

Prüfbericht-Nr.: Test Report No.:	50055783 001	Auftrags-Nr.: Order No.:	154188724	Seite 1 von 40 Page 1 of 40
Kunden-Referenz-Nr.: Client Reference No.:	627624	Auftragsdatum: Order date:	2016.08.11	
Auftraggeber: Client:	Giant Electric Vehicle (KunShan) Co., LTD NO.1 Yue He South Rd. Kun Shan City .Jiangsu China			
Prüfgegenstand: Test item:	EPAC Bicycle			
Bezeichnung / Typ-Nr.: Identification / Type No.:	Dirt E+, Explore E+, Full E+, Quick E+, Road E+, Prime E+ FCC ID: 2AJPMGIANT-EBIKE IC: 21875-GIANTEBIKE			
Auftrags-Inhalt: Order content:	Complete test			
Prüfgrundlage: Test specification:	FCC CFR47 Part 15, Subpart C Section 15.247 RSS-Gen Issue 4, November 2014 RSS-247 Issue 1, May 2015 ANSI C63.10: 2013 KDB 558074 D01 DTS Meas Guidance v03r05 KDB 447498 D01 General RF Exposure Guidance V06 RSS-102 Issue 5, May 2015			
Wareneingangsdatum: Date of receipt:	2016.07.28			
Prüfmuster-Nr.: Test sample No.:	A000425513-001			
Prüfzeitraum: Testing period:	2016.07.28 to 2016.09.02			
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:		
2016.09.12 Elliot Zhang / Senior Project Engineer		2016.09.12 Shi Li / Section Manager		
Datum Date	Name / Stellung Name / Position	Unterschrift Signature	Datum Date	Name / Stellung 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 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 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: Pass

5.3.1 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.4.1 RF EXPOSURE STATEMENT

RESULT: Pass

Contents

1.	GENERAL REMARKS	4
1.1	COMPLEMENTARY MATERIALS	4
2.	TEST SITES	4
2.1	TEST FACILITIES	4
2.2	LIST OF TEST AND MEASUREMENT INSTRUMENTS	5
2.3	TRACEABILITY	5
2.4	CALIBRATION	6
2.5	MEASUREMENT UNCERTAINTY	6
3.	GENERAL PRODUCT INFORMATION	7
3.1	PRODUCT FUNCTION AND INTENDED USE	7
3.2	RATINGS AND SYSTEM DETAILS	7
3.3	INDEPENDENT OPERATION MODES	8
3.4	NOISE GENERATING AND NOISE SUPPRESSING PARTS	8
3.5	SUBMITTED DOCUMENTS	8
4.	TEST SET-UP AND OPERATION MODES	9
4.1	PRINCIPLE OF CONFIGURATION SELECTION	9
4.2	TEST OPERATION AND TEST SOFTWARE	9
4.3	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	9
4.4	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE	9
5.	TEST RESULTS	10
5.1	CONDUCTED TESTING AT ANTENNA PORT	10
5.1.1	Antenna Requirement	10
5.1.2	Peak Output Power	12
5.1.3	6dB Bandwidth	13
5.1.4	Conducted Spurious Emissions	16
5.1.5	Power Spectral Density	19
5.2	EMISSION IN THE FREQUENCY RANGE UP TO 30MHZ	22
5.2.1	Conducted Emission	22
5.3	EMISSION IN THE FREQUENCY RANGE ABOVE 30MHZ	25
5.3.1	Radiated Spurious Emission	25
5.4	RF EXPOSURE	37
5.4.1	RF Exposure Statement	37
6.	LIST OF TABLES	39
7.	LIST OF FIGURES	39

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	2016.11.03
Two-Line V-Network	R&S	ENV216	101683	2016.11.03
Two-Line V-Network	R&S	ENV216	101684	2016.11.03
Temperature/Humidity Meter	Yuhuaze	N/A	N/A	2016.12.20

Radiated Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Due Date
Spectrum Analyzer	Agilent	E4447A	MY45300136	2016.12.08
EMI Test Receiver	R&S	ESR7	101209	2016.11.03
Preamplifier	Schwarzbeck	BBV 9721	9721-008	2017.04.16
Preamplifier	Agilent	83017A	MY53270040	2017.03.29
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	2016.12.14
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	2016.11.07
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	2016.11.07
Broadband Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170549	2017.01.04
Digital Thermometer & Hygrometer	Minggao	N/A	N/A	2016.11.30

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Asset No.	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	2017.05.08
USB Wideband Power Sensor	Boonton	55006	8911	2017.05.08
Temperature/Humidity Meter	Yuhuaze	N/A	N/A	2016.12.20

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 EPAC Bicycles which use the technic of Bluetooth 4.0 Low Engry Only. There are six series in all, all these series using the same bluetooth module and please refer to table 1 for the difference of these series.

For details refer to the User Manual and Circuit Diagram.

3.2 Ratings and System Details

Kind of Equipment	:	EPAC Bicycle
Type Designation	:	Dirt E+; Explore E+; Full E+; Quick E+; Road E+; Prime E+
Operating Frequency band	:	2402 – 2480MHz
Modulation	:	GFSK
Operation Voltage	:	AC 120V/60Hz
Antenna	:	PCB, Max gain -0.82dBi

Series	Contain Light	Display Type	Battery Type	Motor Type	Mechanical Part
Dirt E+	No	EVO/Charge	Front Battery 400WH/500WH	25K	Suspension Fork
Explore E+	Yes	EVO/Charge	Front Battery 400WH/500WH	25K	Suspension Fork & Back Shelf
Quick E+	Yes	EVO	Front Battery 400WH/500WH	25K	N/A
Full E+	No	EVO/Charge	Front Battery 400WH/500WH	25K	Full Suspension
Road E+	No	EVO	Front Battery 400WH/500WH	25K	N/A
Prime E+	Yes	EVO/Charge	Rear Battery 400WH/500WH	25K	Back Shelf

Note:

1. All the six series using the same Bluetooth module.
2. All the six series using the same Display Type EVO, and the series Dirt E+, Explore E+, Full E+ and Prime E+ have an additional version which the Display Type 'EVO' replaced by the Display Type 'Charge'.
3. There are some mechanical different between these six series, which will not take effort to the radio performace.
4. According to the difference listed above, the Explore E+ were chosing to perform the conducted radio test, and the radiated test were performed with the different Display Type respectively.

3.3 Independent Operation Modes

The basic operation modes are:

- A. Transmitting
 - 1. Low Channel
 - 2. Middle Channel
 - 3. High Channel
- B. Receiving
- C. Standby
- D. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

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

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

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 PCB antenna, the directional gain of antenna is -0.82dBi and the PCB antenna is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

Table 3: 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: 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

RSS-Gen 6.3 – External Control	
Requirement:	The device shall not have any external controls accessible to the user that enable it to be adjusted, selected or programmed to operate in violation of the limits prescribed in the applicable RSS.
Results:	The device does not have any transmitter external controls accessible to the user that can be adjusted and operated in violation of the limits of this standard.
Verdict:	PASS

RSS-Gen 8.3 – Antenna Requirement

Requirement: When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacture.

Results:

a) Antenna type:	PCB Antenna
b) Manufacture:	N/A
c) Model No.:	N/A
d) Gain with reference to an isotropic radiator:	-0.82dBi

Verdict: PASS

5.1.2 Peak Output Power

RESULT:**Pass**

Date of testing : 2016.07.28
Test standard : FCC Part 15.247(b)(3)
Clause 5.4(4) of RSS-247 Issue 1 May 2015
Test procedure : ANSI C63.10: 2013
Clause 9.1 of KDB 558074 D01 v03r05
Limit : FCC Part 15.247(b)(3)
Clause 5.4(4) of RSS-247 Issue 1 May 2015
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A.1; A.2; A.3
Ambient temperature : 25°C
Relative humidity : 52%
Atmospheric pressure : 101kPa

Table 4: Peak Output Power

Mode	Freq. [MHz]	Maximum Peak Conducted Output Power [dBm]	Maximum Average Conducted Output Power [dBm]	Limit [dBm]
BLE	2402	5.68	-1.01	30
	2440	5.67	-0.94	30
	2480	5.69	-0.99	30

5.1.3 6dB Bandwidth

RESULT:**Pass**

Date of testing : 2016.07.28
Test standard : FCC Part 15.247(a)(2)
Clause 5.2(1) of RSS-247 Issue 1 May 2015
Test procedure : ANSI C63.10: 2013
Clause 8 of KDB 558074 D01 v03r05
Limit : FCC Part 15.247(a)(2)
Clause 5.2(1) of RSS-247 Issue 1 May 2015
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A.1; A.2; A.3
Ambient temperature : 25°C
Relative humidity : 52%
Atmospheric pressure : 101kPa

Table 5: 6dB Bandwidth

Mode	Frequency [MHz]	6dB Bandwidth [kHz]	Limit [kHz]
BLE	2402	687.812	500
	2440	700.587	500
	2480	697.169	500

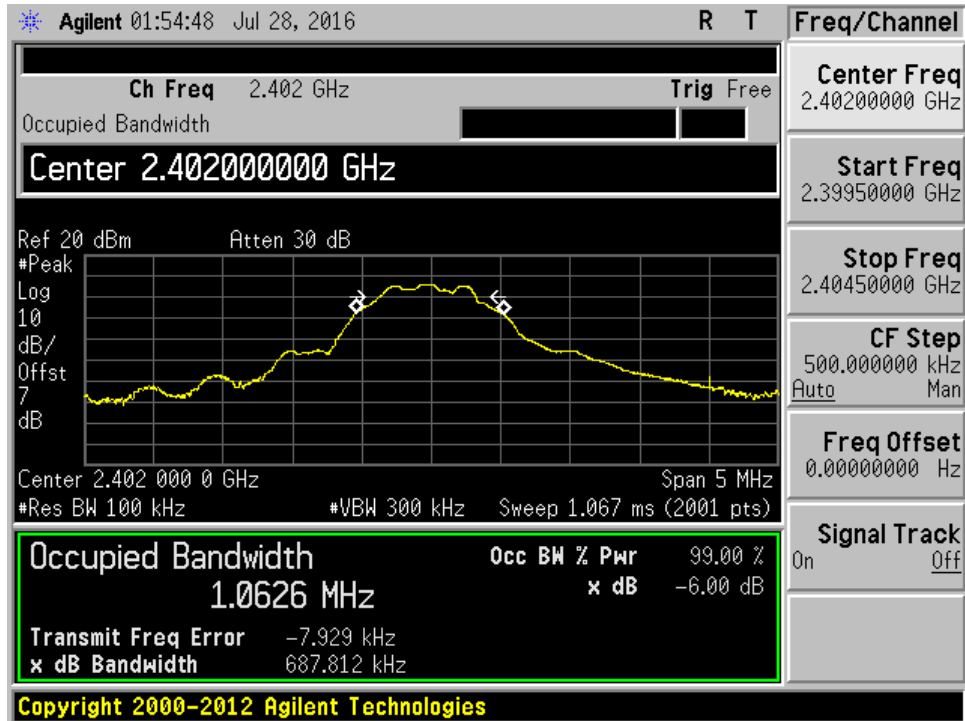
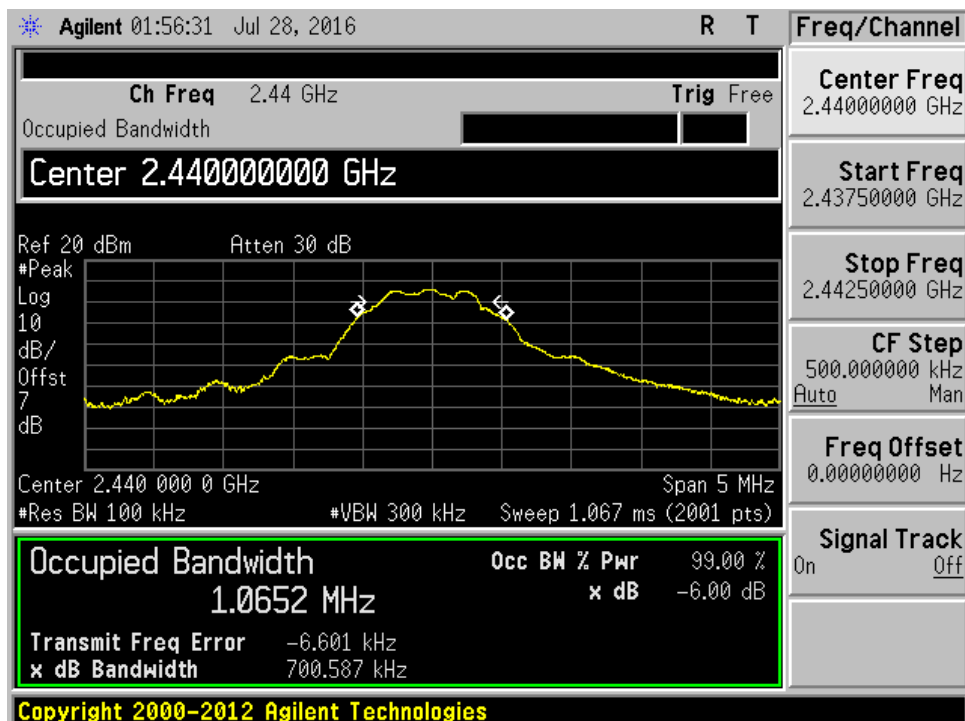
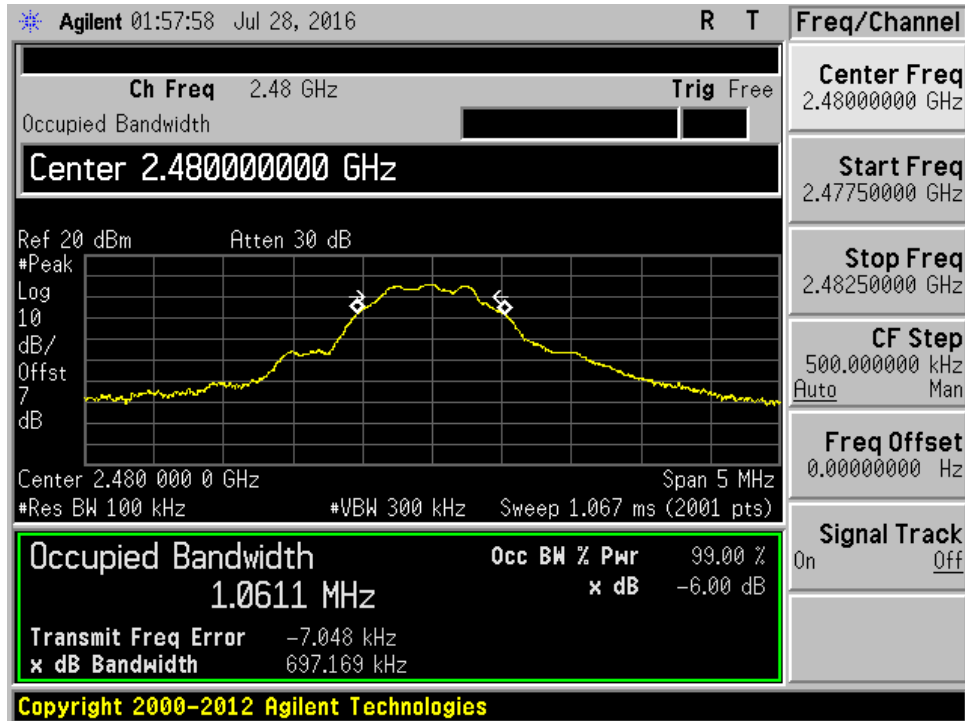
Figure 1: 6dB Bandwidth, 2402MHz

Figure 2: 6dB Bandwidth, 2440MHz


Figure 3: 6dB Bandwidth, 2480MHz


5.1.4 Conducted Spurious Emissions

RESULT:
Pass

Date of testing : 2016.07.28
 Test standard : FCC Part 15.247(d)
 Clause 5.5 of RSS-247 Issue 1 May 2015
 Test procedure : ANSI C63.10: 2013
 Clause 11&12 of KDB 558074 D01 v03r05
 Limit : FCC Part 15.247(d)
 Clause 5.5 of RSS-247 Issue 1 May 2015
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A.1; A.2; A.3
 Ambient temperature : 25°C
 Relative humidity : 52%
 Atmospheric pressure : 101kPa

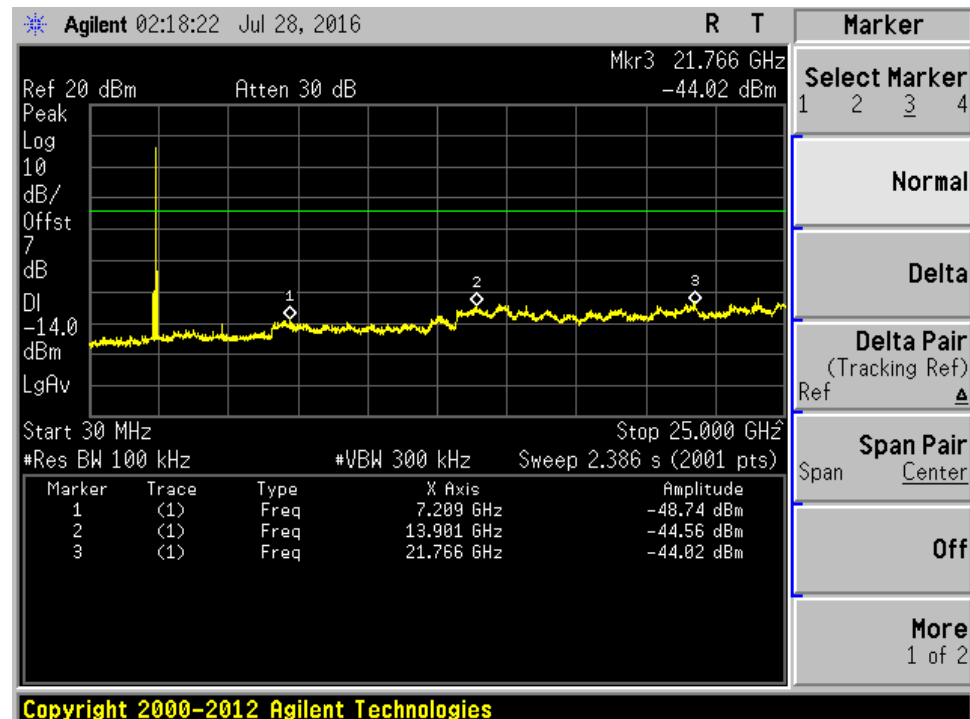
Figure 4: Conducted Spurious Emission, 2402MHz


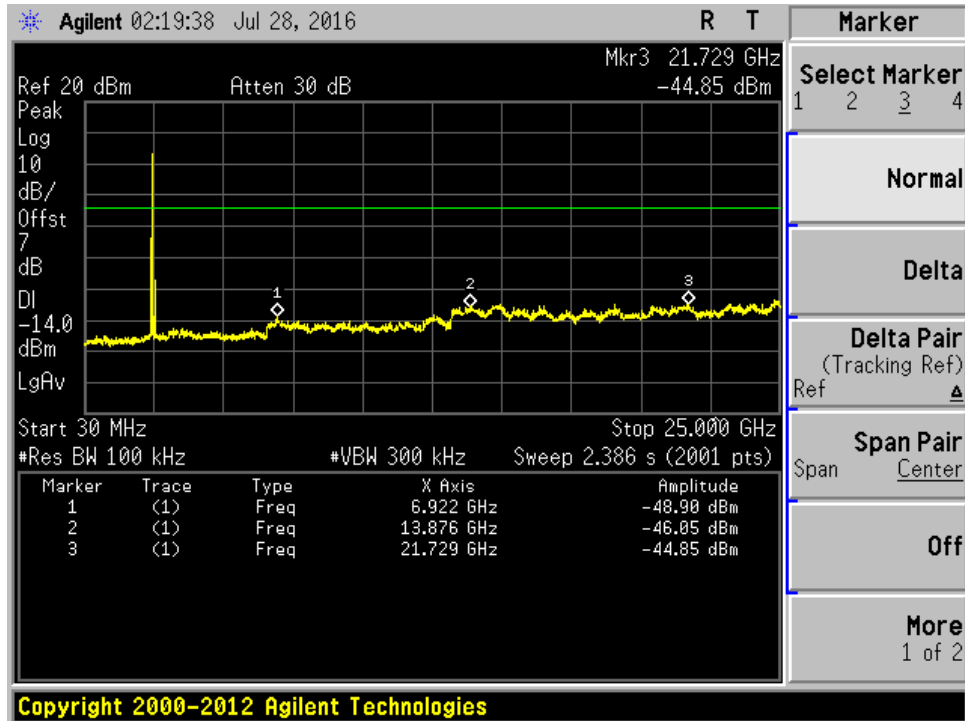
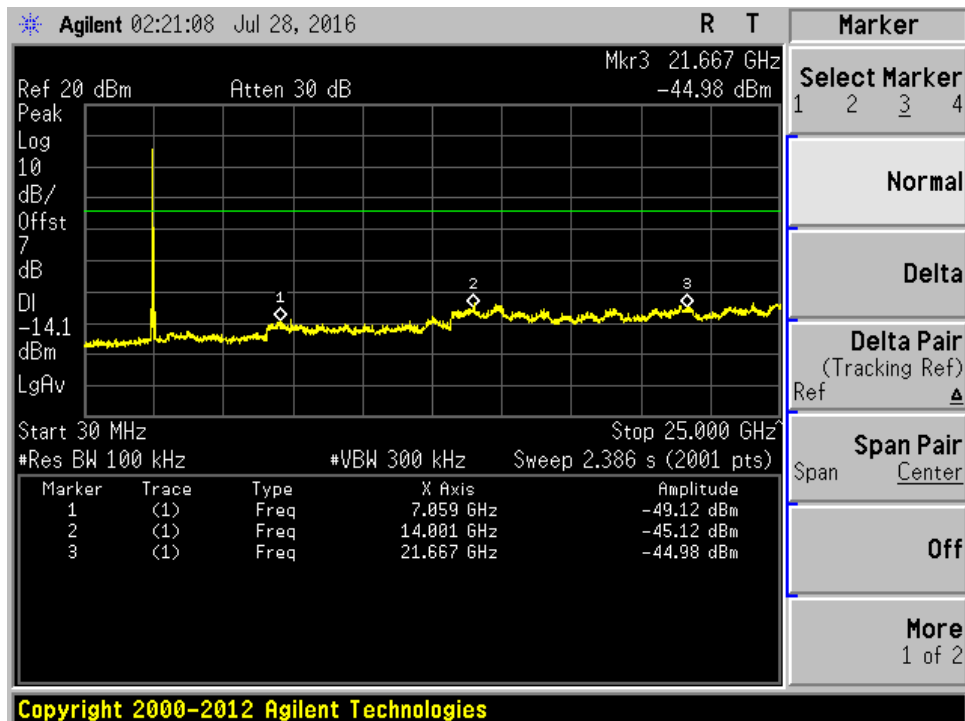
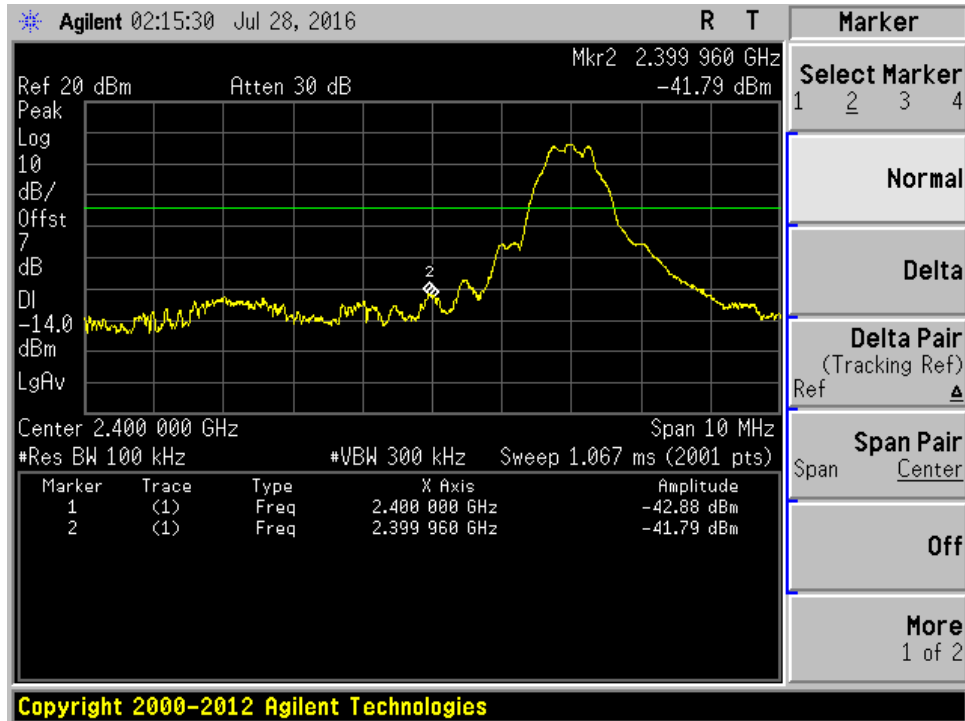
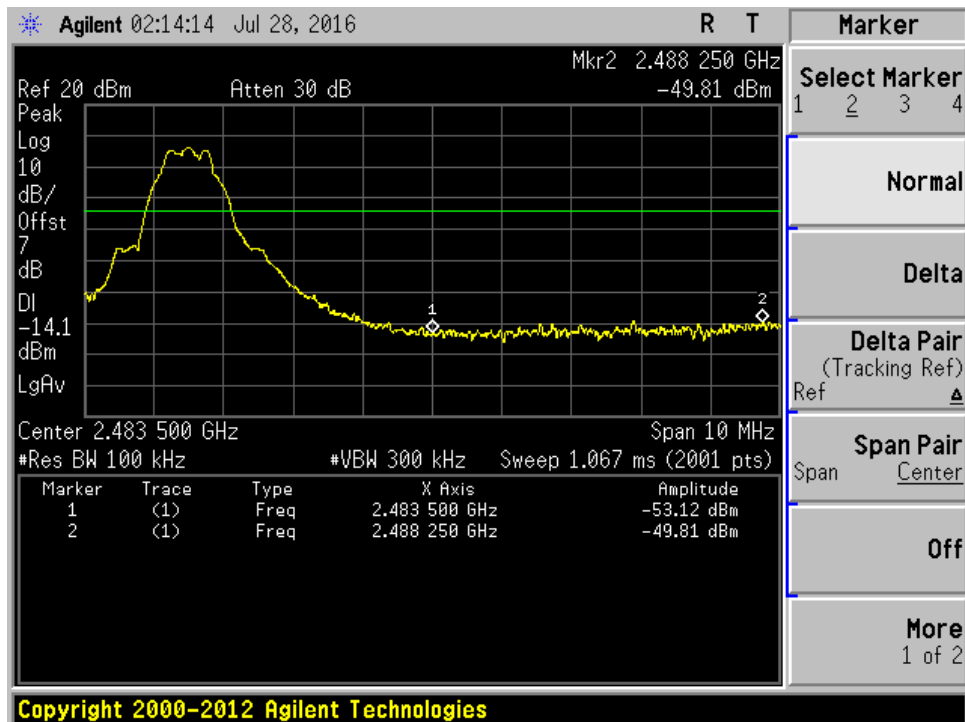
Figure 5: Conducted Spurious Emission, 2440MHz

Figure 6: Conducted Spurious Emission, 2480MHz


Figure 7: Conducted Bandedge, 2402MHz

Figure 8: Conducted Bandedge, 2480MHz


5.1.5 Power Spectral Density

RESULT:**Pass**

Date of testing : 2016.07.28
Test standard : FCC Part 15.247(e)
Clause 5.2(2) of RSS-247 Issue 1 May 2015
Test procedure : ANSI C63.10: 2013
Clause 10 of KDB 558074 D01 v03r05
Limit : FCC Part 15.247(e)
Clause 5.2(2) of RSS-247 Issue 1 May 2015
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A.1; A.2; A.3
Ambient temperature : 25°C
Relative humidity : 52%
Atmospheric pressure : 101kPa

Table 6: Power Spectral Density

Mode	Frequency [MHz]	Result [dBm/3kHz]	Limit [dBm/3kHz]
BLE	2402	-7.57	8
	2426	-7.09	8
	2480	-7.05	8

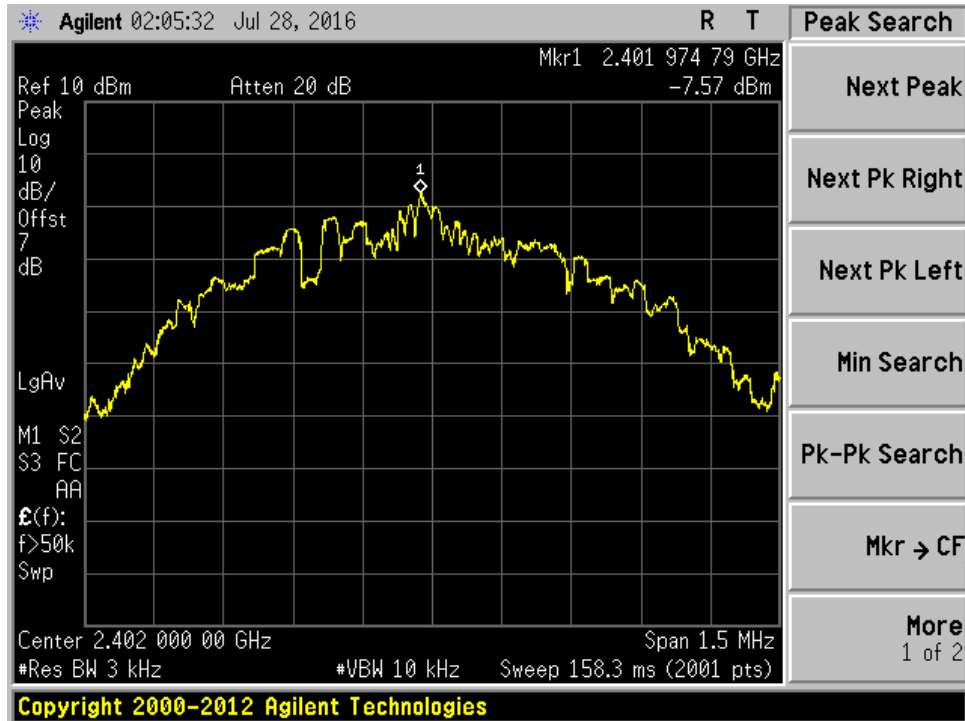
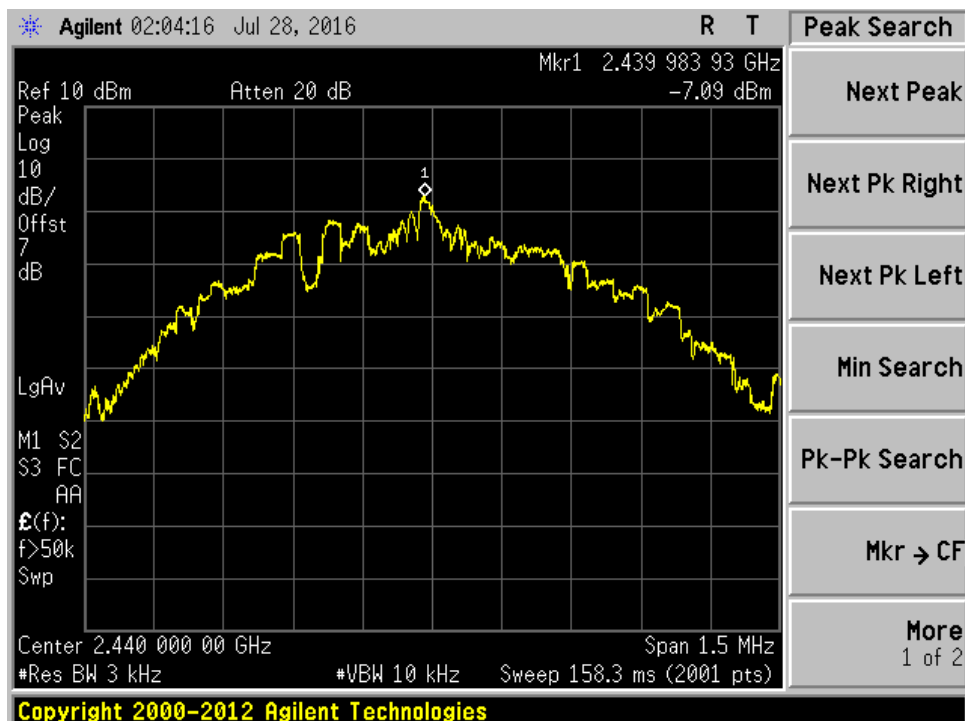
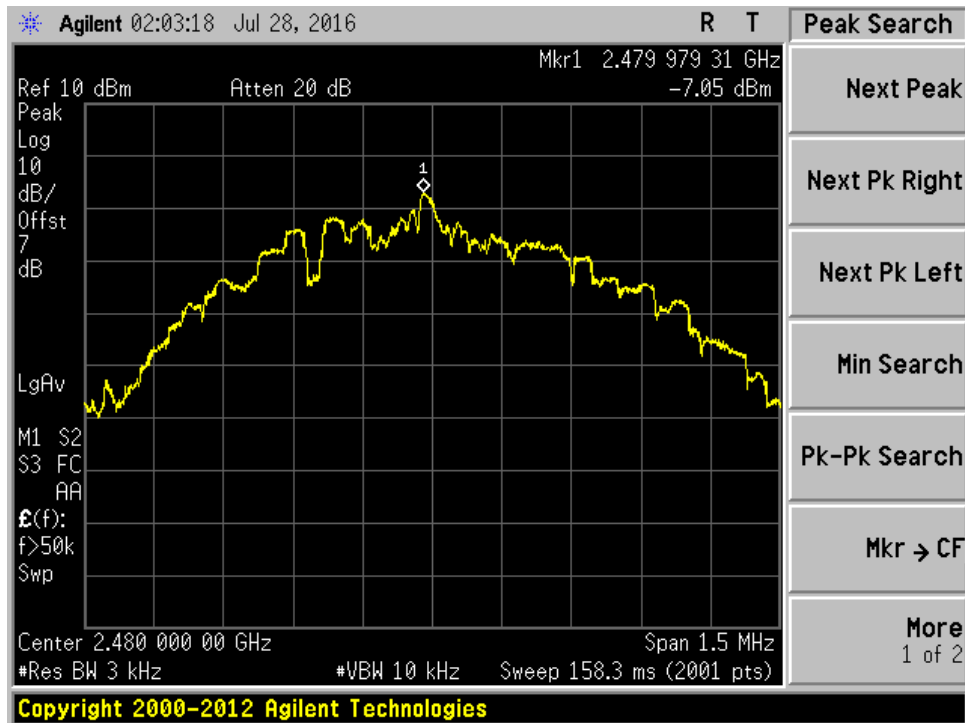
Figure 9: Power Spectral Density, 2402MHz

Figure 10: Power Spectral Density, 2440MHz


Figure 11: Power Spectral Density, 2480MHz


5.2 Emission in the Frequency Range up to 30MHz

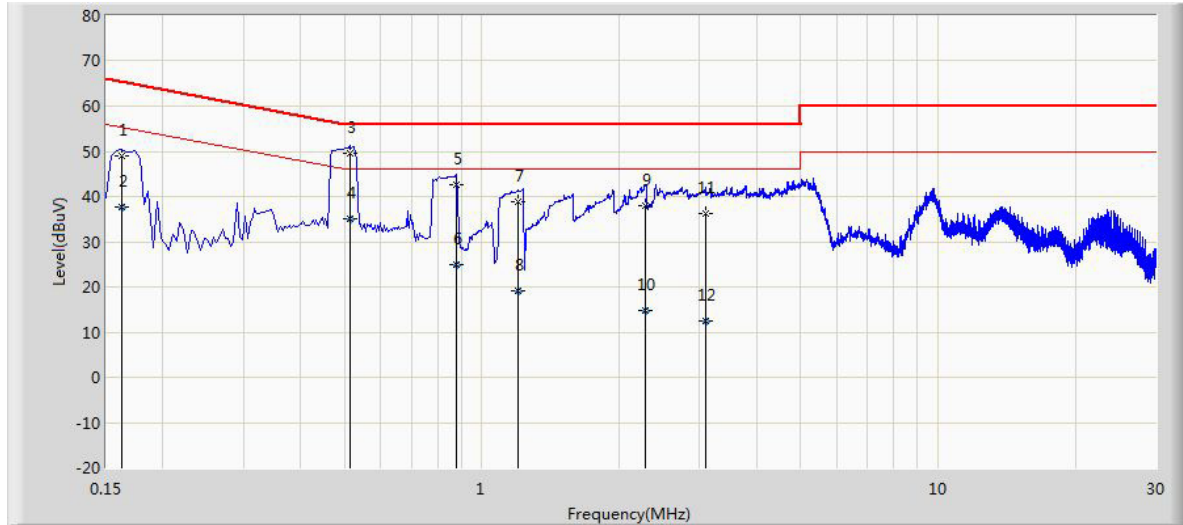
5.2.1 Conducted Emission

RESULT:**Pass**

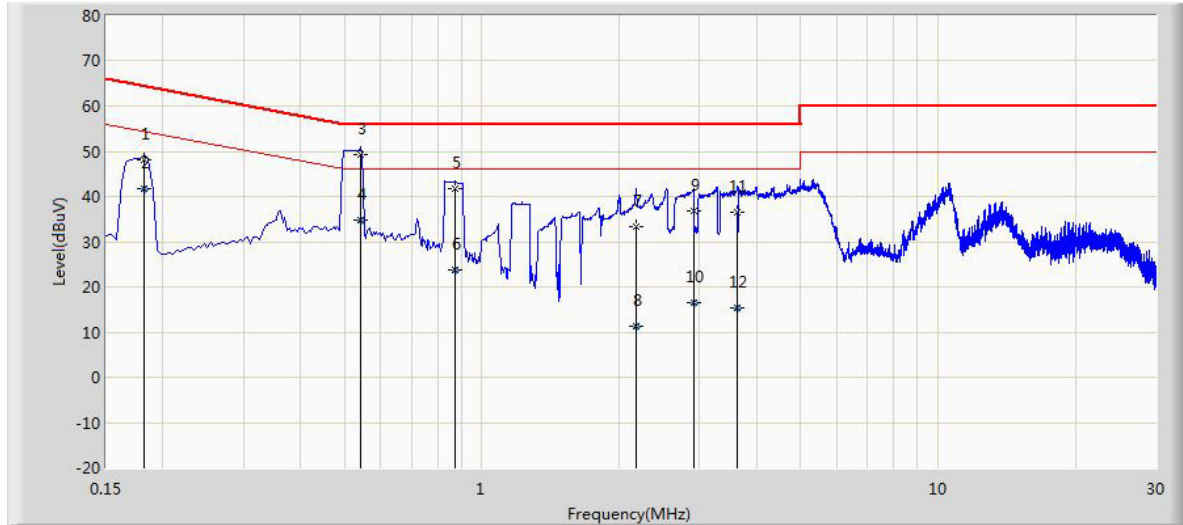
Date of testing	: 2016.09.18
Test standard	: FCC Part 15.207 (a) Clause 8.8 of RSS-Gen Issue 4, November 2014
Test procedure	: ANSI C63.10: 2013
Limit	: FCC Part 15.207(a) Clause 8.8 of RSS-Gen Issue 4, November 2014
Kind of test site	: Shielded room

Test setup

Operation Mode	: A
Ambient temperature	: 25°C
Relative humidity	: 52%
Atmospheric pressure	: 101kPa

Figure 12: Conducted Emission, L Line

Table 7: Conducted Emission, L Line

Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
0.162	48.876	38.779	-16.485	65.361	10.097	QP
0.162	37.734	27.637	-17.627	55.361	10.097	AV
0.514	49.590	39.433	-6.410	56.000	10.156	QP
0.514	35.011	24.855	-10.989	46.000	10.156	AV
0.878	42.729	32.757	-13.271	56.000	9.972	QP
0.878	25.065	15.093	-20.935	46.000	9.972	AV
1.202	38.961	29.060	-17.039	56.000	9.901	QP
1.202	19.013	9.112	-26.987	46.000	9.901	AV
2.278	38.049	28.186	-17.951	56.000	9.863	QP
2.278	14.656	4.792	-31.344	46.000	9.863	AV
3.090	36.102	26.242	-19.898	56.000	9.859	QP
3.090	12.372	2.512	-33.628	46.000	9.859	AV

Figure 13: Conducted Emission, N Line

Table 8: Conducted Emission, N Line

Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
0.182	48.093	38.051	-16.301	64.394	10.042	QP
0.182	41.772	31.730	-12.622	54.394	10.042	AV
0.542	49.407	39.244	-6.593	56.000	10.163	QP
0.542	34.757	24.594	-11.243	46.000	10.163	AV
0.874	41.619	31.641	-14.381	56.000	9.978	QP
0.874	23.707	13.729	-22.293	46.000	9.978	AV
2.182	33.409	23.540	-22.591	56.000	9.869	QP
2.182	11.229	1.360	-34.771	46.000	9.869	AV
2.906	36.698	26.842	-19.302	56.000	9.855	QP
2.906	16.429	6.574	-29.571	46.000	9.855	AV
3.634	36.643	26.712	-19.357	56.000	9.931	QP
3.634	15.239	5.308	-30.761	46.000	9.931	AV

5.3 Emission in the Frequency Range above 30MHz

5.3.1 Radiated Spurious Emission

RESULT:
Pass

Date of testing : 2016.09.05
 Test standard : FCC Part 15.247(d)
 Clause 5.5 of RSS-247 Issue 1 May 2015
 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)
 Clause 5.5 of RSS-247 Issue 1 May 2015
 Clause 8.9 of RSS-Gen Issue 4 November 2014
 Kind of test site : 3m Semi-Anechoic Chamber

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A.1; A.2; A.3
 Ambient temperature : 25°C
 Relative humidity : 52%
 Atmospheric pressure : 101kPa

Table 9: Radiated Spurious Emission, below 1GHz, for EVO

Channel	Freq. [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type	Ant. Pol.
Low	36.305	14.412	1.254	-25.588	40.000	13.157	QP	H
	44.065	15.480	0.824	-24.520	40.000	14.656	QP	H
	51.825	15.412	0.524	-24.588	40.000	14.888	QP	H
	63.465	13.645	0.587	-26.355	40.000	13.058	QP	H
	95.475	14.223	1.827	-29.277	43.500	12.396	QP	H
	884.570	27.594	3.572	-18.406	46.000	24.022	QP	H
	43.580	15.079	0.524	-24.921	40.000	14.555	QP	V
	48.430	15.682	0.714	-24.318	40.000	14.968	QP	V
	53.765	15.682	0.824	-24.318	40.000	14.858	QP	V
	108.570	15.922	2.924	-27.578	43.500	12.998	QP	V
	501.905	20.885	2.524	-25.115	46.000	18.361	QP	V
	914.640	26.512	2.270	-19.488	46.000	24.243	QP	V

Note:

All the three channels have been evaluated, only the worst case was shown on the table above.

Table 10: Radiated Spurious Emission, below 1GHz, for charge

Channel	Freq. [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type	Ant. Pol.
Low	44.065	16.100	1.444	-23.900	40.000	14.656	QP	H
	51.340	15.443	0.540	-24.557	40.000	14.903	QP	H
	56.190	14.903	0.424	-25.097	40.000	14.478	QP	H
	109.540	13.794	0.825	-29.706	43.500	12.969	QP	H
	113.220	15.933	3.550	-27.567	43.500	12.383	QP	H
	794.360	24.305	1.514	-21.695	46.000	22.791	QP	H
	38.245	15.051	1.544	-24.949	40.000	13.506	QP	V
	46.490	15.516	0.525	-24.484	40.000	14.991	QP	V
	50.855	16.446	1.524	-23.554	40.000	14.921	QP	V
	98.870	14.380	1.544	-29.120	43.500	12.836	QP	V
	536.340	20.398	1.521	-25.602	46.000	18.877	QP	V
	851.105	26.183	2.540	-19.817	46.000	23.644	QP	V

Note:

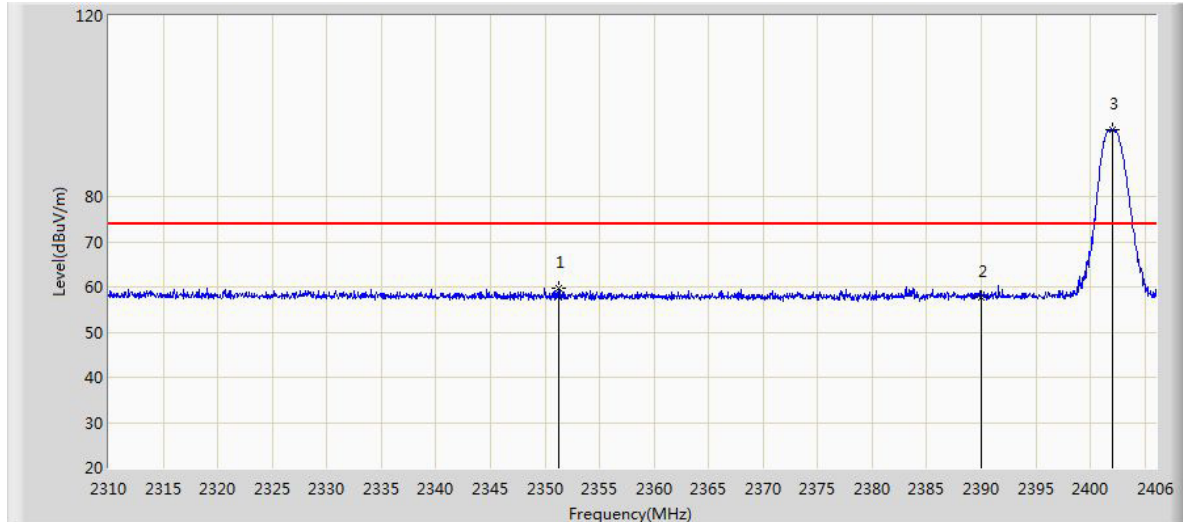
All the three channels have been evaluated, only the worst case was shown on the table above.

Table 11: Radiated Spurious Emission, above 1GHz, for EVO

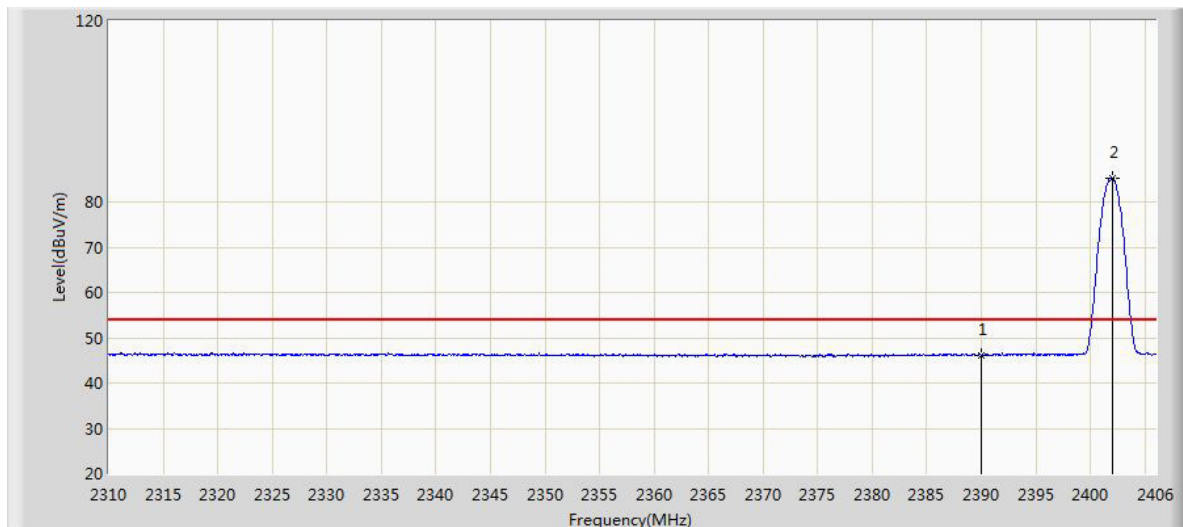
Channel	Freq. [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type	Ant. Pol.
Low	7205.000	51.917	41.403	-22.083	74.000	10.513	PK	H
	8267.500	42.647	32.379	-31.353	74.000	10.269	PK	H
	10120.500	45.906	32.410	-28.094	74.000	13.497	PK	H
	11497.500	48.927	31.651	-25.073	74.000	17.276	PK	H
	7205.000	52.351	41.837	-21.649	74.000	10.513	PK	V
	8318.500	43.385	33.125	-30.615	74.000	10.259	PK	V
	10214.000	47.120	32.984	-26.880	74.000	14.136	PK	V
	11506.000	49.248	31.784	-24.752	74.000	17.464	PK	V
Middle	6270.000	39.948	33.720	-34.052	74.000	6.228	PK	H
	7319.955	53.312	42.661	-0.688	54.000	10.651	AV	H
	7324.000	57.875	47.236	-16.125	74.000	10.639	PK	H
	10273.500	47.506	33.102	-26.494	74.000	14.404	PK	H
	11557.000	49.614	31.942	-24.386	74.000	17.672	PK	H
	6287.000	41.782	35.797	-32.218	74.000	5.985	PK	V
	7319.975	53.566	42.915	-0.434	54.000	10.651	AV	V
	7324.000	58.274	47.635	-15.726	74.000	10.639	PK	V
	10018.500	47.098	33.905	-26.902	74.000	13.194	PK	V
	11489.000	48.576	31.454	-25.424	74.000	17.121	PK	V
High	6040.500	40.034	34.767	-33.966	74.000	5.266	PK	H
	7439.980	52.544	41.811	-1.456	54.000	10.733	AV	H
	7443.000	57.630	46.891	-16.370	74.000	10.739	PK	H
	10273.500	47.112	32.708	-26.888	74.000	14.404	PK	H
	11557.000	49.627	31.955	-24.373	74.000	17.672	PK	H
	6372.000	41.787	35.371	-32.213	74.000	6.417	PK	V
	7439.935	53.272	42.539	-0.728	54.000	10.733	AV	V
	7443.000	56.592	45.853	-17.408	74.000	10.739	PK	V
	10545.500	48.034	32.702	-25.966	74.000	15.333	PK	V
	11608.000	50.389	32.973	-23.611	74.000	17.415	PK	V

Table 12: Radiated Spurious Emission, above 1GHz, for charge

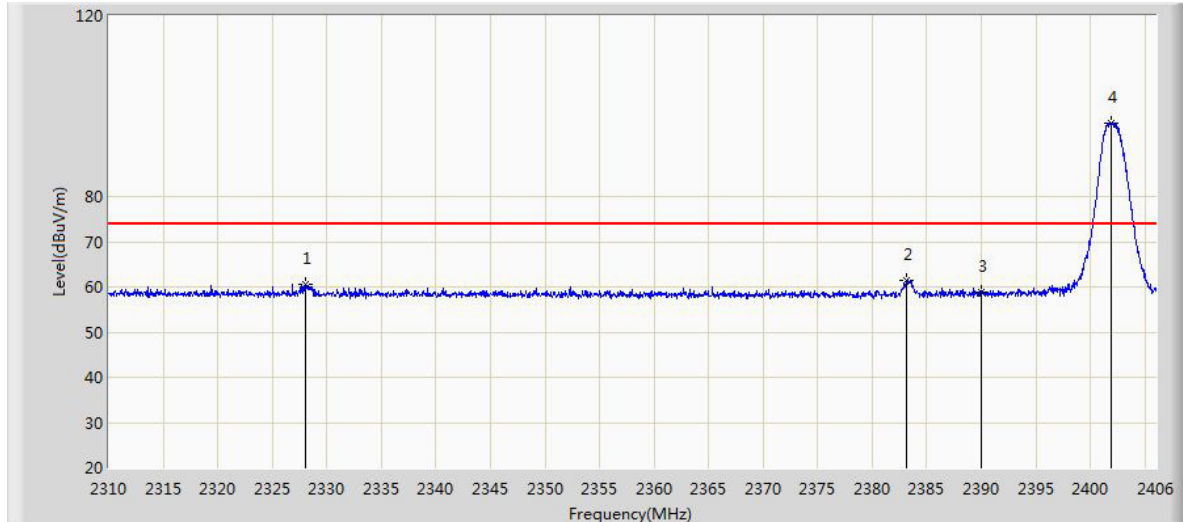
Channel	Freq. [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type	Ant. Pol.
Low	7205.000	56.261	45.747	-17.739	74.000	10.513	PK	H
	7206.038	53.002	42.474	-0.998	54.000	10.527	AV	H
	8301.500	44.798	34.609	-29.202	74.000	10.189	PK	H
	10324.500	47.907	33.226	-26.093	74.000	14.681	PK	H
	11982.000	50.422	33.576	-23.578	74.000	16.846	PK	H
	7205.000	50.954	40.440	-23.046	74.000	10.513	PK	V
	7206.035	48.639	38.111	-5.361	54.000	10.527	AV	V
	8242.000	43.622	33.304	-30.378	74.000	10.318	PK	V
	10112.000	48.297	34.874	-25.703	74.000	13.423	PK	V
	11982.000	50.422	33.576	-23.578	74.000	16.846	PK	V
Middle	6406.000	41.281	34.709	-32.719	74.000	6.572	PK	H
	7315.500	54.624	43.959	-19.376	74.000	10.665	PK	H
	7319.993	51.937	41.286	-2.063	54.000	10.651	AV	H
	8871.000	45.156	33.611	-28.844	74.000	11.545	PK	H
	11191.500	48.579	31.906	-25.421	74.000	16.673	PK	H
	6482.500	42.473	35.223	-31.527	74.000	7.249	PK	V
	7315.500	52.404	41.739	-21.596	74.000	10.665	PK	V
	8718.000	45.874	34.448	-28.126	74.000	11.426	PK	V
	11191.500	48.579	31.906	-25.421	74.000	16.673	PK	V
High	6134.000	41.113	35.444	-32.887	74.000	5.669	PK	H
	7443.000	52.167	41.428	-21.833	74.000	10.739	PK	H
	8718.000	45.874	34.448	-28.126	74.000	11.426	PK	H
	11565.500	49.233	31.677	-24.767	74.000	17.556	PK	H
	6244.500	41.212	35.295	-32.788	74.000	5.917	PK	V
	7443.000	47.965	37.226	-26.035	74.000	10.739	PK	V
	8828.500	46.117	34.500	-27.883	74.000	11.617	PK	V
	11565.500	49.233	31.677	-24.767	74.000	17.556	PK	V

Figure 14: Radiated Restricted Band Edge, 2402MHz, Horizontal, PK, for EVO

Table 13: Radiated Restricted Band Edge, 2402MHz, Horizontal, PK, for EVO

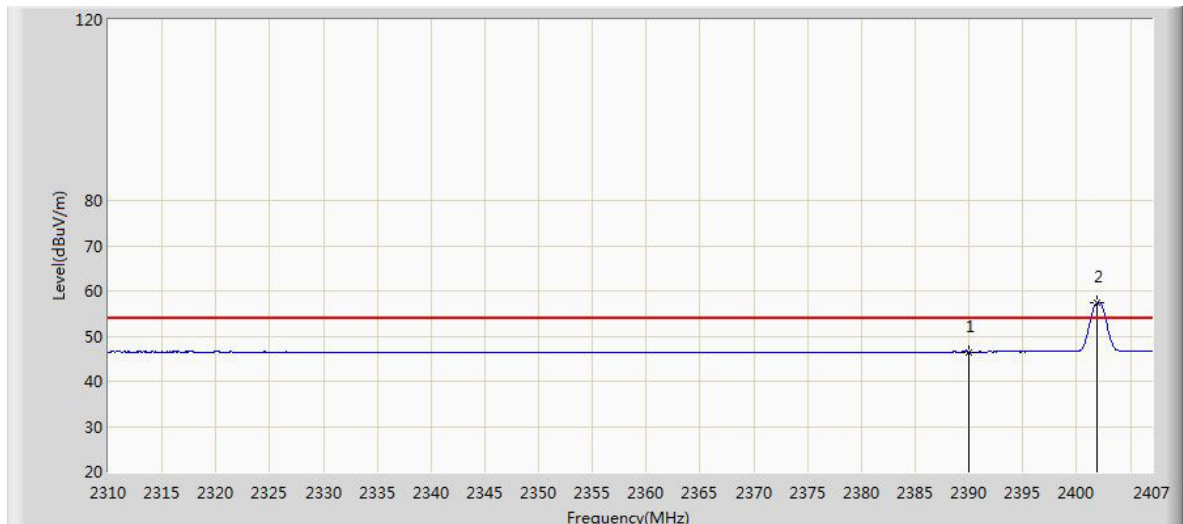
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2351.232	59.846	27.571	-14.154	74.000	32.275	PK
2390.000	57.788	25.510	-16.212	74.000	32.278	PK
2402.064	94.652	62.378	N/A	N/A	32.273	PK

Figure 15: Radiated Restricted Band Edge, 2402MHz, Horizontal, AV, for EVO

Table 14: Radiated Restricted Band Edge, 2402MHz, Horizontal, AV, for EVO

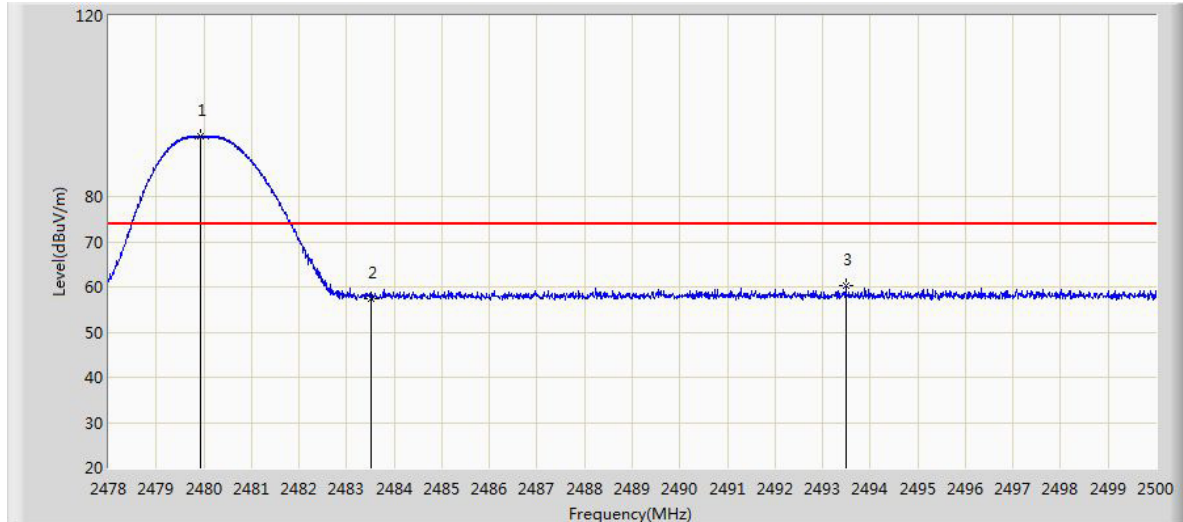
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	46.077	13.799	-7.923	54.000	32.278	AV
2402.064	85.266	52.992	N/A	N/A	32.273	AV

Figure 16: Radiated Restricted Band Edge, 2402MHz, Vertical, PK, for EVO

Table 15: Radiated Restricted Band Edge, 2402MHz, Vertical, PK, for EVO

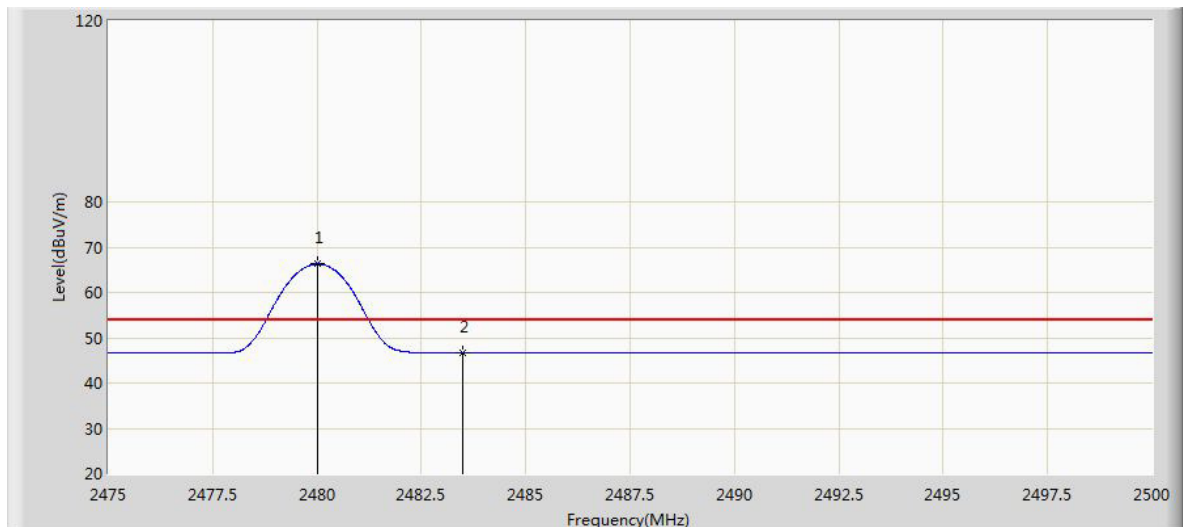
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2328.096	60.562	28.192	-13.438	74.000	32.370	PK
2383.104	61.482	29.242	-12.518	74.000	32.240	PK
2390.000	58.836	26.558	-15.164	74.000	32.278	PK
2401.968	96.296	64.022	N/A	N/A	32.274	PK

Figure 17: Radiated Restricted Band Edge, 2402MHz, Vertical, AV, for EVO

Table 16: Radiated Restricted Band Edge, 2402MHz, Vertical, AV, for EVO

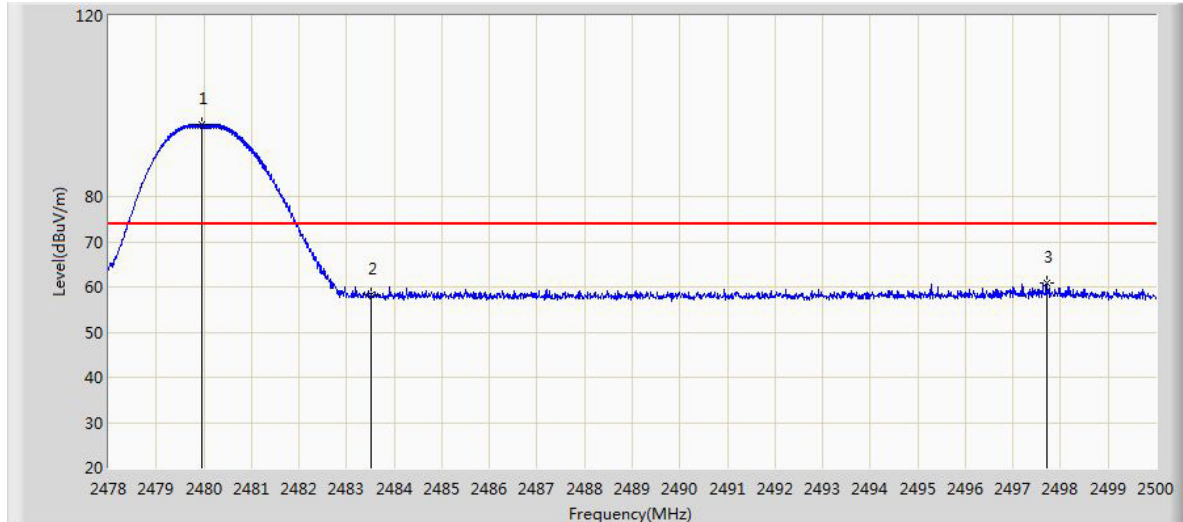
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	45.781	13.503	-8.219	54.000	32.278	AV
2401.920	85.841	53.567	N/A	N/A	32.274	AV

Figure 18: Radiated Restricted Band Edge, 2480MHz, Horizontal, PK, for EVO

Table 17: Radiated Restricted Band Edge, 2480MHz, Horizontal, PK, for EVO

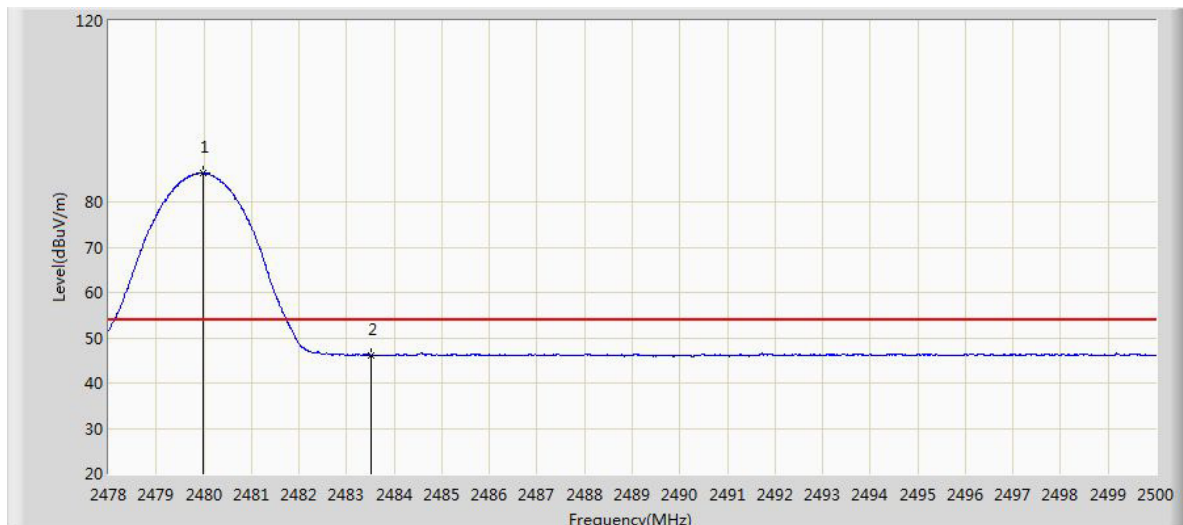
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.936	93.293	61.024	N/A	N/A	32.269	PK
2483.500	57.505	25.224	-16.495	74.000	32.282	PK
2493.488	60.426	28.110	-13.574	74.000	32.316	PK

Figure 19: Radiated Restricted Band Edge, 2480MHz, Horizontal, AV, for EVO

Table 18: Radiated Restricted Band Edge, 2480MHz, Horizontal, AV, for EVO

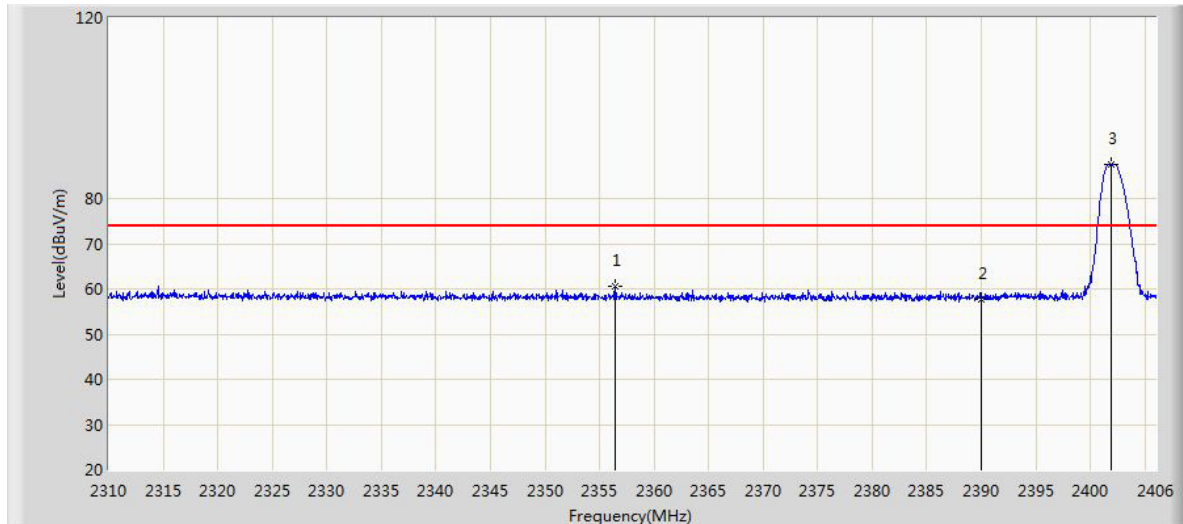
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.936	83.900	51.631	N/A	N/A	32.269	AV
2483.500	46.019	13.738	-7.981	54.000	32.282	AV
2489.264	46.571	14.270	-7.429	54.000	32.301	AV

Figure 20: Radiated Restricted Band Edge, 2480MHz, Vertical, PK, for EVO

Table 19: Radiated Restricted Band Edge, 2480MHz, Vertical, PK, for EVO

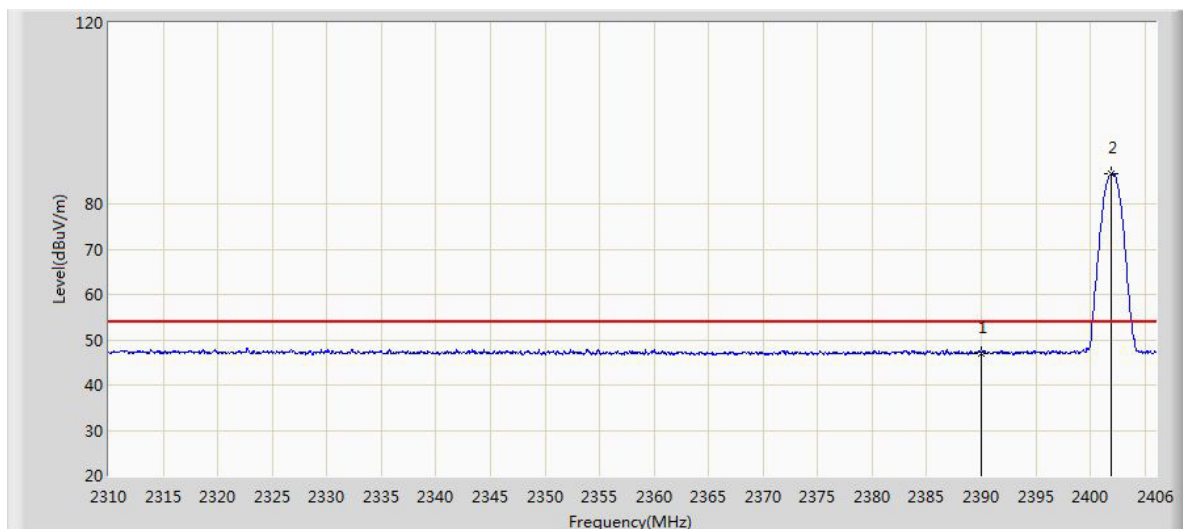
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.969	95.889	63.620	N/A	N/A	32.269	PK
2483.500	58.123	25.842	-15.877	74.000	32.282	PK
2497.701	60.964	28.645	-13.036	74.000	32.319	PK

Figure 21: Radiated Restricted Band Edge, 2480MHz, Vertical, AV, for EVO

Table 20: Radiated Restricted Band Edge, 2480MHz, Vertical, AV, for EVO

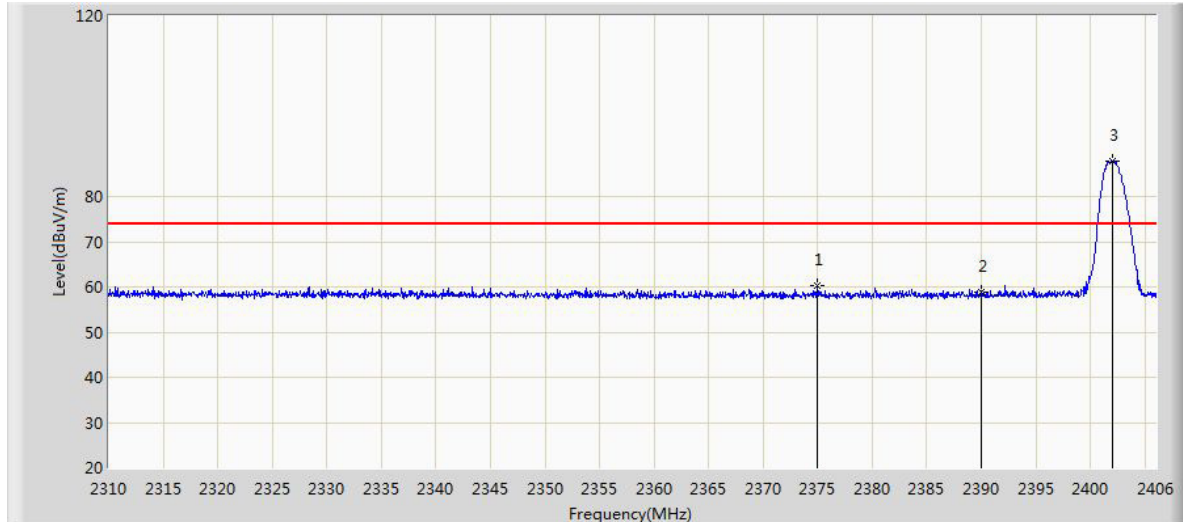
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.980	86.308	54.039	N/A	N/A	32.269	AV
2483.500	46.059	13.778	-7.941	54.000	32.282	AV

Figure 22: Radiated Restricted Band Edge, 2402MHz, Horizontal, PK, for charge

Table 21: Radiated Restricted Band Edge, 2402MHz, Horizontal, PK, for charge

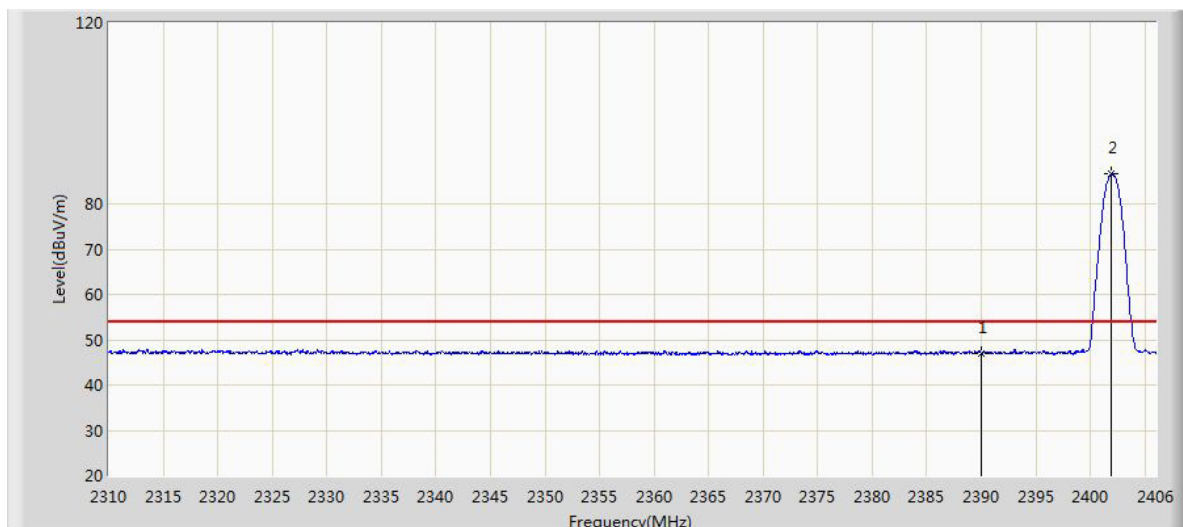
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2356.464	60.484	28.226	-13.516	74.000	32.258	PK
2390.000	57.775	25.497	-16.225	74.000	32.278	PK
2401.920	87.657	55.383	N/A	N/A	32.274	PK

Figure 23: Radiated Restricted Band Edge, 2402MHz, Horizontal, AV, for charge

Table 22: Radiated Restricted Band Edge, 2402MHz, Horizontal, AV, for charge

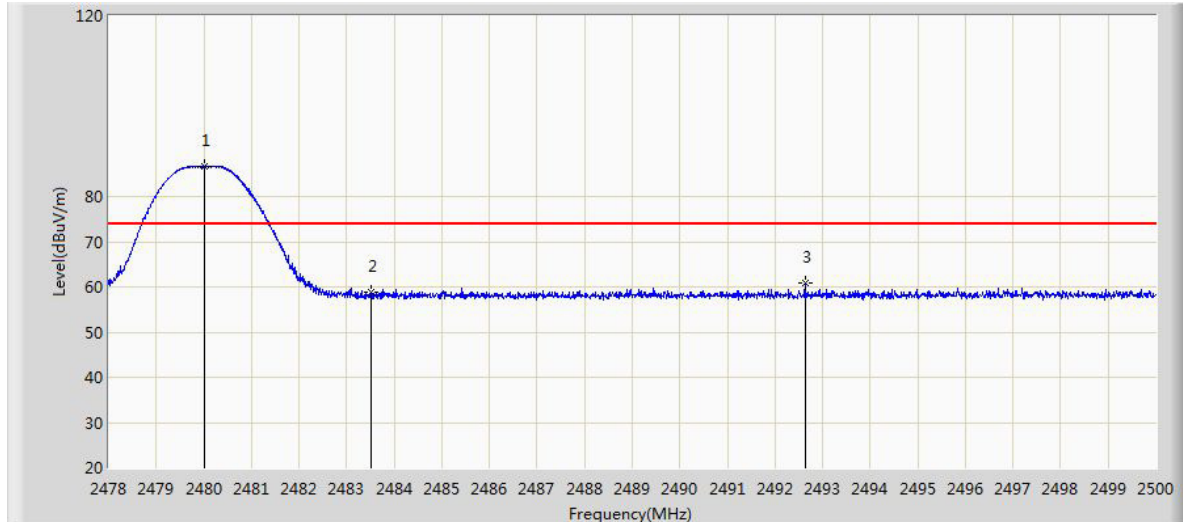
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	47.077	14.799	-6.923	54.000	32.278	AV
2401.920	86.738	54.464	N/A	N/A	32.274	AV

Figure 24: Radiated Restricted Band Edge, 2402MHz, Vertical, PK, for charge

Table 23: Radiated Restricted Band Edge, 2402MHz, Vertical, PK, for charge

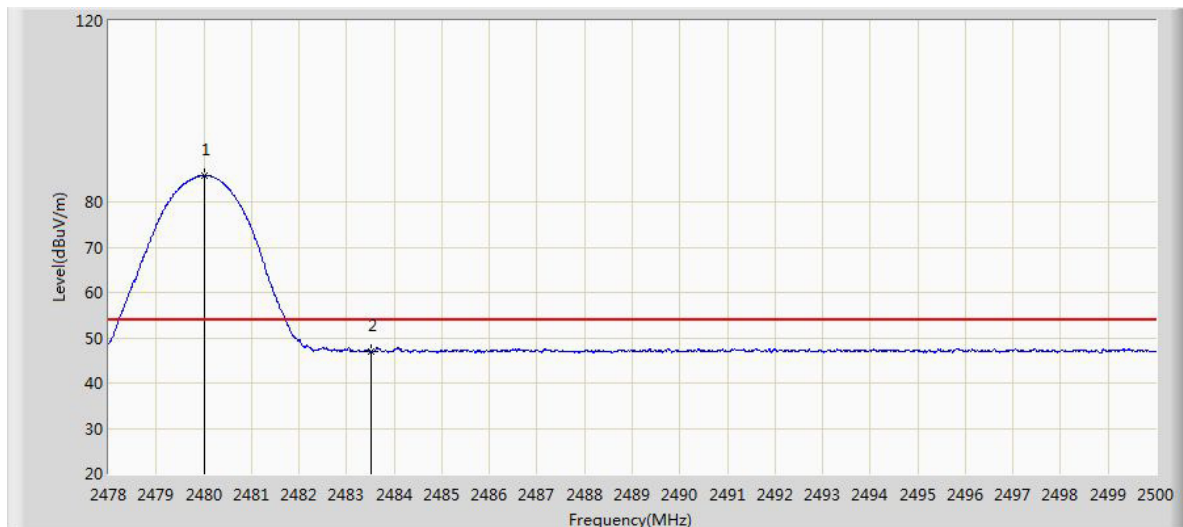
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2374.992	60.291	28.080	-13.709	74.000	32.211	PK
2390.000	58.924	26.646	-15.076	74.000	32.278	PK
2402.064	87.686	55.412	N/A	N/A	32.273	PK

Figure 25: Radiated Restricted Band Edge, 2402MHz, Vertical, AV, for charge

Table 24: Radiated Restricted Band Edge, 2402MHz, Vertical, AV, for charge

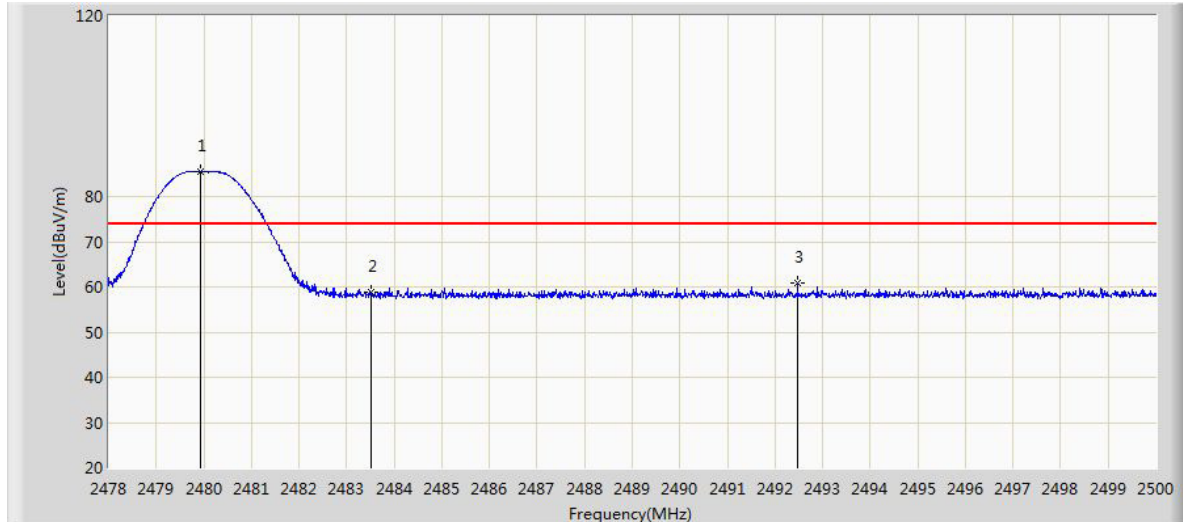
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2390.000	46.983	14.705	-7.017	54.000	32.278	AV
2401.968	86.637	54.363	N/A	N/A	32.274	AV

Figure 26: Radiated Restricted Band Edge, 2480MHz, Horizontal, PK, for charge

Table 25: Radiated Restricted Band Edge, 2480MHz, Horizontal, PK, for charge

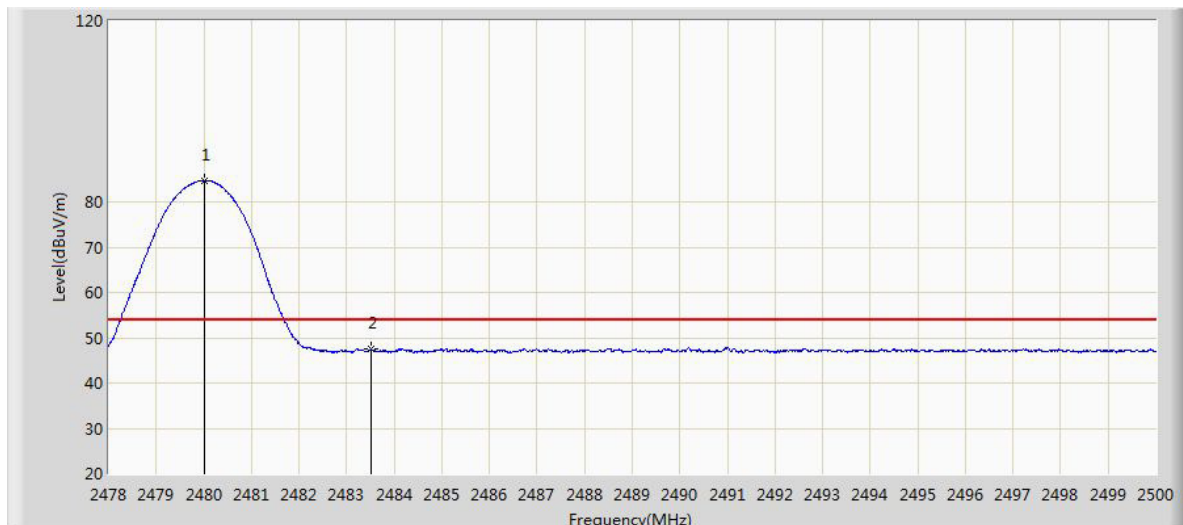
Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2480.002	86.720	54.451	N/A	N/A	32.269	PK
2483.500	58.754	26.473	-15.246	74.000	32.282	PK
2492.630	60.888	28.575	-13.112	74.000	32.313	PK

Figure 27: Radiated Restricted Band Edge, 2480MHz, Horizontal, AV, for charge

Table 26: Radiated Restricted Band Edge, 2480MHz, Horizontal, AV, for charge

Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2480.002	85.797	53.528	N/A	N/A	32.269	AV
2483.500	46.961	14.680	-7.039	54.000	32.282	AV

Figure 28: Radiated Restricted Band Edge, 2480MHz, Vertical, PK, for charge

Table 27: Radiated Restricted Band Edge, 2480MHz, Vertical, PK, for charge

Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2479.936	85.407	53.138	N/A	N/A	32.269	PK
2483.500	58.704	26.423	-15.296	74.000	32.282	PK
2492.476	60.897	28.585	-13.103	74.000	32.312	PK

Figure 29: Radiated Restricted Band Edge, 2480MHz, Vertical, AV, for charge

Table 28: Radiated Restricted Band Edge, 2480MHz, Vertical, AV, for charge

Frequency [MHz]	Measure Level [dBuV/m]	Reading Level [dBuV]	Over Limit [dB]	Limit [dBuV/m]	Factor [dB]	Type
2480.024	84.764	52.495	N/A	N/A	32.269	AV
2483.500	47.463	15.182	-6.537	54.000	32.282	AV

5.4 RF Exposure

5.4.1 RF Exposure Statement

RESULT:**Pass**

Evaluate standard : FCC KDB # 447498 D01 V06
RSS-102 Issue 5

The maximum measured transmitter power is the following:

Frequency [GHz]	Maximum Conducted (average) Output Power [dBm]	Maximum Conducted (average) Output Power [mW]
2.440	-0.94	0.80537844

Evaluation for FCC

According to FCC KDB # 447498 D01 V06, Clause 4.3.1

- (a) For 100MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$$\frac{(\text{max. power of channel, including tune - up tolerance, mW})}{(\text{min. test separation distance, mm})} \times \sqrt{f(\text{GHz})}$$

≤ 3.0 , for 1-g SAR, and ≤ 7.5 , for 10-g extremity SAR

So, the max allowed power for 1-g SAR with distance 5mm at 2440MHz is 9.60mW

And the max allowed power for 10-g extremity SAR with distance 5mm at 2440MHz is 24.01mW

The EUT is well below the SAR test exclusion thresholds.

Evaluation for IC

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance^{4,5}

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥50 mm
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

RSS-102 section 2.5.1 Exemption Limits for Routine Evaluation, Table 1 shows the SAR evaluation for a device with a separation distance of 5mm at 2450MHz is 4mW.

The EUT is well below the SAR test exclusion thresholds.

Conclusion

SAR data is not required for either FCC or IC.

6. List of Tables

Table 1: List of Test and Measurement Equipment	5
Table 2: Measurement Uncertainty	6
Table 3: Antenna Requirement	10
Table 4: Peak Output Power	12
Table 5: 6dB Bandwidth	13
Table 6: Power Spectral Density	19
Table 7: Conducted Emission, L Line.....	23
Table 8: Conducted Emission, N Line	24
Table 9: Radiated Spurious Emission, below 1GHz, for EVO.....	25
Table 10: Radiated Spurious Emission, below 1GHz, for charge	26
Table 11: Radiated Spurious Emission, above 1GHz, for EVO	27
Table 12: Radiated Spurious Emission, above 1GHz, for charge	28
Table 13: Radiated Restricted Band Edge, 2402MHz, Horizontal, PK, for EVO	29
Table 14: Radiated Restricted Band Edge, 2402MHz, Horizontal, AV, for EVO	29
Table 15: Radiated Restricted Band Edge, 2402MHz, Vertical, PK, for EVO.....	30
Table 16: Radiated Restricted Band Edge, 2402MHz, Vertical, AV, for EVO.....	30
Table 17: Radiated Restricted Band Edge, 2480MHz, Horizontal, PK, for EVO	31
Table 18: Radiated Restricted Band Edge, 2480MHz, Horizontal, AV, for EVO	31
Table 19: Radiated Restricted Band Edge, 2480MHz, Vertical, PK, for EVO.....	32
Table 20: Radiated Restricted Band Edge, 2480MHz, Vertical, AV, for EVO.....	32
Table 21: Radiated Restricted Band Edge, 2402MHz, Horizontal, PK, for charge	33
Table 22: Radiated Restricted Band Edge, 2402MHz, Horizontal, AV, for charge	33
Table 23: Radiated Restricted Band Edge, 2402MHz, Vertical, PK, for charge	34
Table 24: Radiated Restricted Band Edge, 2402MHz, Vertical, AV, for charge	34
Table 25: Radiated Restricted Band Edge, 2480MHz, Horizontal, PK, for charge	35
Table 26: Radiated Restricted Band Edge, 2480MHz, Horizontal, AV, for charge	35
Table 27: Radiated Restricted Band Edge, 2480MHz, Vertical, PK, for charge	36
Table 28: Radiated Restricted Band Edge, 2480MHz, Vertical, AV, for charge	36

7. List of Figures

Figure 1: 6dB Bandwidth, 2402MHz.....	14
Figure 2: 6dB Bandwidth, 2440MHz.....	14
Figure 3: 6dB Bandwidth, 2480MHz.....	15
Figure 4: Conducted Spurious Emission, 2402MHz	16
Figure 5: Conducted Spurious Emission, 2440MHz	17
Figure 6: Conducted Spurious Emission, 2480MHz	17
Figure 7: Conducted Bandedge, 2402MHz	18
Figure 8: Conducted Bandedge, 2480MHz	18
Figure 9: Power Spectral Density, 2402MHz	20
Figure 10: Power Spectral Density, 2440MHz	20
Figure 11: Power Spectral Density, 2480MHz	21
Figure 12: Conducted Emission, L Line	23
Figure 13: Conducted Emission, N Line	24
Figure 14: Radiated Restricted Band Edge, 2402MHz, Horizontal, PK, for EVO	29

Prüfbericht - Nr.: 50055783 001

Test Report No.

Seite 40 von 40

Page 40 of 40

Figure 15: Radiated Restricted Band Edge, 2402MHz, Horizontal, AV, for EVO	29
Figure 16: Radiated Restricted Band Edge, 2402MHz, Vertical, PK, for EVO	30
Figure 17: Radiated Restricted Band Edge, 2402MHz, Vertical, AV, for EVO	30
Figure 18: Radiated Restricted Band Edge, 2480MHz, Horizontal, PK, for EVO	31
Figure 19: Radiated Restricted Band Edge, 2480MHz, Horizontal, AV, for EVO	31
Figure 20: Radiated Restricted Band Edge, 2480MHz, Vertical, PK, for EVO	32
Figure 21: Radiated Restricted Band Edge, 2480MHz, Vertical, AV, for EVO	32
Figure 22: Radiated Restricted Band Edge, 2402MHz, Horizontal, PK, for charge.....	33
Figure 23: Radiated Restricted Band Edge, 2402MHz, Horizontal, AV, for charge.....	33
Figure 24: Radiated Restricted Band Edge, 2402MHz, Vertical, PK, for charge	34
Figure 25: Radiated Restricted Band Edge, 2402MHz, Vertical, AV, for charge	34
Figure 26: Radiated Restricted Band Edge, 2480MHz, Horizontal, PK, for charge.....	35
Figure 27: Radiated Restricted Band Edge, 2480MHz, Horizontal, AV, for charge.....	35
Figure 28: Radiated Restricted Band Edge, 2480MHz, Vertical, PK, for charge	36
Figure 29: Radiated Restricted Band Edge, 2480MHz, Vertical, AV, for charge	36