measure Level [dBuV/m]	Over Limit [dB]	Limit [dBuV/m]	Type
2410.980	-6.658	88.571	-25.429	114.000	PK

Note: The measurements using an average detector for the frequency above 1GHz were not performed since the results measured with a Peak detector are totally meet the average limit (94dBuV/m).

Figure 2: Field Strength of Fundamental Emissions, Antenna Vertical

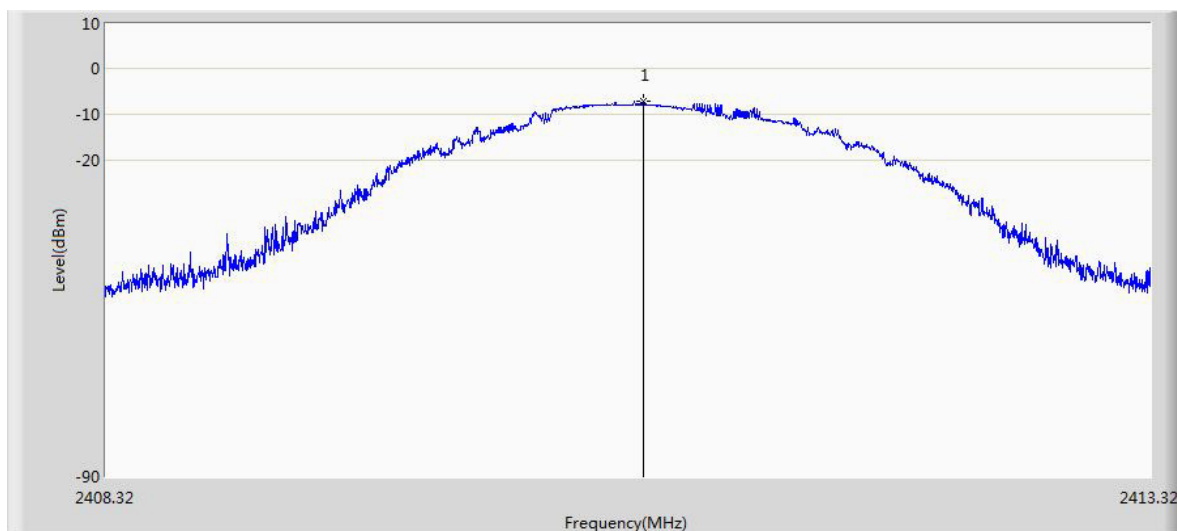


Table 6: Field Strength of Fundamental Emissions, Antenna Vertical

Frequency [MHz]	Measure Level [dBm]	Measure Level [dBuV/m]	Over Limit [dB]	Limit [dBuV/m]	Type
2410.897	-7.223	88.006	-25.994	114.000	PK

Note: The measurements using an average detector for the frequency above 1GHz were not performed since the results measured with a Peak detector are totally meet the average limit (94dBuV/m).

5.1.3 20dB Spectrum Bandwidth

RESULT:

Pass

Date of testing : 11.05.2017
Test standard : FCC Part 15.215
Test procedure : ANSI C63.10: 2013
Limit : FCC Part 15.215(c)

Figure 3: 99% Bandwidth

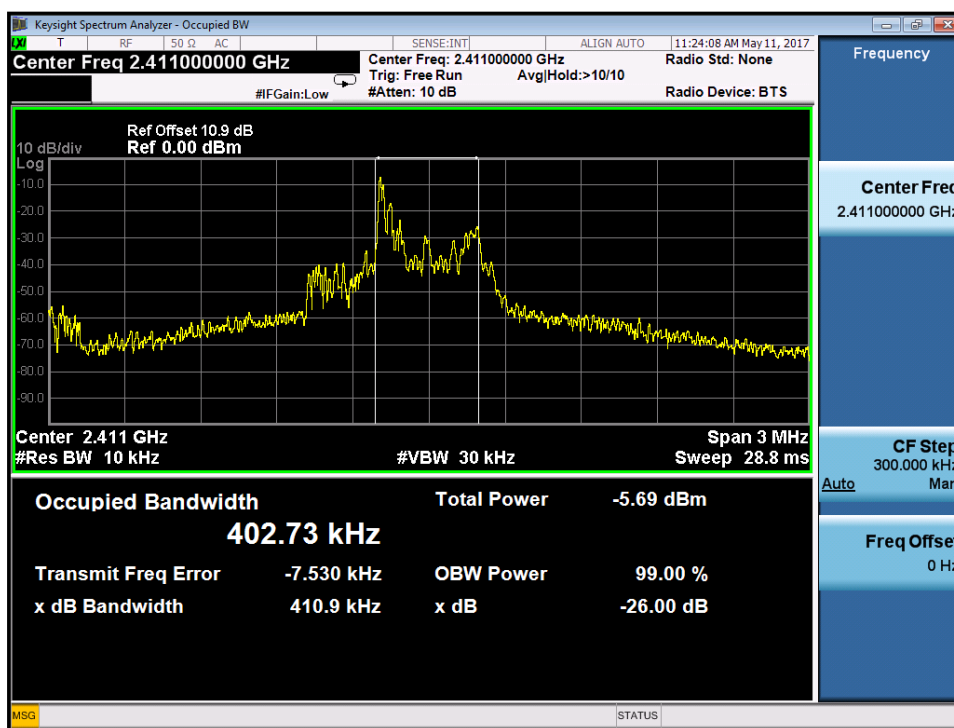
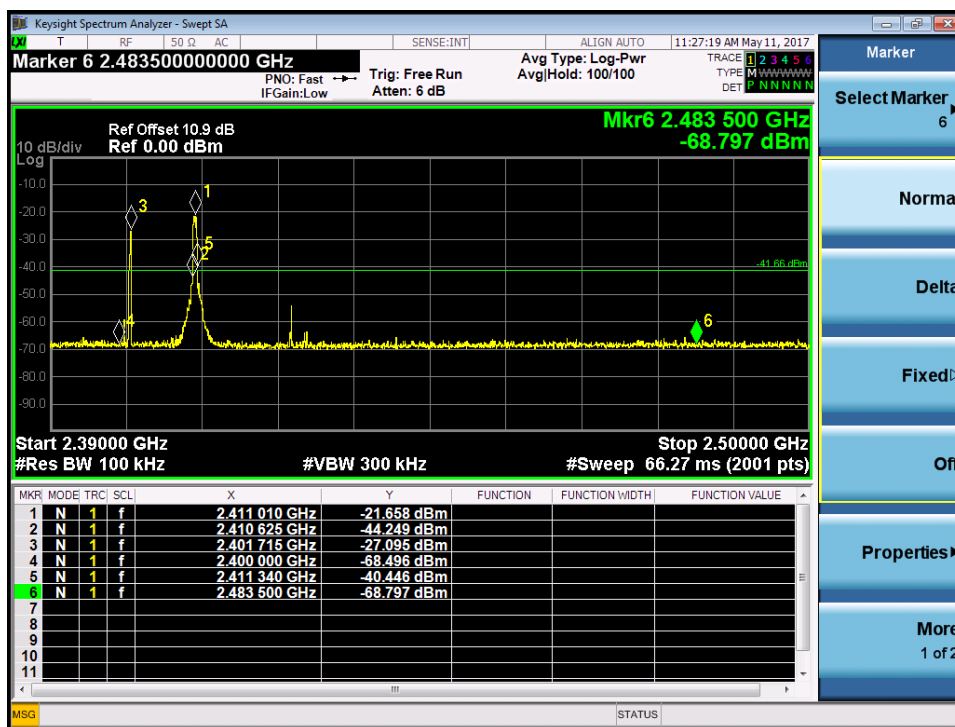


Figure 4: 20dB Spectrum Bandwidth Measurement



Note: 2402MHz is fundamental frequency of Bluetooth which will be assessed by 15.247.

RESULT:

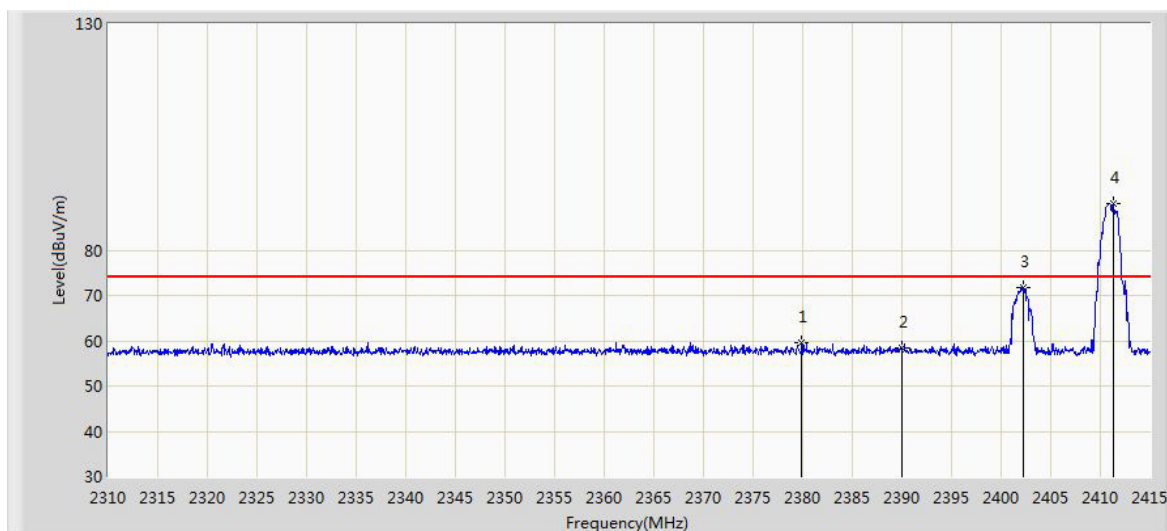
Pass

Table 7: Radiated Emissions

Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type	Antenna Polarity
5785.500	41.093	37.156	-32.907	74.000	3.936	PK	H
7222.000	44.752	36.967	-29.248	74.000	7.785	PK	H
9015.500	43.622	34.696	-30.378	74.000	8.925	PK	H
12126.500	48.346	36.442	-25.654	74.000	11.904	PK	H
3176.000	36.908	38.468	-37.092	74.000	-1.560	PK	V
4434.000	37.857	36.390	-36.143	74.000	1.467	PK	V
4821.450	29.219	26.520	-24.781	54.000	2.699	AV	V
4825.000	54.230	51.530	-19.770	74.000	2.700	PK	V
7519.500	44.698	36.403	-29.302	74.000	8.295	PK	V

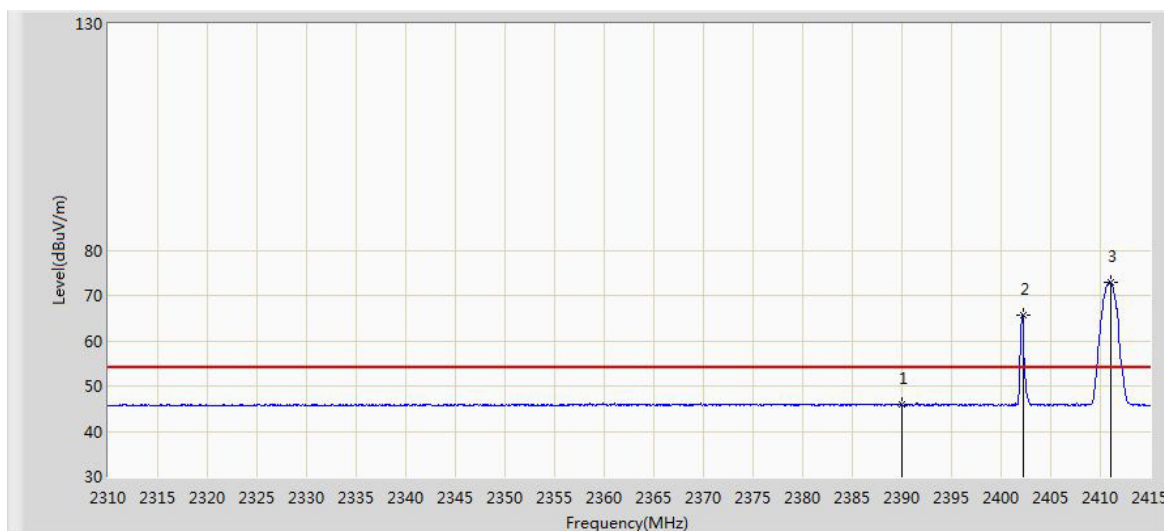
Note:

1. The radiated emission below 30MHz is very low, so it was not shown on the report.
2. The measurements using an average detector for the frequency above 1GHz were not performed since the results measured with a Peak detector are totally meet the average limit.

Figure 5: Band Edge, Antenna H, PK, Low


Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2379.930	59.544	28.323	-14.456	74.000	31.221	PK
2390.000	58.285	27.082	-15.715	74.000	31.203	PK
2402.242	71.772	40.588	-2.228	74.000	31.184	PK
2411.272	90.222	N/A	N/A	74.000	31.171	PK

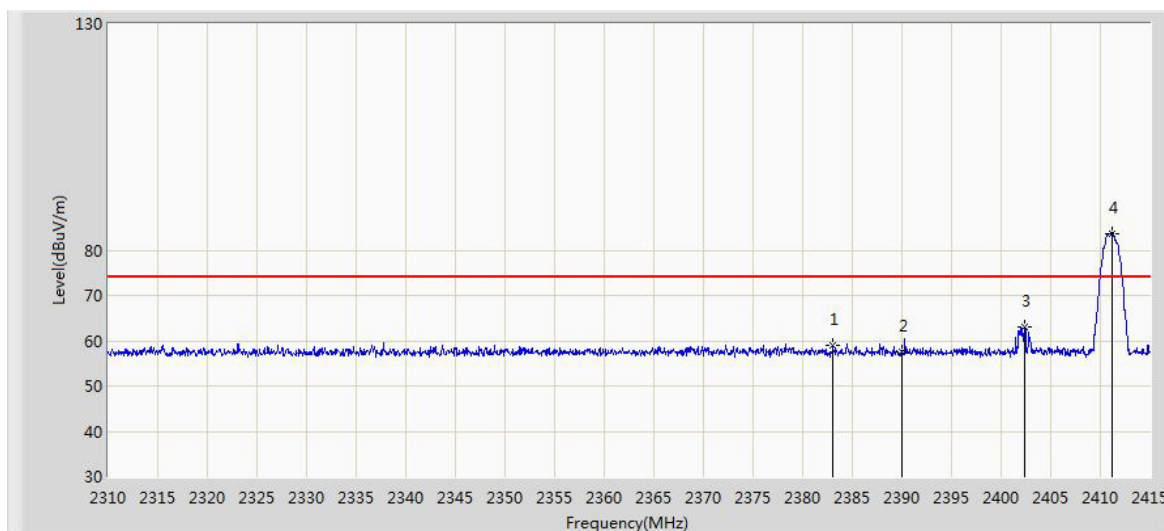
Note: 2402MHz is fundamental frequency of Bluetooth which will be assessed by 15.247.

Figure 6: Band Edge, Antenna H, AV, Low


Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	45.806	14.603	-8.194	54.000	31.203	AV
2402.190	65.681	34.497	11.681	54.000	31.184	AV
2411.010	72.808	N/A	N/A	54.000	31.171	AV

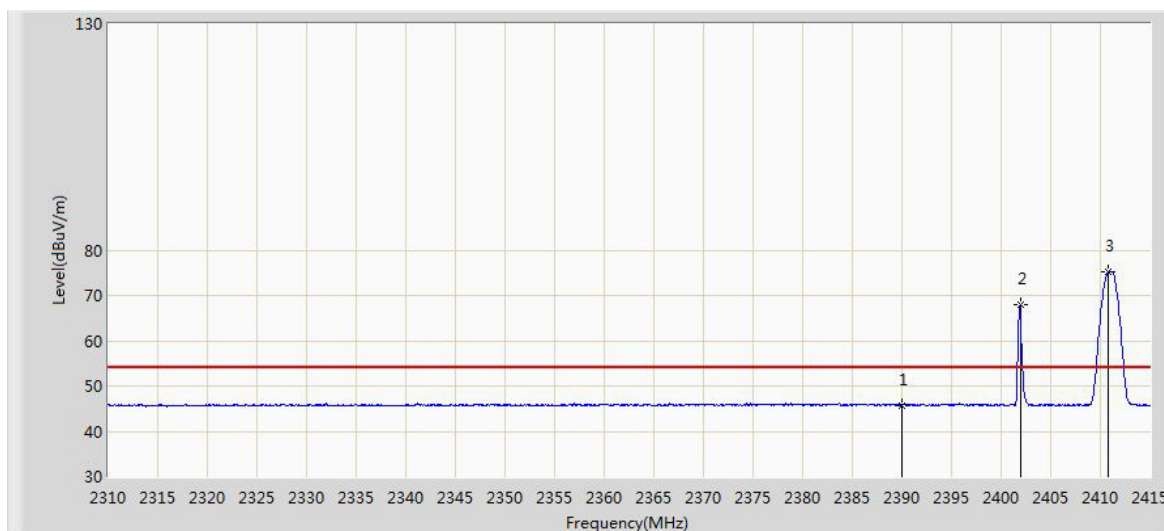
Note: 2402MHz is fundamental frequency of Bluetooth which will be assessed by 15.247.

Figure 7: Band Edge, Antenna V, PK, Low



Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2383.028	58.902	27.686	-15.098	74.000	31.216	PK
2390.000	57.403	26.200	-16.597	74.000	31.203	PK
2402.400	63.122	31.938	-10.878	74.000	31.184	PK
2411.167	83.676	N/A	N/A	74.000	31.171	PK

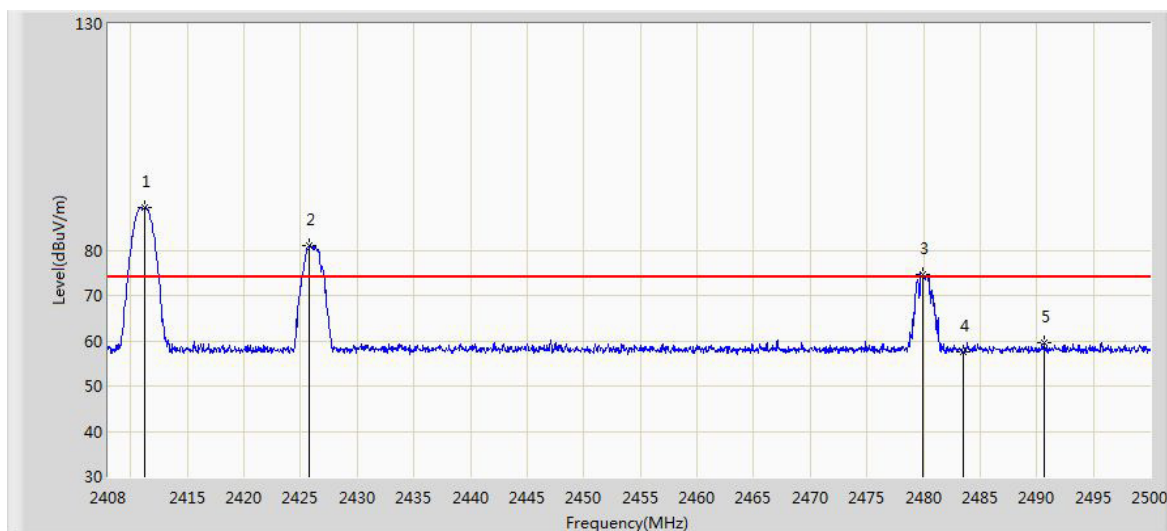
Note: 2402MHz is fundamental frequency of Bluetooth which will be assessed by 15.247.

Figure 8: Band Edge, Antenna V, AV, Low


Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	45.781	14.578	-8.219	54.000	31.203	AV
2401.927	68.089	36.905	14.089	54.000	31.184	AV
2410.853	75.243	44.072	21.243	54.000	31.172	AV

Note: 2402MHz is fundamental frequency of Bluetooth which will be assessed by 15.247.

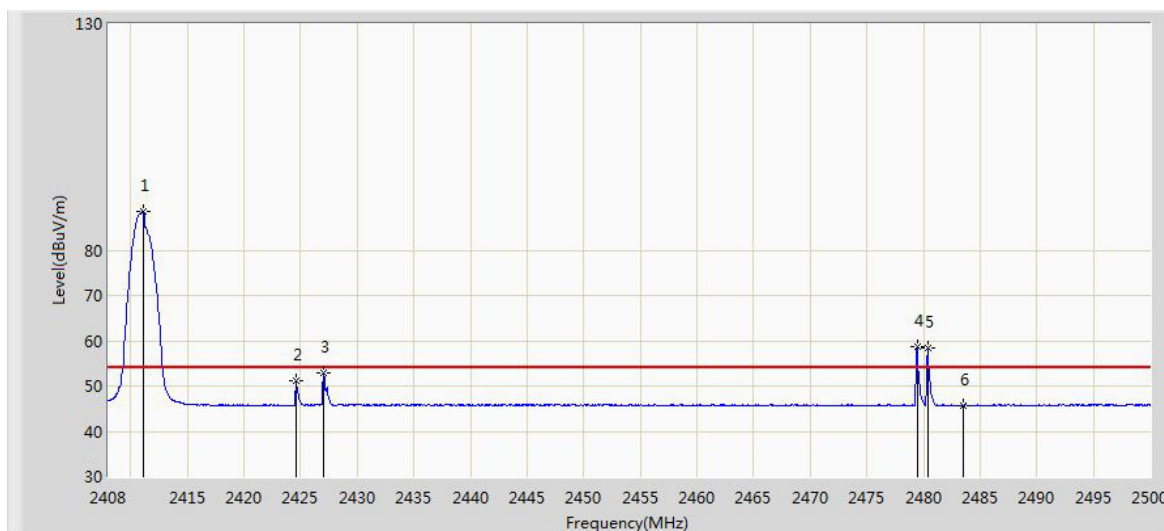
Figure 9: Band Edge, Antenna H, PK, High



Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2411.220	89.335	58.164	15.335	74.000	31.171	PK
2425.802	81.043	49.897	7.043	74.000	31.146	PK
2479.898	74.765	43.581	0.765	74.000	31.184	PK
2483.500	57.467	26.274	-16.533	74.000	31.194	PK
2490.616	59.581	28.369	-14.419	74.000	31.212	PK

Note: 2425.802MHz and 2479.898MHz are fundamental frequencies of Bluetooth which will be assessed by 15.247.

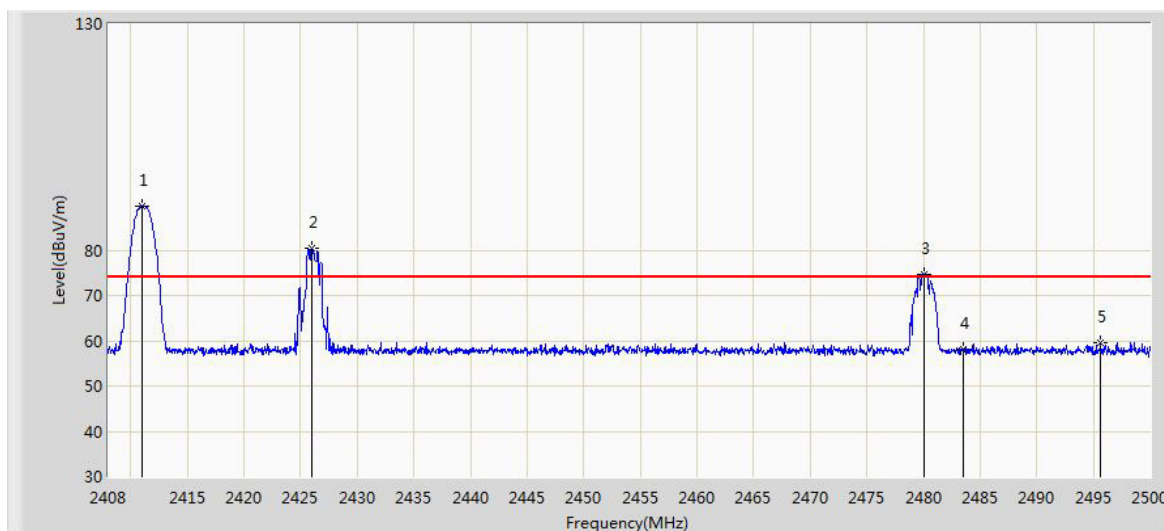
Figure 10: Band Edge, Antenna H, AV, High



Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2411.082	88.570	57.399	34.570	54.000	31.171	AV
2424.606	51.272	20.124	-2.728	54.000	31.148	AV
2427.044	52.765	21.621	-1.235	54.000	31.143	AV
2479.438	58.727	27.544	4.727	54.000	31.182	AV
2480.358	58.398	27.213	4.398	54.000	31.185	AV
2483.500	45.759	14.566	-8.241	54.000	31.194	AV

Note: 2479.438MHz and 2480.358MHz are fundamental frequencies of Bluetooth which will be assessed by 15.247.

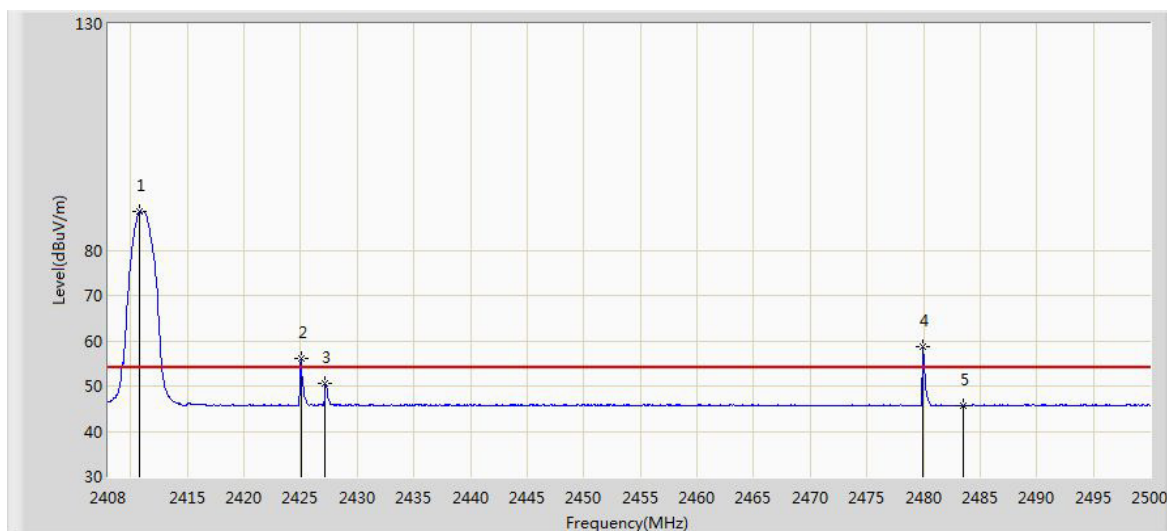
Figure 11: Band Edge, Antenna V, PK, High



Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2410.944	89.808	58.637	15.808	74.000	31.171	PK
2425.940	80.500	49.354	6.500	74.000	31.146	PK
2480.082	74.697	43.513	0.697	74.000	31.184	PK
2483.500	57.973	26.780	-16.027	74.000	31.194	PK
2495.630	59.603	28.378	-14.397	74.000	31.226	PK

Note: 2425.940MHz and 2480.082MHz are fundamental frequencies of Bluetooth which will be assessed by 15.247.

Figure 12: Band Edge, Antenna V, AV, High



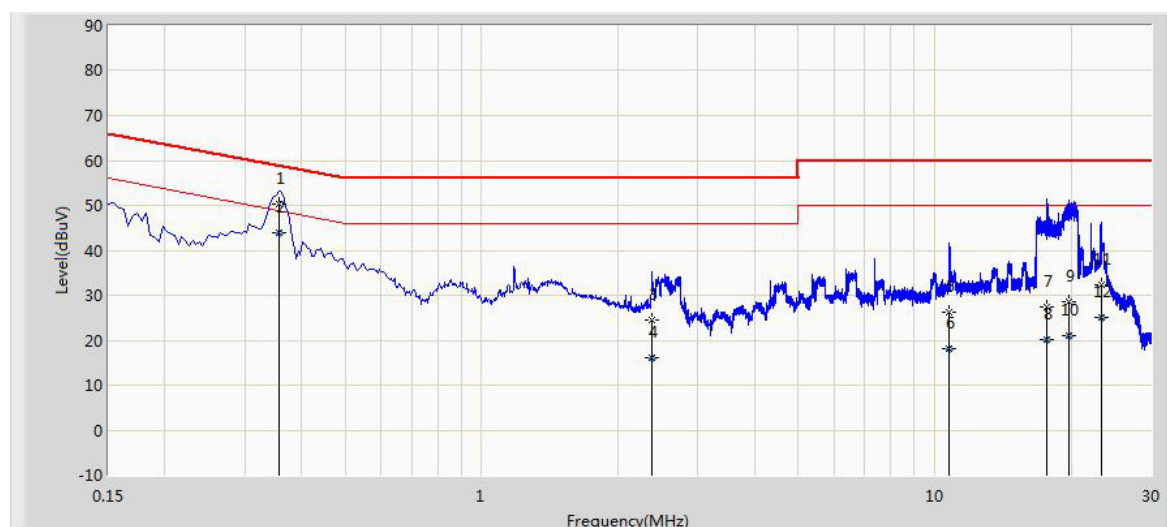
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2410.806	88.681	57.509	34.681	54.000	31.172	AV
2425.020	56.001	24.854	2.001	54.000	31.147	AV
2427.182	50.644	19.501	-3.356	54.000	31.143	AV
2479.944	58.639	27.455	4.639	54.000	31.184	AV
2483.500	45.702	14.509	-8.298	54.000	31.194	AV

Note: 2425.020MHz and 2479.944MHz are fundamental frequencies of Bluetooth which will be assessed by 15.247.

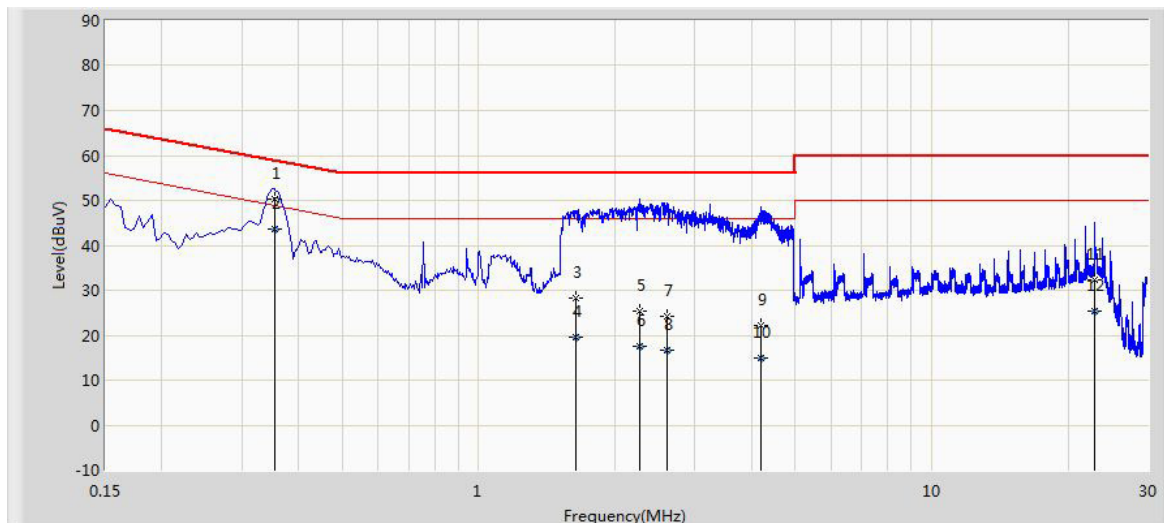
5.1.5 Conducted Emissions

RESULT:
Pass

Date of testing : 20.06.2017
 Test standard : FCC Part 15.207(a)
 Test procedure : ANSI C63.10: 2013
 Limit : FCC Part 15.207(a)
 Kind of test site : Shield room

Figure 13: Conducted Emission, L Line

Table 8: Conducted Emission, L Line

Frequency [MHz]	Measure Level [dBuV]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV]	Factor [dB]	Type
0.358	50.334	40.283	-8.441	58.775	10.051	QP
0.358	43.869	33.818	-4.905	48.775	10.051	AV
2.374	24.447	14.585	-31.553	56.000	9.861	QP
2.374	15.965	6.104	-30.035	46.000	9.861	AV
10.774	26.112	15.993	-33.888	60.000	10.118	QP
10.774	18.043	7.925	-31.957	50.000	10.118	AV
17.718	27.427	17.332	-32.573	60.000	10.095	QP
17.718	20.023	9.928	-29.977	50.000	10.095	AV
19.738	28.479	18.353	-31.521	60.000	10.126	QP
19.738	21.087	10.961	-28.913	50.000	10.126	AV
23.254	32.214	22.022	-27.786	60.000	10.192	QP
23.254	25.015	14.823	-24.985	50.000	10.192	AV

Figure 14: Conducted Emission, N Line

Table 9: Conducted Emission, N Line

Frequency [MHz]	Measure Level [dBuV]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV]	Factor [dB]	Type
0.354	50.274	40.196	-8.594	58.868	10.078	QP
0.354	43.532	33.454	-5.336	48.868	10.078	AV
1.634	28.202	18.316	-27.798	56.000	9.886	QP
1.634	19.562	9.676	-26.438	46.000	9.886	AV
2.266	25.401	15.534	-30.599	56.000	9.868	QP
2.266	17.573	7.705	-28.427	46.000	9.868	AV
2.602	24.185	14.328	-31.815	56.000	9.857	QP
2.602	16.708	6.851	-29.292	46.000	9.857	AV
4.194	22.139	12.155	-33.861	56.000	9.984	QP
4.194	14.886	4.902	-31.114	46.000	9.984	AV
22.854	32.460	22.215	-27.540	60.000	10.245	QP
22.854	25.376	15.131	-24.624	50.000	10.245	AV

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