Prüfbericht-Nr.: *Test Report No.:*	**50085892 001**	**Auftrags-Nr.:** *Order No.:*	**154243722**	**Seite 1 von 20** *Page 1 of 20*
Kunden-Referenz-Nr.: *Client Reference No.:*	**52195561**	**Auftragsdatum:** *Order date:*	**26.04.2017**	
Auftraggeber: *Client:*	**AXENT Corporation Ltd.** 3 Musick, Irvine CA 92618 USA			
Prüfgegenstand: *Test item:*	**Tankless toilet (Remote Controller)**			
Bezeichnung / Typ-Nr.: *Identification / Type No.:*	**Hi-Touch** **FCC ID: 2AL4GHI-TOUCH**			
Auftrags-Inhalt: *Order content:*	**Complete test**			
Prüfgrundlage: *Test specification:*	**FCC CFR47 Part 15, Subpart C Section 15.249** **ANSI C63.10: 2013**			
Wareneingangsdatum: *Date of receipt:*	**05.05.2017**	Please refer to the External Photos		
Prüfmuster-Nr.: *Test sample No.:*	**A000540881-006**			
Prüfzeitraum: *Testing period:*	**Refer to test report**			
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:*

Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*
11.07.2017	Elliot Zhang / Assistant Project Manager	Elliot Zhang

kontrolliert von / *reviewed by:*

Datum *Date*	**Name / Stellung** *Name / Position*	**Unterschrift** *Signature*
11.07.2017	Shi Li / Department Manager	SL

Sonstiges / *Other*

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
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.

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.

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*

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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 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 basics 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 a remote controller which using a 2.4GHz wireless module to control the intelligent toilet.

The aim of this report is to evaluate the 2.4GHz wireless module 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:	Tankless toilet (Remote Controller)
Model No.:	Hi-Touch
Rated Voltage:	DC 4.5V (3*AAA)
2.4GHz Wireless module	
Frequency:	2411MHz
Modulation Type:	FSK
Antenna Type:	PCB Antenna
Antenna Gain:	0 dBi

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	:	19.05.2017
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

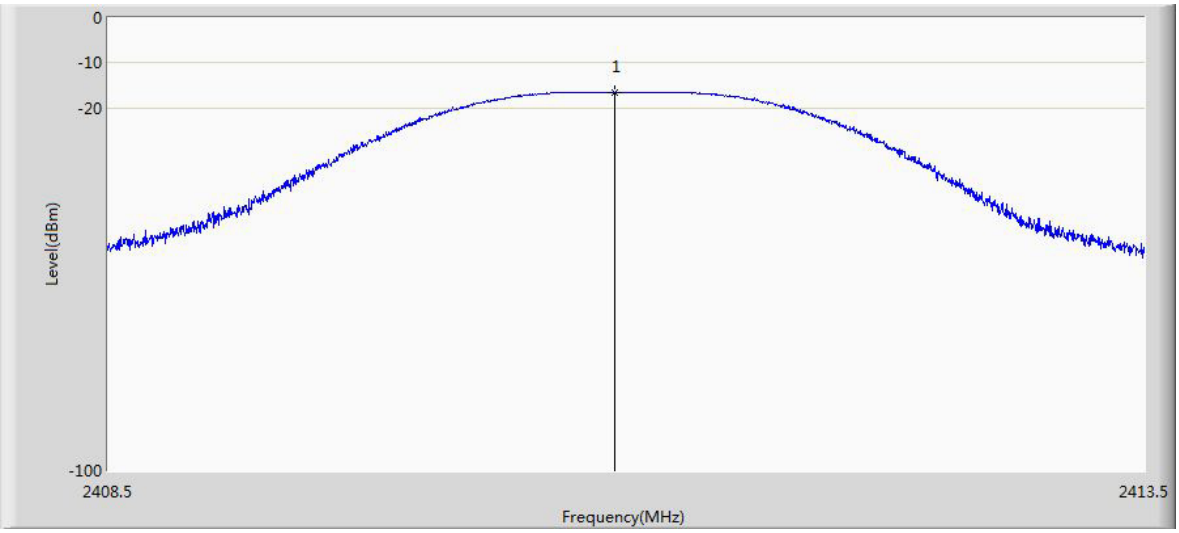


Table 5: Field Strength of Fundamental Emissions, Antenna Horizontal

Frequency [MHz]	Measure Level [dBm]	Measure Level [dBuV/m]	Over Limit [dB]	Limit [dBuV/m]	Type
2410.945	-16.531	78.698	-35.302	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

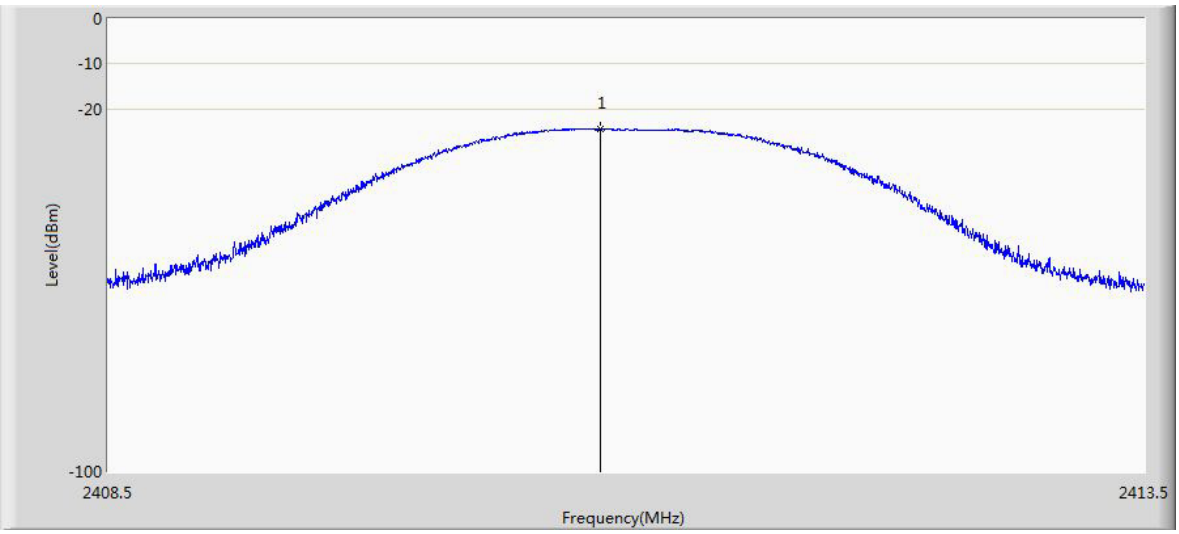


Table 6: Field Strength of Fundamental Emissions, Antenna Vertical

Frequency [MHz]	Measure Level [dBm]	Measure Level [dBuV/m]	Over Limit [dB]	Limit [dBuV/m]	Type
2410.875	-24.351	70.878	-43.122	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

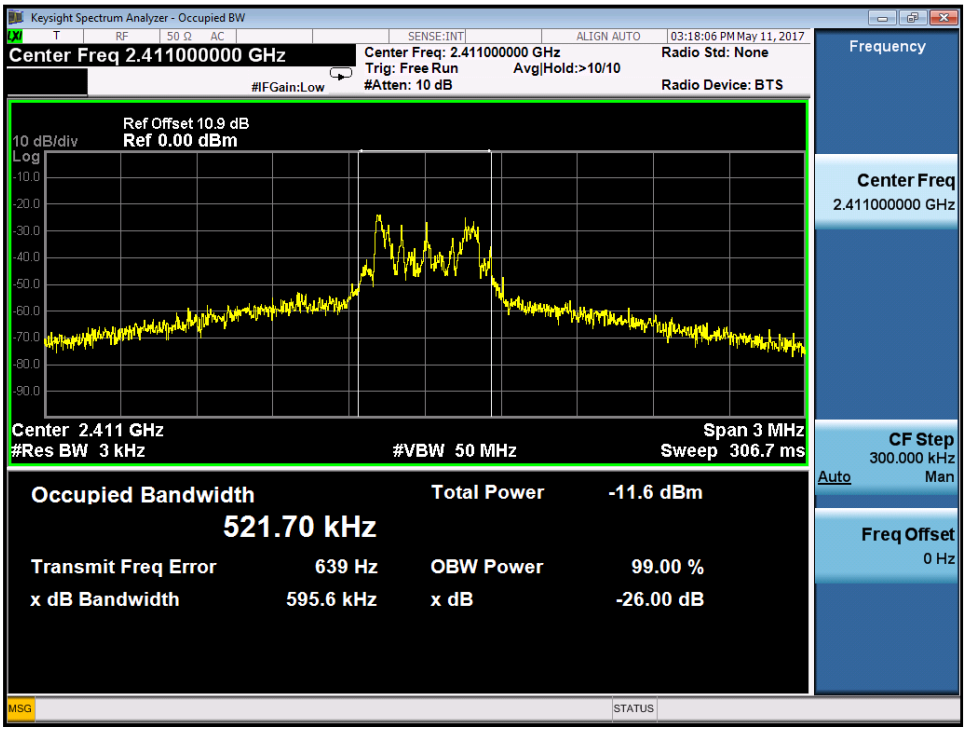
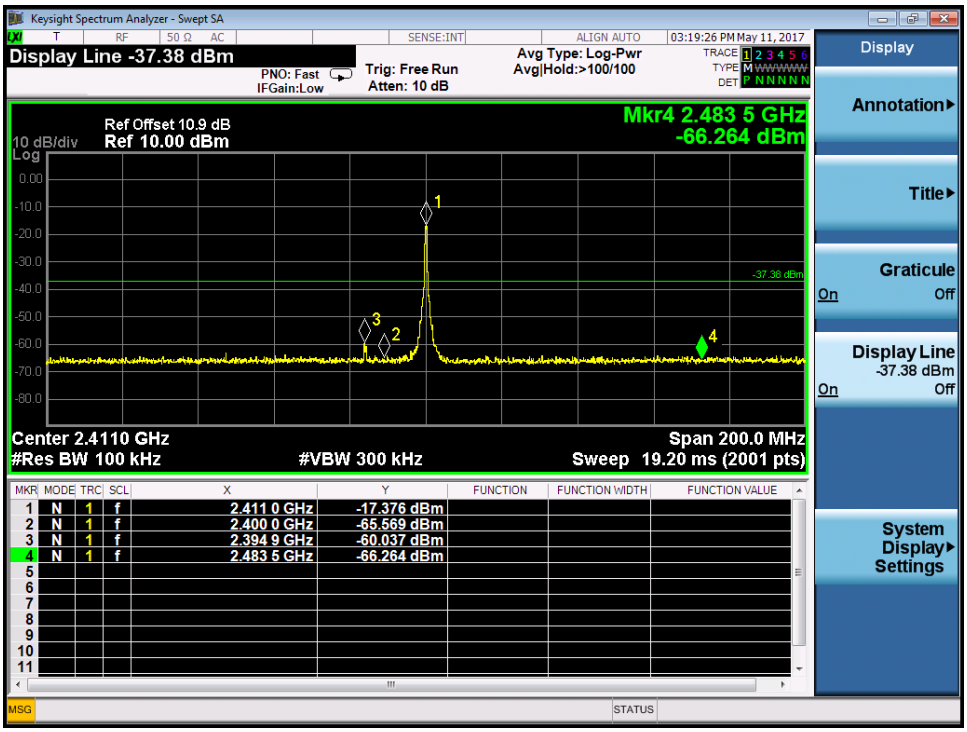


Figure 4: 20dB Spectrum Bandwidth Measurement



5.1.4 Radiated Emissions

RESULT: **Pass**

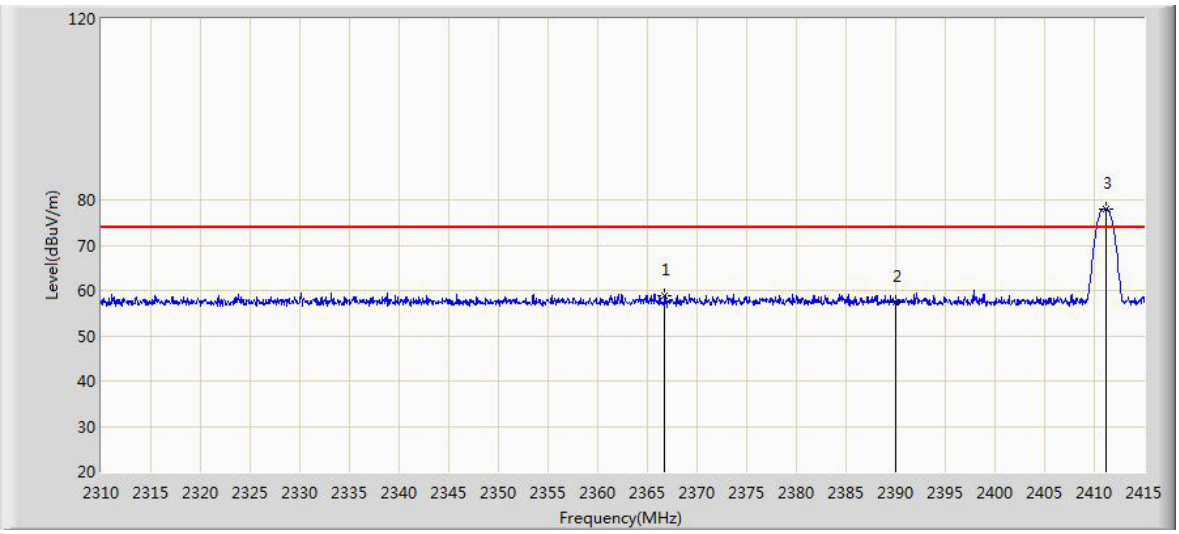
Date of testing	:	18.05.2017
Test standard	:	FCC Part 15.249
Test procedure	:	ANSI C63.10: 2013
Frequency range	:	9kHz – 30MHz 30MHz – tenth harmonic of the highest fundamental frequency
Limit	:	FCC Part 15.249(a) & FCC Part 15.249(e), FCC Part 15.249(d) & FCC Part 15.209;
Kind of test site	:	3m Semi-Anechoic Chamber

Table 7: Radiated Emissions

Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type	Antenna Polarity
38.730	13.583	-0.787	-26.417	40.000	14.370	QP	H
53.765	13.162	-0.633	-26.838	40.000	13.795	QP	H
151.735	13.330	-1.856	-30.170	43.500	15.186	QP	H
323.910	12.748	-2.214	-33.252	46.000	14.962	QP	H
446.130	16.707	-1.019	-29.293	46.000	17.726	QP	H
676.505	19.887	-1.851	-26.113	46.000	21.738	QP	H
4821.835	29.838	27.139	-24.162	54.000	2.699	AV	H
4825.000	48.551	45.851	-25.449	74.000	2.700	PK	H
7230.500	48.254	40.450	-25.746	74.000	7.804	PK	H
10749.500	46.072	33.554	-27.928	74.000	12.518	PK	H
12874.500	47.625	35.633	-26.375	74.000	11.992	PK	H
42.610	12.508	-1.843	-27.492	40.000	14.351	QP	V
57.645	12.691	-0.839	-27.309	40.000	13.530	QP	V
140.580	12.560	-1.973	-30.940	43.500	14.533	QP	V
300.145	12.143	-2.161	-33.857	46.000	14.304	QP	V
461.650	15.830	-2.123	-30.170	46.000	17.953	QP	V
674.565	19.615	-2.110	-26.385	46.000	21.726	QP	V
4825.000	46.930	44.230	-27.070	74.000	2.700	PK	V
7230.500	46.003	38.199	-27.997	74.000	7.804	PK	V
10783.500	46.317	33.737	-27.683	74.000	12.580	PK	V
13622.500	47.478	33.616	-26.522	74.000	13.861	PK	V

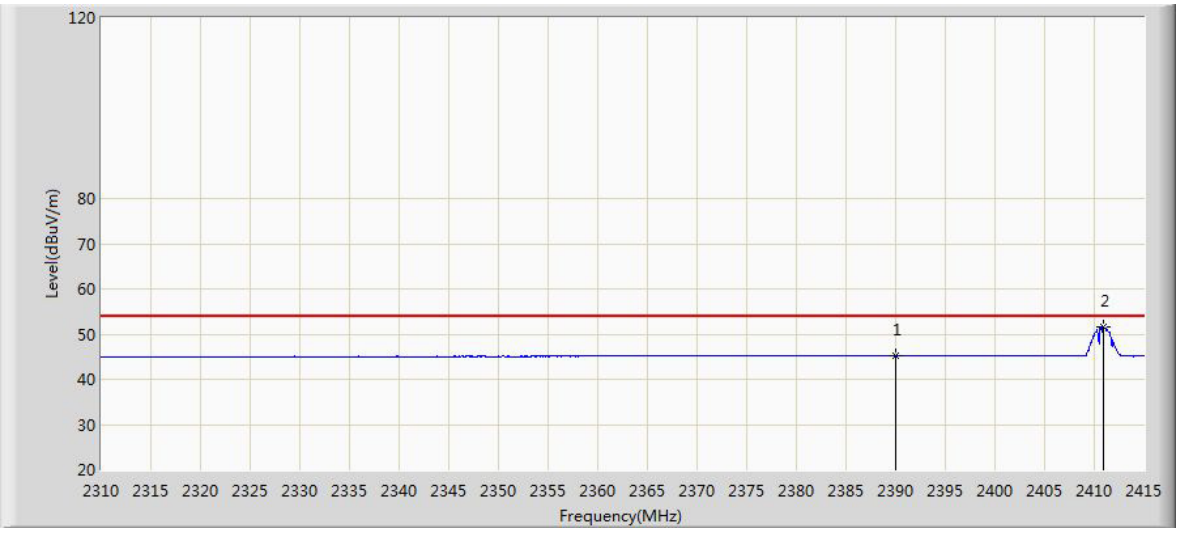
Note:
1. The radiated emission below 30MHz is very low, so it was not shown on the report.
2. The measurements using an average detector for the frequency above 1GHz were not performed since the results measured with a Peak detector are totally meet the average limit.

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



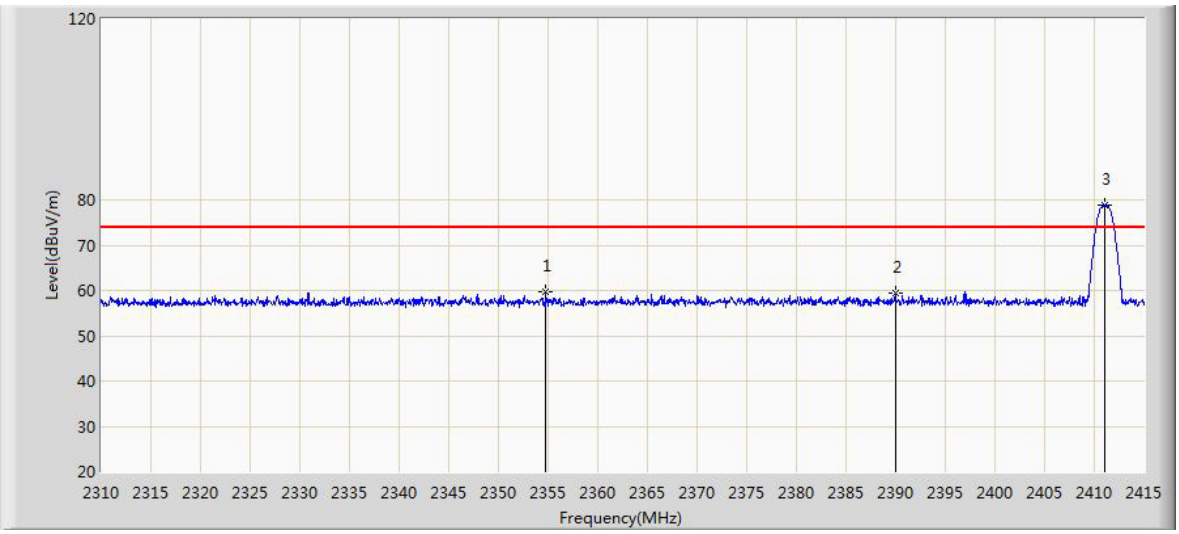
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2366.752	58.746	27.500	-15.254	74.000	31.246	PK
2390.000	57.307	26.104	-16.693	74.000	31.203	PK
2411.167	77.932	46.761	N/A	N/A	31.171	PK

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



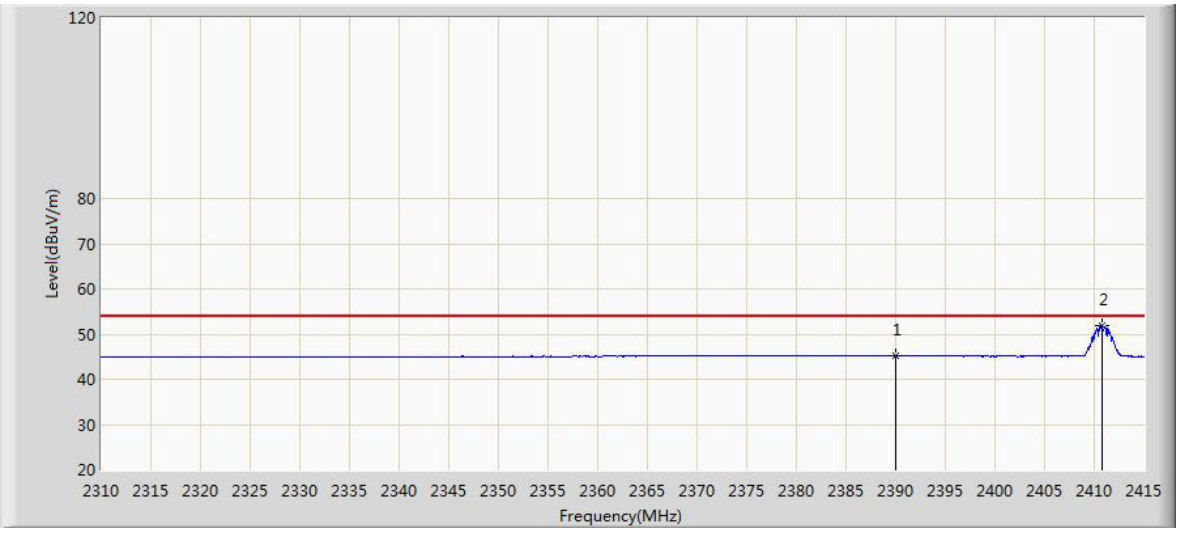
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	45.123	13.920	-8.877	54.000	31.203	AV
2410.905	51.568	20.397	N/A	N/A	31.172	AV

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



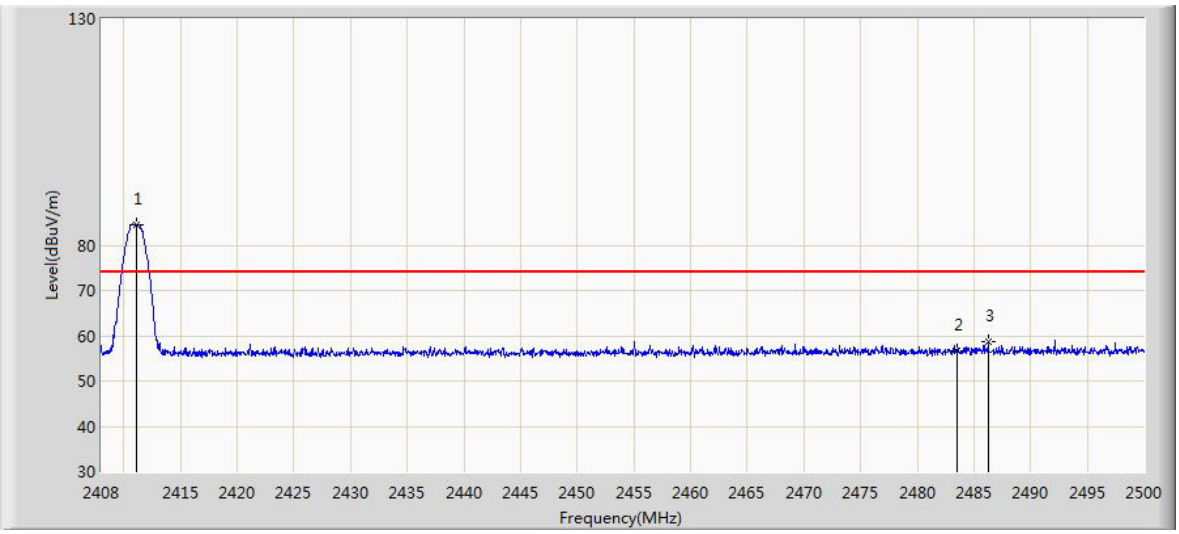
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2354.730	59.656	28.381	-14.344	74.000	31.275	PK
2390.000	59.505	28.302	-14.495	74.000	31.203	PK
2411.010	78.754	47.583	N/A	N/A	31.171	PK

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



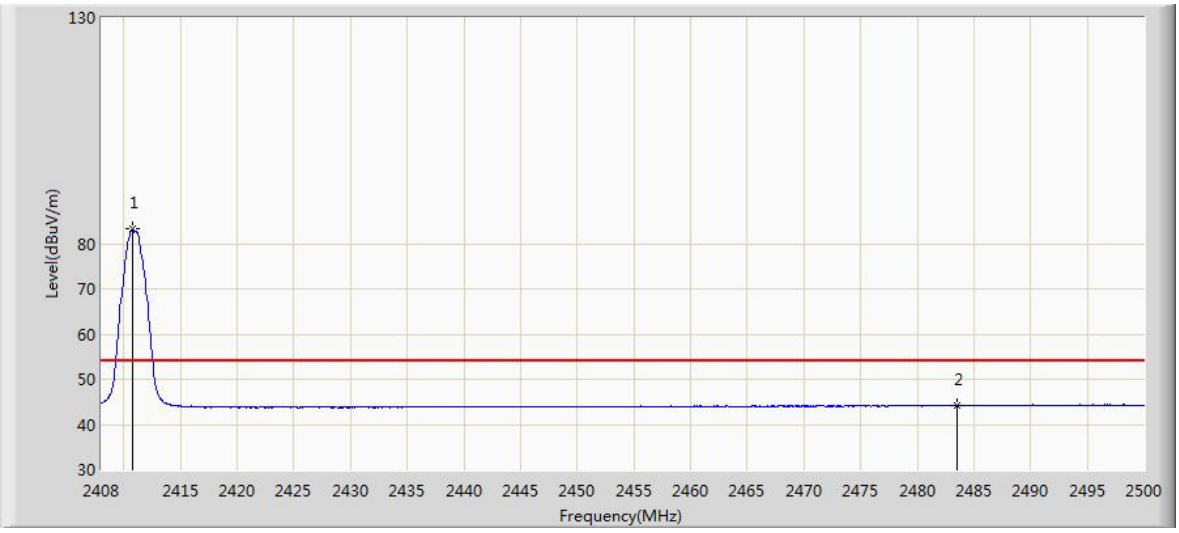
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	45.111	13.908	-8.889	54.000	31.203	AV
2410.800	51.892	20.720	-2.108	54.000	31.172	AV

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



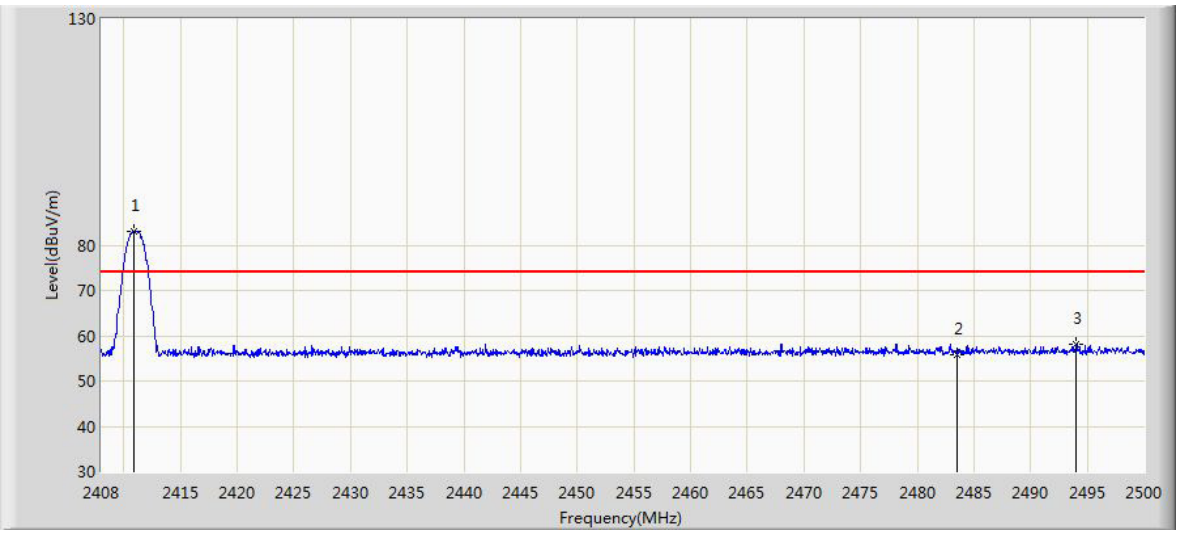
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2411.128	84.632	53.461	10.632	74.000	31.171	PK
2483.500	56.791	25.598	-17.209	74.000	31.194	PK
2486.292	58.741	27.540	-15.259	74.000	31.201	PK

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



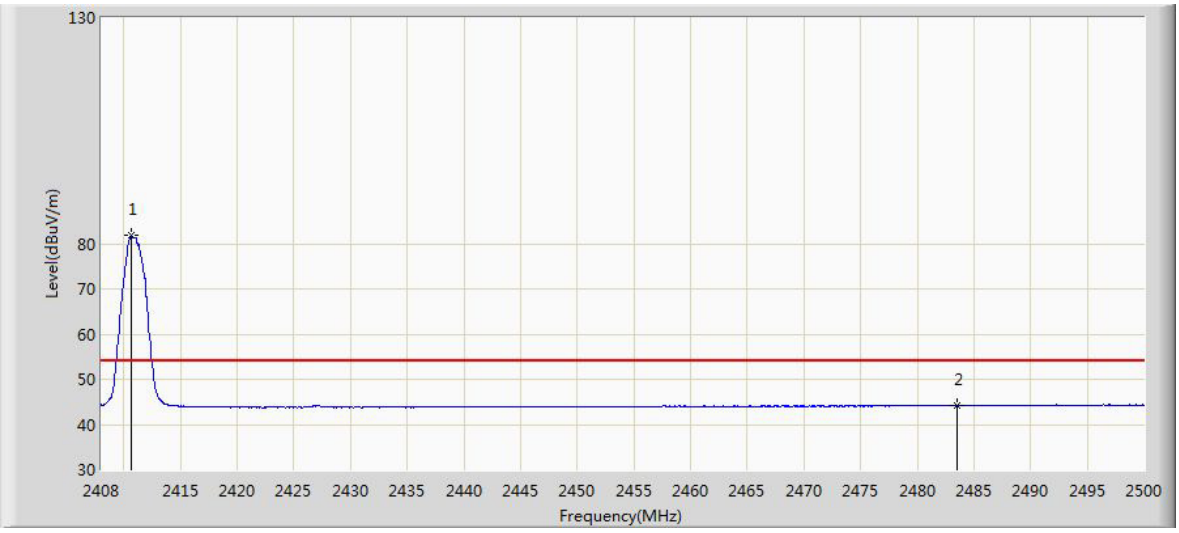
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2410.714	83.262	52.090	29.262	54.000	31.172	AV
2483.500	44.156	12.963	-9.844	54.000	31.194	AV

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
2410.898	83.180	52.009	9.180	74.000	31.172	PK
2483.500	55.924	24.731	-18.076	74.000	31.194	PK
2494.020	58.057	26.836	-15.943	74.000	31.221	PK

Figure 12: Band Edge, Antenna V, AV



Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2410.668	81.831	50.659	27.831	54.000	31.172	AV
2483.500	44.180	12.987	-9.820	54.000	31.194	AV

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