

RF

TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
**CENTAURI 200 Enterprise/Industrial IoT
Gateway**

ISSUED TO
Volansys Technologies Pvt Ltd

Block A-7th Floor, Safal Profitaire, Corporate Road, Prahladnagar,
Ahmedabad-380015, Gujarat, India



Tested by: *Ye Hongji*

Date: *Jul 15, 2021*

Approved by: *Wei Yanquan*

Wei Yanquan
(Chief Engineer)

Date: *Jul 15, 2021*

Report No.: BL-SZ2120210-603

EUT Name: CENTAURI 200 Enterprise/Industrial
IoT Gateway

Model Name: CT200-LTE-50

Brand Name: Volansys

Test Standard: 47 CFR Part 15 Subpart C
RSS-210 (Issue10, Apr. 2020)
RSS-Gen (Issue 5, Feb. 2021)

FCC ID: 2AKNO-CT200LTE50

ISED Number 22256- CT200LTE50

Test Conclusion: Pass

Test Date: Feb. 09, 2021 ~ Jul. 06, 2021

Date of Issue: Jul. 15, 2021

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Revision History

Version	Issue Date	Revisions Content
<u>Rev. 01</u>	<u>Jul. 08, 2021</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>Jul. 15, 2021</u>	<u>Update of standard in section 3.1, correct the verdict in section 3.2 & add field strength of fundamental emissions test plots.</u>

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1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory is a testing organization accredited by FCC as an accredited testing laboratory. The designation number is CN1196.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20°C to 25°C
Ambient Relative Humidity	45% to 55%
Ambient Pressure	100 kPa to 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v2.5.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Volansys Technologies Pvt Ltd
Address	Block A-7th Floor, Safal Profitaire, Corporate Road, Prahladnagar, Ahmedabad-380015, Gujarat, India

2.2 Manufacturer Information

Manufacturer	Volansys Technologies Pvt Ltd
Address	Ratana Business Hub, 207, 2nd Floor, Opp Bharat Petrol PumpSanathal Chokdi, Changodar Highway, Ahmedabad 382210 Gujarat India

2.3 Factory Information

Factory	Volansys Technologies Pvt Ltd
Address	Ratana Business Hub, 207, 2nd Floor, Opp Bharat Petrol PumpSanathal Chokdi, Changodar Highway, Ahmedabad 382210 Gujarat India

2.4 General Description for Equipment under Test (EUT)

EUT Name	CENTAURI 200 Enterprise/Industrial IoT Gateway
Model Name Under Test	CT200-LTE-50
Series Model Name	N/A
Description of Model name differentiation	N/A
Serial Number	2005900001
Hardware Version	3.1
Software Version	RC6
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Technical Information

The requirement for the following technical information of the EUT was tested in this report:

Modulation Type	FSK
Product Type	☒ Mobile ☐ Portable ☐ Fix Location
Frequency Range	908.40 MHz to 916.00 MHz
Tested Channel	Low (908.40 MHz), Middle (908.42 MHz), High (916.00 MHz)
Antenna Type	FPC Antenna
Antenna Gain	1.0 dBi (In test items related to antenna gain, the final results reflect this figure. This value is provided by the applicant.)

2.6 Additional Instructions

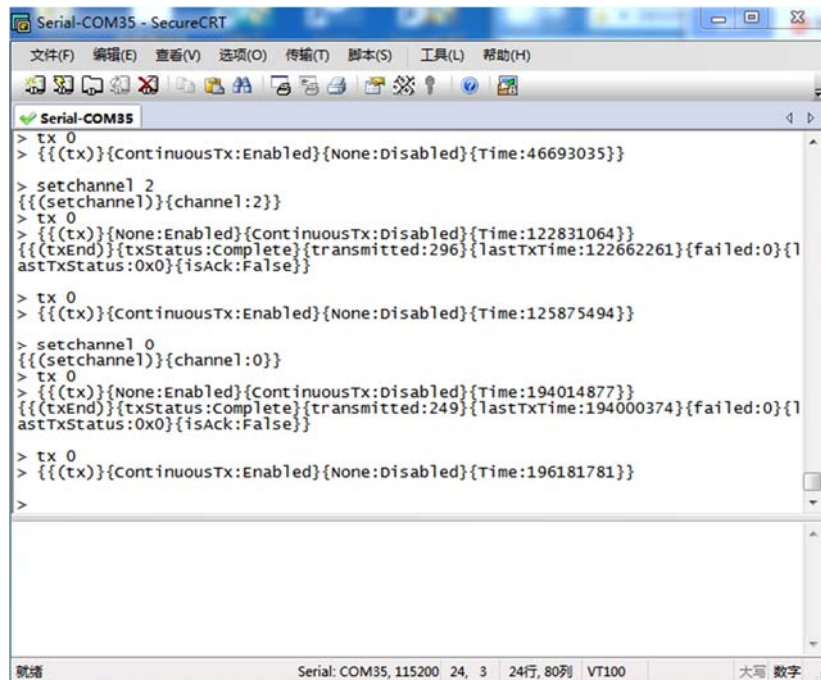
EUT Software Settings:

Mode	☒ Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.
------	--

During testing. Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power level setup in software			
Test Software Version	SecureCRT		
Support Units (Software installation media)	Description	Manufacturer	Model
	Notebook	Lenovo	X220
Mode	Channel	Frequency (MHz)	Soft Set
FSK	Low	908.40	Power parameter Settings is 18
	Middle	908.42	
	High	916.00	

Run Software



```

Serial-COM35 - SecureCRT
文件(F) 编辑(E) 查看(V) 选项(O) 传输(T) 脚本(S) 工具(L) 帮助(H)

Serial-COM35
> tx 0
> {{{(tx)}}{ContinuousTx:Enabled}{None:Disabled}{Time:46693035}}
> setchannel 2
> {{{(setchannel)}}{channel:2}}
> tx 0
> {{{(tx)}}{None:Enabled}{ContinuousTx:Disabled}{Time:122831064}}
> {{{(txEnd)}}{txStatus:Complete}{transmitted:296}{lastTxTime:122662261}{failed:0}{lastTxStatus:0x0}{isAck:False}}
> tx 0
> {{{(tx)}}{ContinuousTx:Enabled}{None:Disabled}{Time:125875494}}
> setchannel 0
> {{{(setchannel)}}{channel:0}}
> tx 0
> {{{(tx)}}{None:Enabled}{ContinuousTx:Disabled}{Time:194014877}}
> {{{(txEnd)}}{txStatus:Complete}{transmitted:249}{lastTxTime:194000374}{failed:0}{lastTxStatus:0x0}{isAck:False}}
> tx 0
> {{{(tx)}}{ContinuousTx:Enabled}{None:Disabled}{Time:196181781}}
>

```

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15, Subpart C	Miscellaneous Wireless Communications Services
2	RSS-Gen Issue 5 (Issue 5, Feb. 2021)	General Requirements for Compliance of Radio Apparatus
3	RSS-210 Issue 10 (Issue 10, Apr. 2020)	Licence-Exempt Radio Apparatus: Category I Equipment
4	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Verdict

No.	Description	FCC Part No.	ISED Part No.	Test Result	Verdict	Remark
1	Antenna Requirement	15.203	RSS-Gen 6.8	--	Pass	Note ¹
2	20 dB and 99% Bandwidth	15.215 (c)	RSS-Gen 6.7	ANNEX A.1	N/A	--
3	AC Conducted Emission	15.207	RSS-Gen 8.8	ANNEX A.2	N/A	--
4	Field Strength of Fundamental Emissions	15.249 (a)	RSS-Gen 8.9	ANNEX A.3	Pass	
5	Radiated Emission Test Band Edge Measurement	15.249 (a) 15.249 (d) 15.209	RSS-210 B.10 RSS-Gen 8.9 RSS-Gen 8.10	ANNEX A.4	Pass	Note ²

Note¹: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203.

Note²: the limit is 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209

Note³: This product has two kinds of antenna match circuits about ZWAVE module, these two circuits have been tested in this report.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the normal environmental conditions were within the listed ranges:

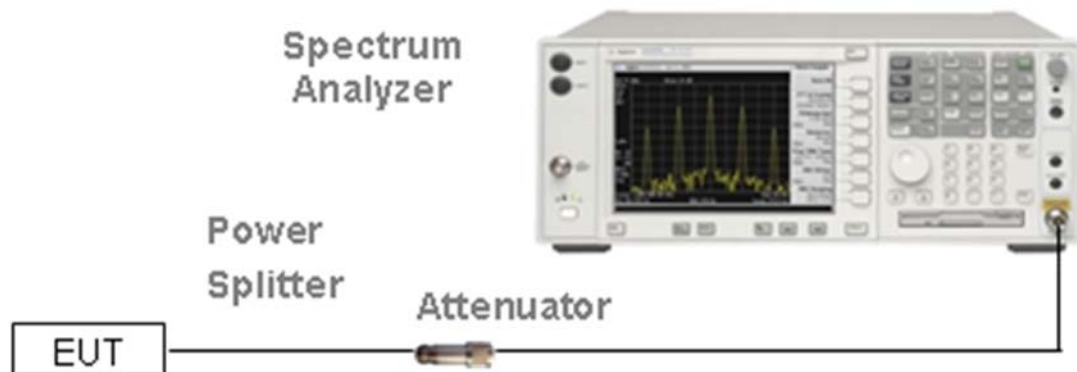
Relative Humidity	45% to 55%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+22°C to +25°C
Working Voltage of the EUT	NV (Normal Voltage)	5 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-40	101544	2021.04.01	2022.03.31
Bluetooth Signaling Unit	ROHDE&SCHWARZ	CMW500	142028	2021.06.01	2022.05.31
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2021.06.01	2022.05.31
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2021.06.01	2022.05.31
LISN	SCHWARZBECK	NSLK 8127	8127-687	2021.06.01	2022.05.31
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	2019.10.29	2021.10.28
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	2019.07.02	2021.07.01
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1917	2019.07.02	2021.07.01
Test Antenna-Horn (18-40 GHz)	A-INFO	LB-180400KF	J211060273	2021.01.05	2023.01.04
Anechoic Chamber	RAINFORD	9m*6m*6m	N/A	2017.02.21	2022.02.20
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	N/A	2018.08.08	2021.08.07
Shielded Enclosure	ChangNing	CN-130701	130703	--	--

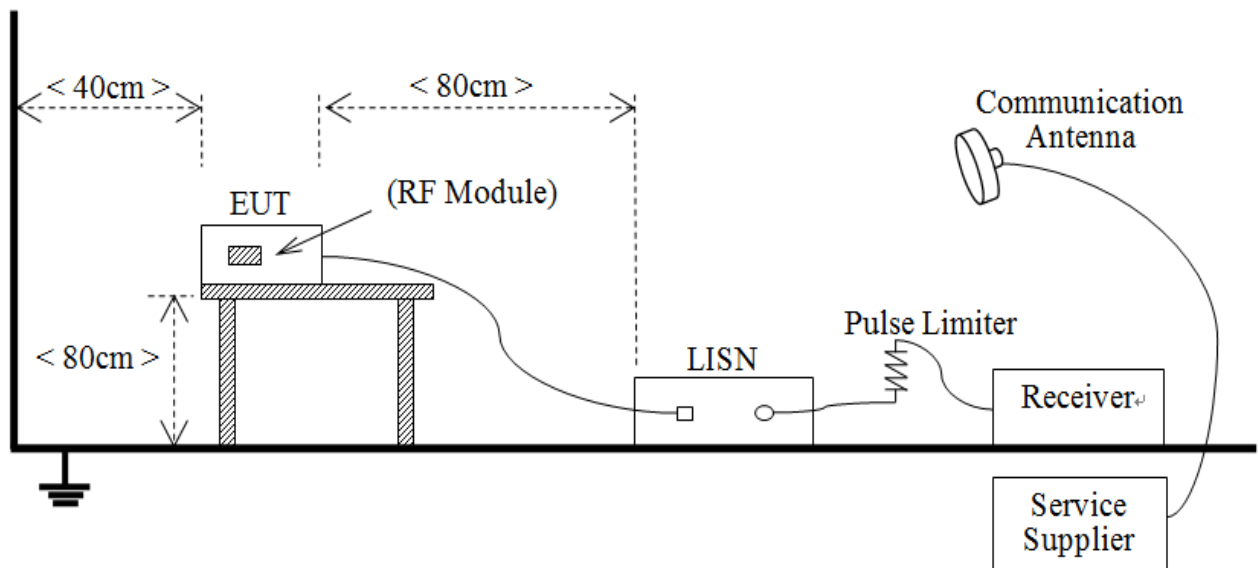
4.3 Description of Test Setup

4.3.1 For Antenna Port Test



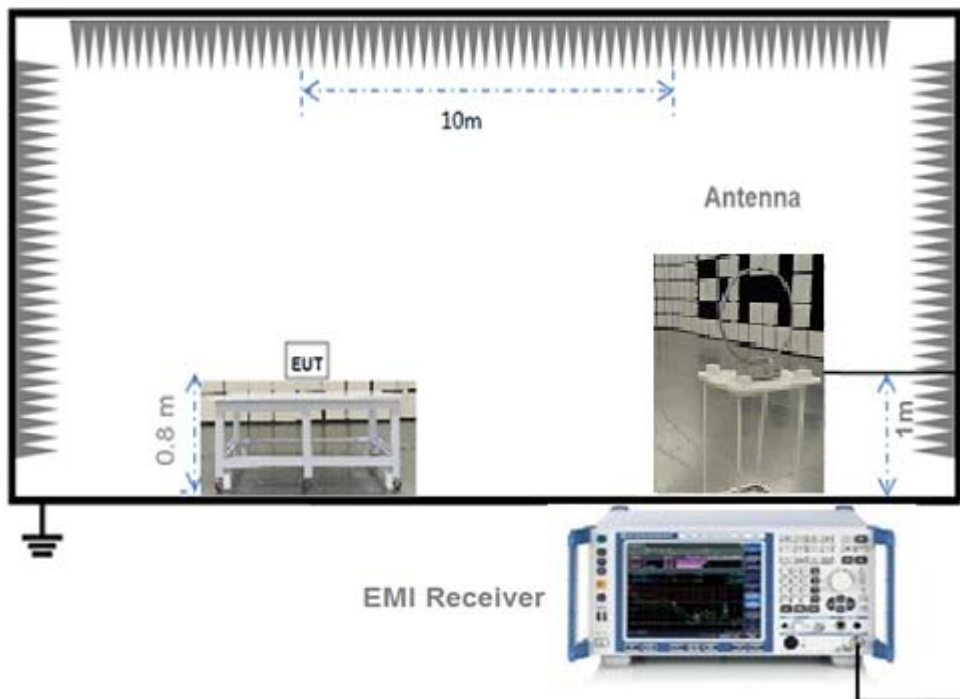
(Diagram 1)

4.3.2 For AC Power Supply Port Test



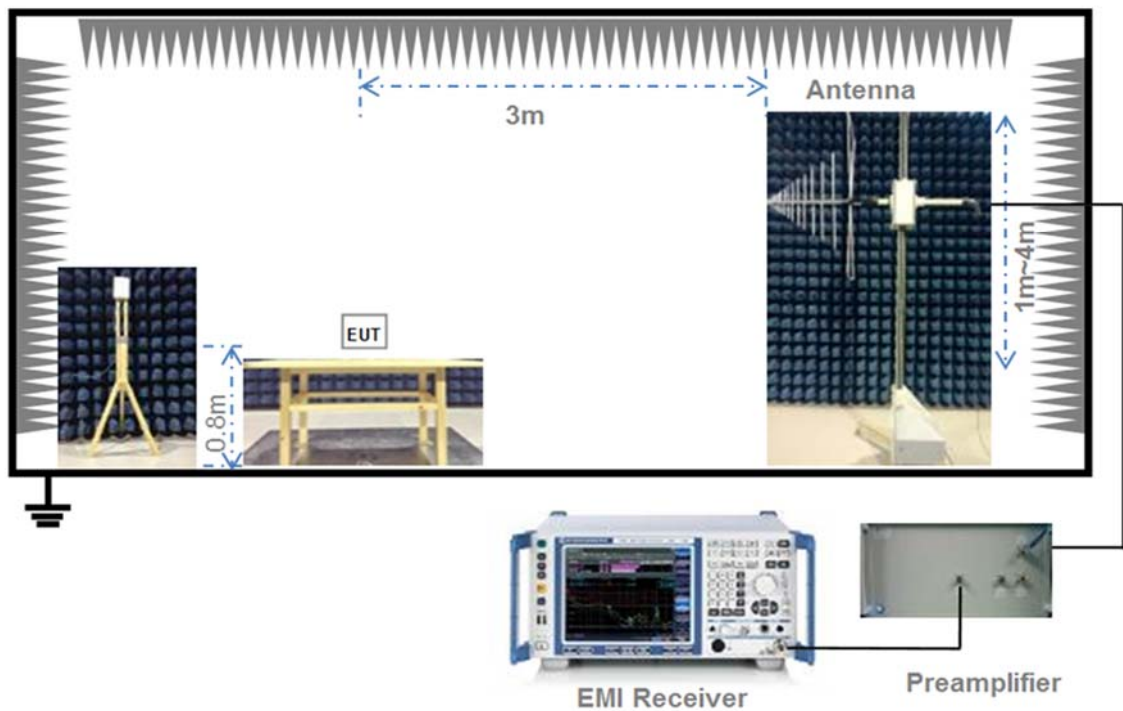
(Diagram 2)

4.3.3 For Radiated Test (Below 30 MHz)



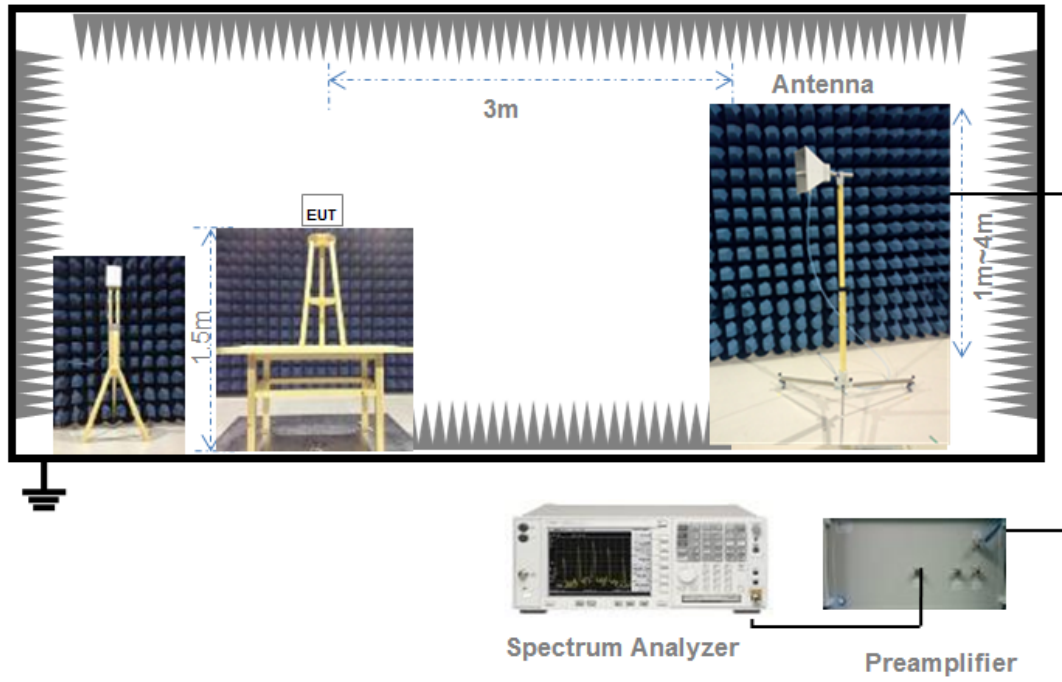
(Diagram 3)

4.3.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.3.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203; RSS-Gen, 6.8

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of § 15.211, § 15.213, § 15.217, § 15.219, or § 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

Protected Method	Description
The antenna is embedded in the product.	An embedded-in antenna design is used.

Reference Documents	Item
Photo	Please refer to the EUT Photo documents.

5.1.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

5.2 20 dB and 99% Bandwidth

5.2.1 Limit

FCC §15.215(c); RSS-Gen, 6.7

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

5.2.2 Test Setups

See section 4.1.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW $\geq$ 1% of the 20 dB bandwidth

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.2.4 Test Result

Please refer to ANNEX A.1.

5.3 Conducted Emission

5.3.1 Limit

FCC §15.207; RSS-Gen, 8.8

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56*	56 to 46*
0.50 - 5	56	46
5 - 30	60	50

5.3.2 Test Setups

See section 4.1.1 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

5.3.4 Test Result

Please refer to ANNEX A.2.

5.4 field strength of Fundamental emissions

5.4.1 Limit

FCC&15.249(a); RSS-Gen, 8.9

Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

5.4.2 Test Setups

See section 4.1.2-4.4.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented. The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.4.4 Test Result

Please refer to ANNEX A.3.

5.5 Radiated Spurious Emission and Bandedge Measurement

5.5.1 Limit

FCC §15.249(a); FCC §15.249(d); FCC §15.209; RSS-210, B.10; RSS-Gen, 8.9; RSS-Gen, 8.10

Except as provided in paragraph (a) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Frequency (MHz)	Field Strength of Fundamental (mV/m)	Field Strength of Harmonics (μV/m)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

- For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
- For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.5.2 Test Setups

See section 4.1.2-4.4.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented. The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.5.4 Test Result

Please refer to ANNEX A.4.

ANNEX A TEST RESULT

A.1 20dB bandwidth and 99% bandwidth

Test Data

Channel	Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)
Low	908.40	147.000	124.980
Middle	908.42	147.000	125.030
High	916.00	171.000	144.390

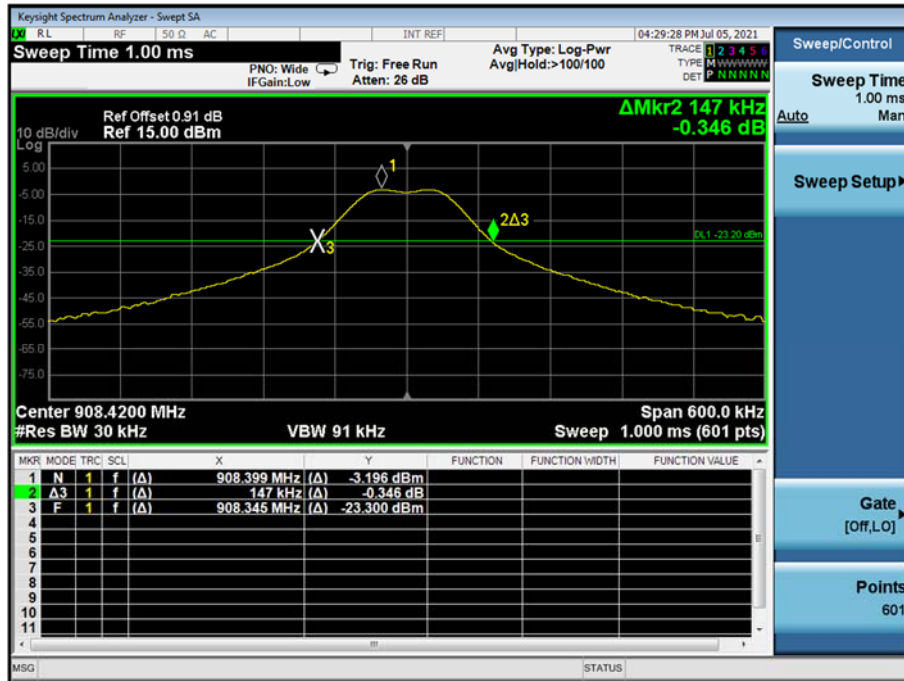
Test plots

20 dB Bandwidth

Low Channel



Middle Channel

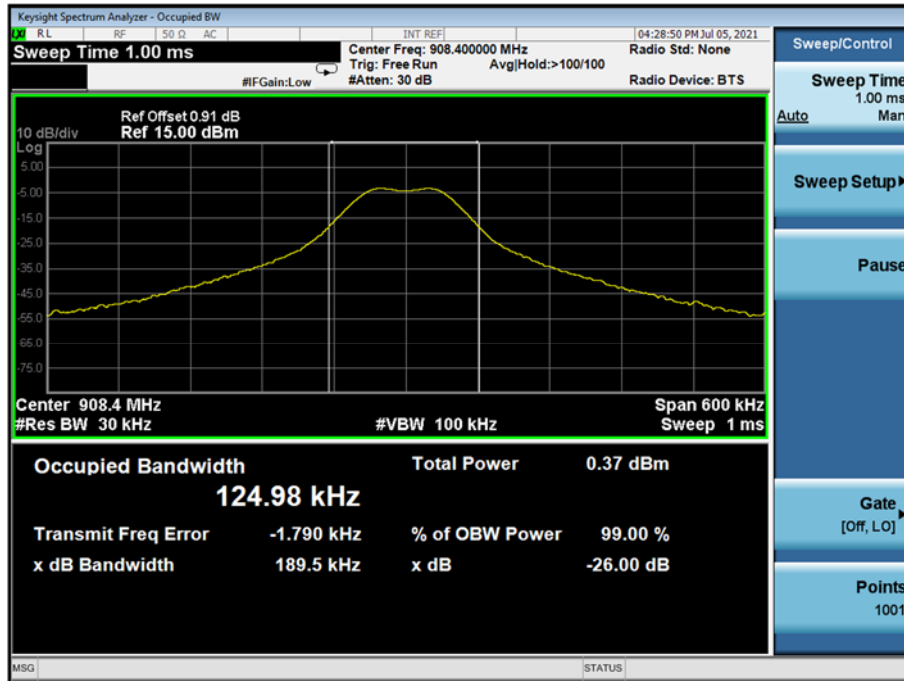


High Channel



99% dB Bandwidth

Low Channel



Middle Channel



High Channel



A.2 Conducted Emission

Note¹: The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

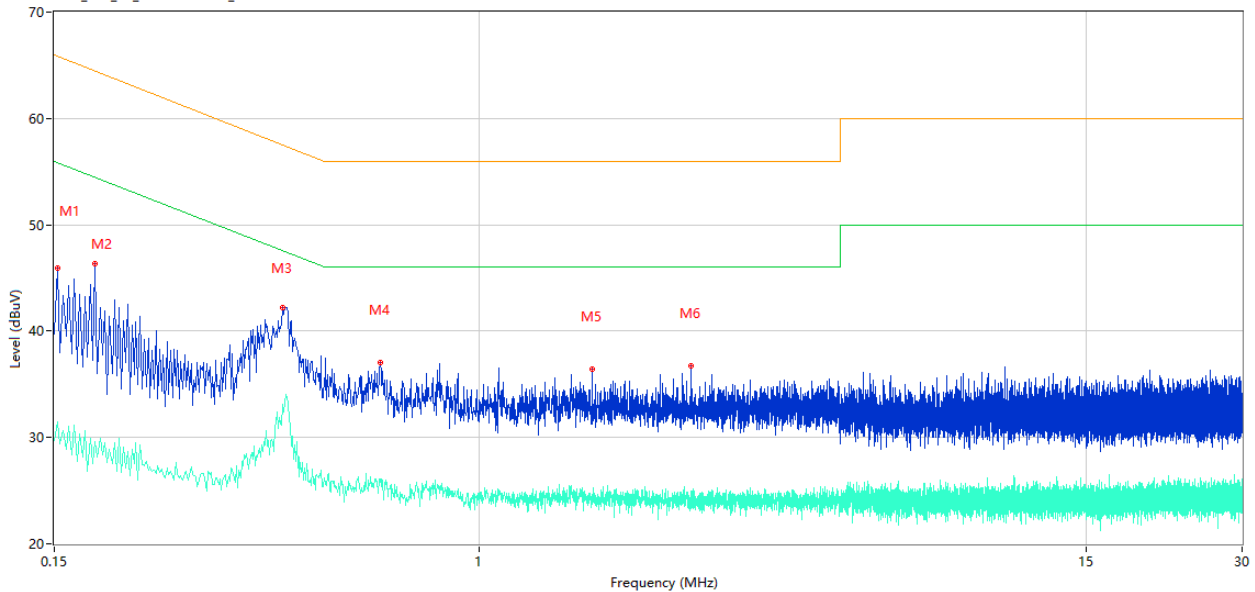
Note²: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

Note³: Results (dBuV) = Original reading level of Spectrum Analyzer (dBuV) + Factor (dB)

Test Data and Plots

PHASE L

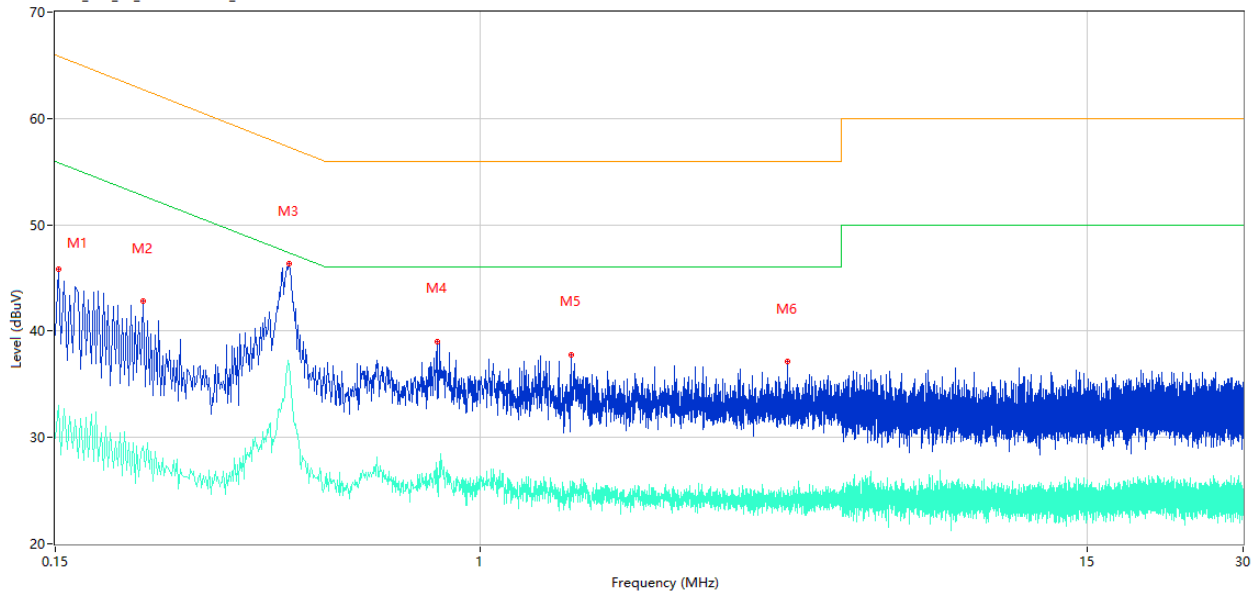
CE Test case_FCC_CE_FCC PART 15B_Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.152	45.98	10.41	65.89	-19.91	Peak	L	Pass
1**	0.152	31.52	10.41	55.89	-24.37	AV	L	Pass
2	0.180	46.29	10.39	64.49	-18.20	Peak	L	Pass
2**	0.180	29.64	10.39	54.49	-24.85	AV	L	Pass
3	0.416	42.25	10.31	57.53	-15.28	Peak	L	Pass
3**	0.416	33.16	10.31	47.53	-14.37	AV	L	Pass
4	0.642	37.01	10.27	56.00	-18.99	Peak	L	Pass
4**	0.642	26.12	10.27	46.00	-19.88	AV	L	Pass
5	1.652	36.47	10.26	56.00	-19.53	Peak	L	Pass
5**	1.652	24.19	10.26	46.00	-21.81	AV	L	Pass
6	2.572	36.77	10.27	56.00	-19.23	Peak	L	Pass
6**	2.572	24.93	10.27	46.00	-21.07	AV	L	Pass

PHASE N

CE Test case_FCC_CE_FCC PART 15B_Class B



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.150	39.66	10.41	66.00	-26.34	Peak	N	Pass
1**	0.150	29.93	10.41	56.00	-26.07	AV	N	Pass
2	0.222	42.81	10.37	62.74	-19.93	Peak	N	Pass
2**	0.222	29.22	10.37	52.74	-23.52	AV	N	Pass
3	0.426	46.35	10.31	57.33	-10.98	Peak	N	Pass
3**	0.426	36.88	10.31	47.33	-10.45	AV	N	Pass
4	0.824	39.02	10.26	56.00	-16.98	Peak	N	Pass
4**	0.824	27.08	10.26	46.00	-18.92	AV	N	Pass
5	1.500	37.80	10.25	56.00	-18.20	Peak	N	Pass
5**	1.500	25.40	10.25	46.00	-20.60	AV	N	Pass
6	3.922	37.16	10.30	56.00	-18.84	Peak	N	Pass
6**	3.922	24.66	10.30	46.00	-21.34	AV	N	Pass

A.3 Field Strength of Fundamental Emissions

Test Data

1# circuit

Operating Frequency (MHz)	Field Strength (dBuV/m)	Limit @3m (dBuV/m)	Antenna	Verdict
908.40	86.323	94	Vertical	Pass
	93.567	94	Horizontal	Pass
908.42	86.038	94	Vertical	Pass
	93.535	94	Horizontal	Pass
916.00	83.923	94	Vertical	Pass
	91.015	94	Horizontal	Pass

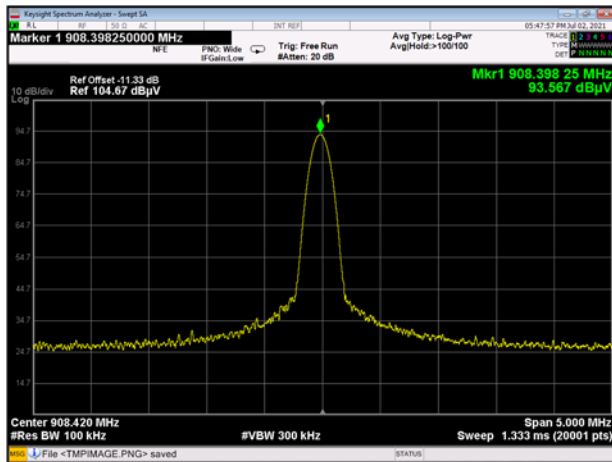
2# circuit

Operating Frequency (MHz)	Field Strength (dBuV/m)	Limit @3m (dBuV/m)	Antenna	Verdict
908.40	88.777	94	Vertical	Pass
	88.966	94	Horizontal	Pass
908.42	88.729	94	Vertical	Pass
	88.929	94	Horizontal	Pass
916.00	90.296	94	Vertical	Pass
	90.624	94	Horizontal	Pass

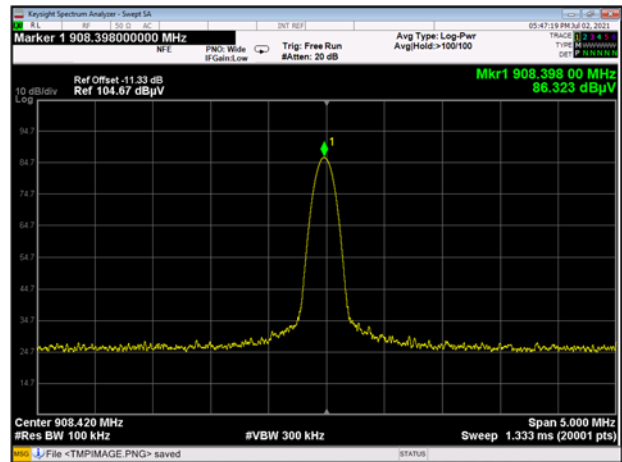
Test plots

1# circuit

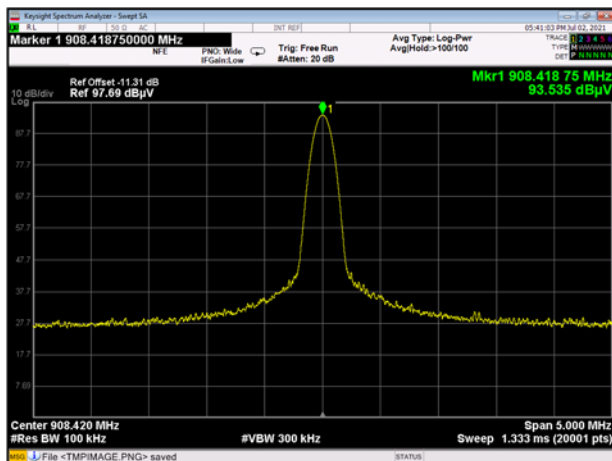
LOW CHANNEL, PEAK, ANT H



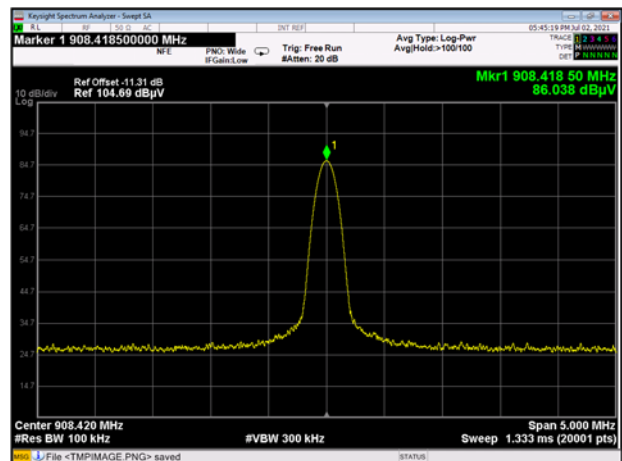
LOW CHANNEL, PEAK, ANT V



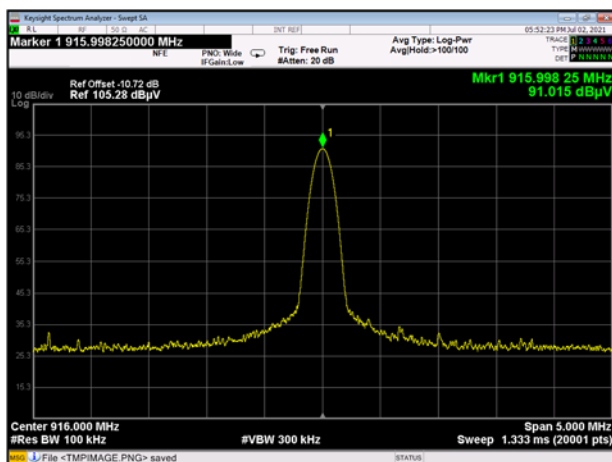
Middle CHANNEL, PEAK, ANT H



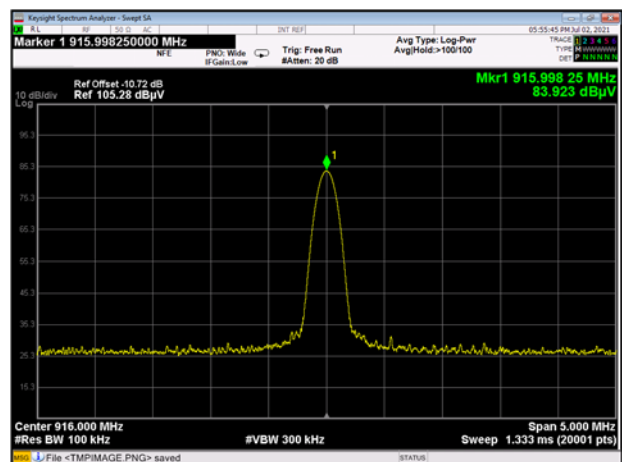
Middle CHANNEL, PEAK, ANT V



HIGH CHANNEL, PEAK, ANT H

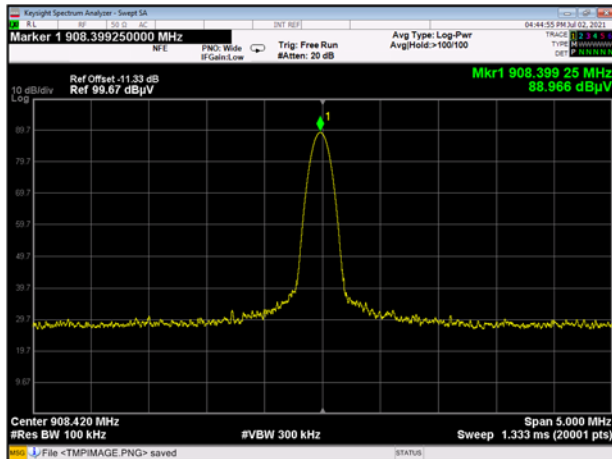


HIGH CHANNEL, PEAK, ANT V

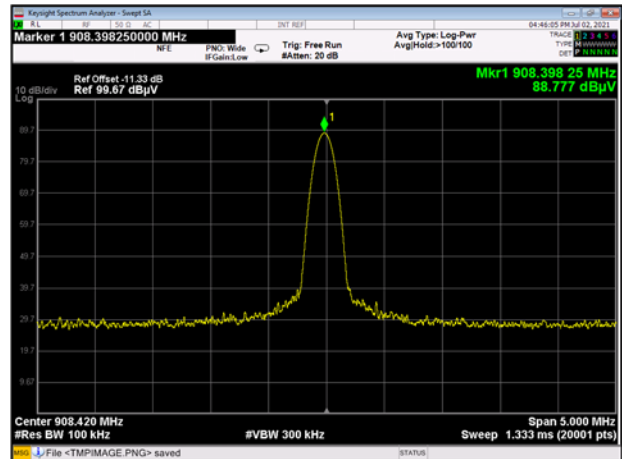


2# circuit

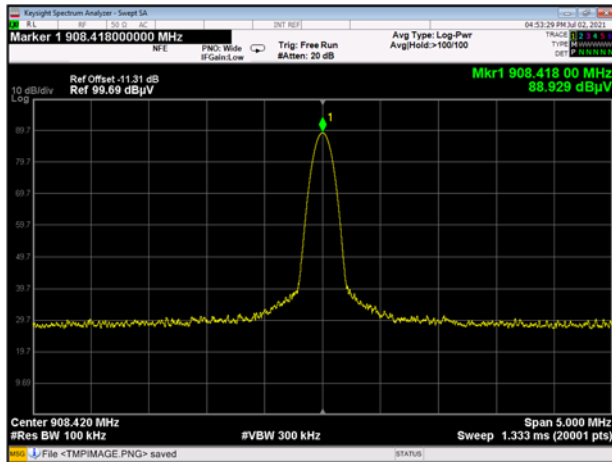
LOW CHANNEL, PEAK, ANT H



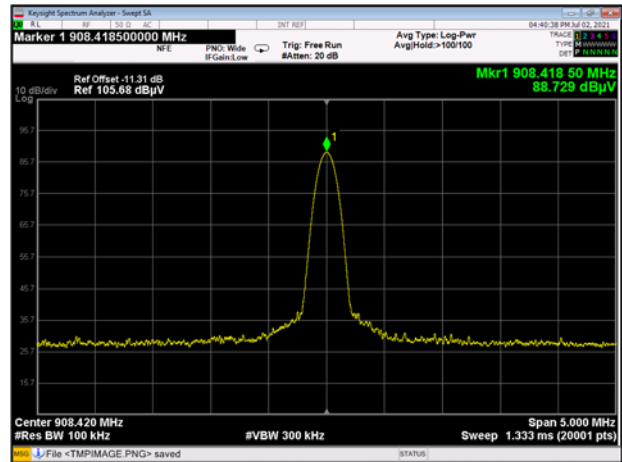
LOW CHANNEL, PEAK, ANT V



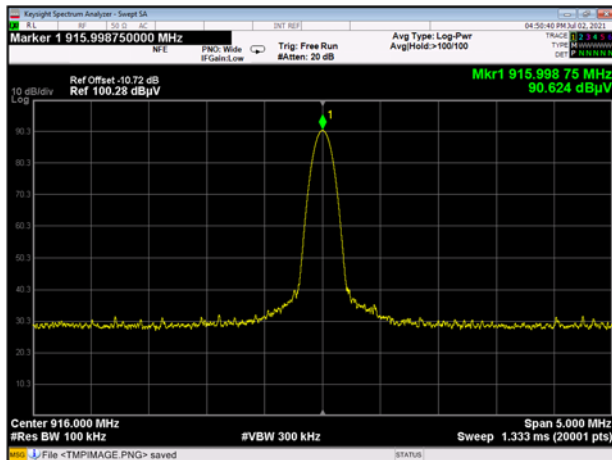
Middle CHANNEL, PEAK, ANT H



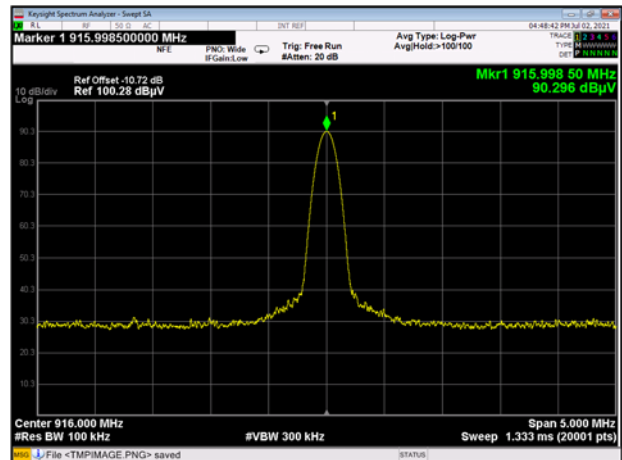
Middle CHANNEL, PEAK, ANT V



HIGH CHANNEL, PEAK, ANT H



HIGH CHANNEL, PEAK, ANT V



A.4 Radiated Emission and Bandedge Measurement

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

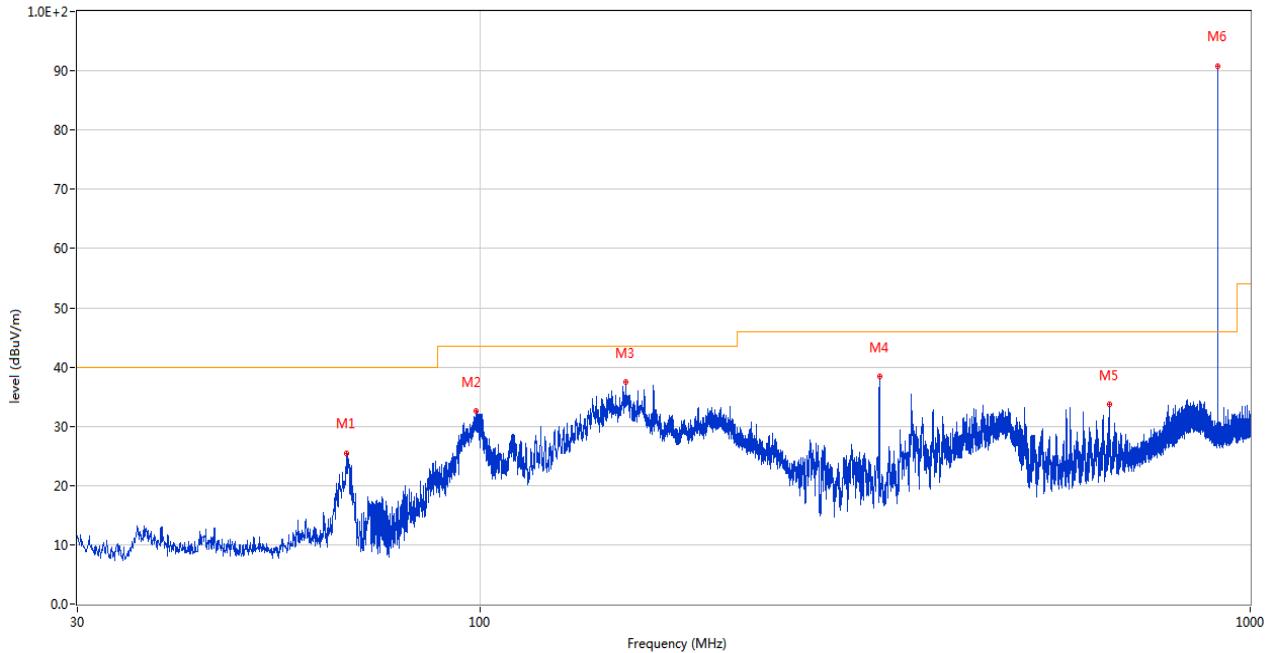
Test Data and Plots (30 MHz ~ 1 GHz)

Note: The bold frequency is the fundamental.

1# circuit

Low Channel 30 MHz to 1 GHz, ANT H

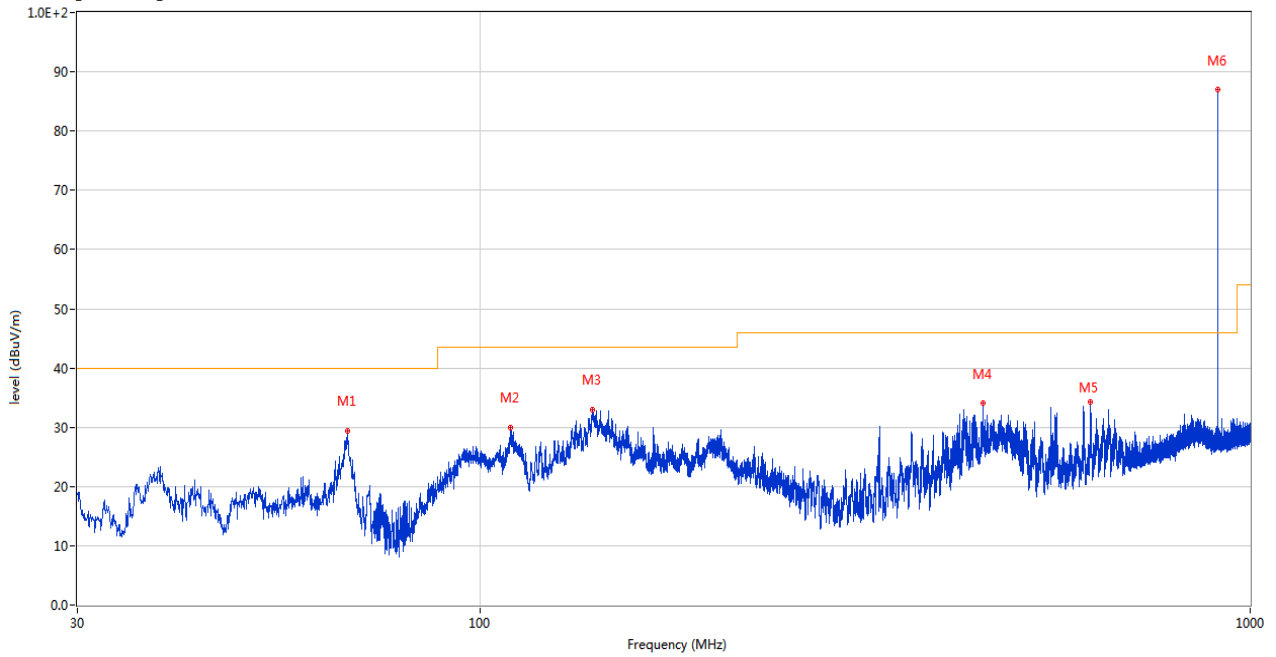
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	67.151	25.46	-28.51	40.0	-14.54	Peak	281.00	200	Horizontal	Pass
2	98.919	32.63	-29.32	43.5	-10.87	Peak	90.00	200	Horizontal	Pass
3	154.645	37.52	-24.92	43.5	-5.98	Peak	0.00	200	Horizontal	Pass
4	330.021	38.33	-23.49	46.0	-7.67	Peak	360.00	200	Horizontal	Pass
5	655.698	33.69	-15.22	46.0	-12.31	Peak	245.00	200	Horizontal	Pass
6	908.383	90.86	-11.33	94.0	-3.14	Peak	80.00	100	Horizontal	Pass

Low Channel 30 MHz to 1 GHz, ANT V

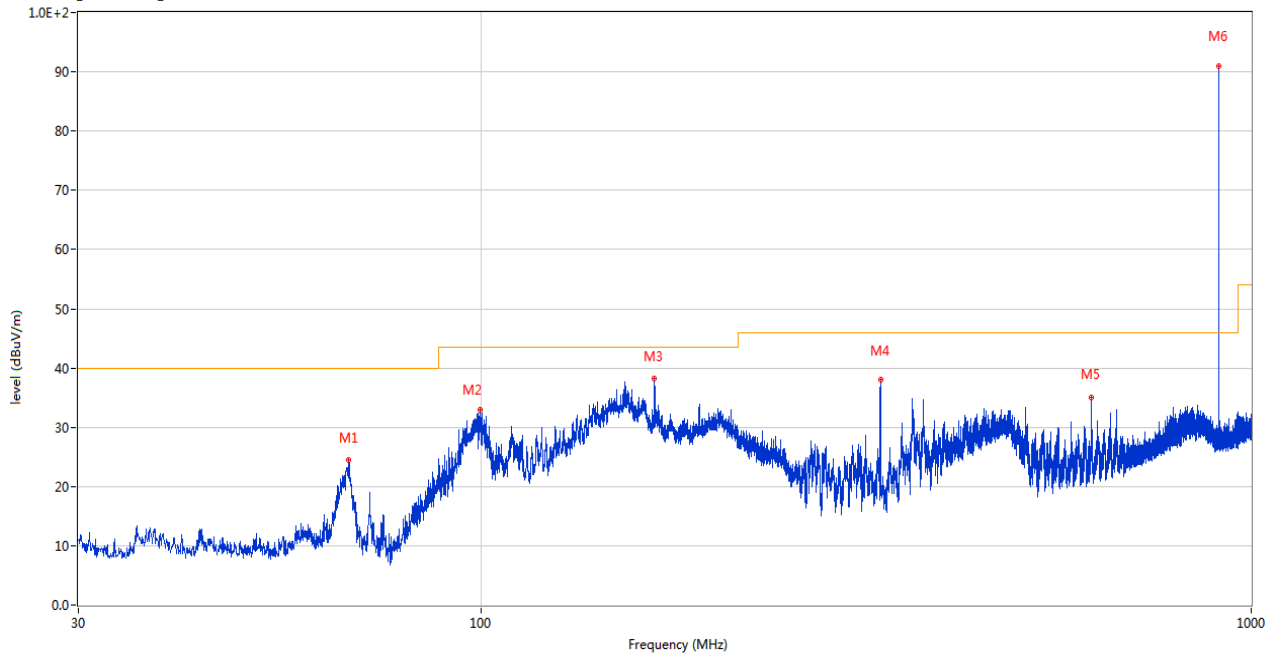
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	67.200	29.37	-28.52	40.0	-10.63	Peak	250.00	100	Vertical	Pass
2	109.637	29.86	-28.40	43.5	-13.64	Peak	83.00	100	Vertical	Pass
3	139.901	32.95	-25.56	43.5	-10.55	Peak	213.00	100	Vertical	Pass
4	450.058	34.12	-19.93	46.0	-11.88	Peak	165.00	100	Vertical	Pass
5	619.566	34.28	-15.96	46.0	-11.72	Peak	132.00	200	Vertical	Pass
6	908.383	87.03	-11.33	94.0	-6.97	Peak	176.00	100	Vertical	Pass

Middle Channel 30 MHz to 1 GHz, ANT H

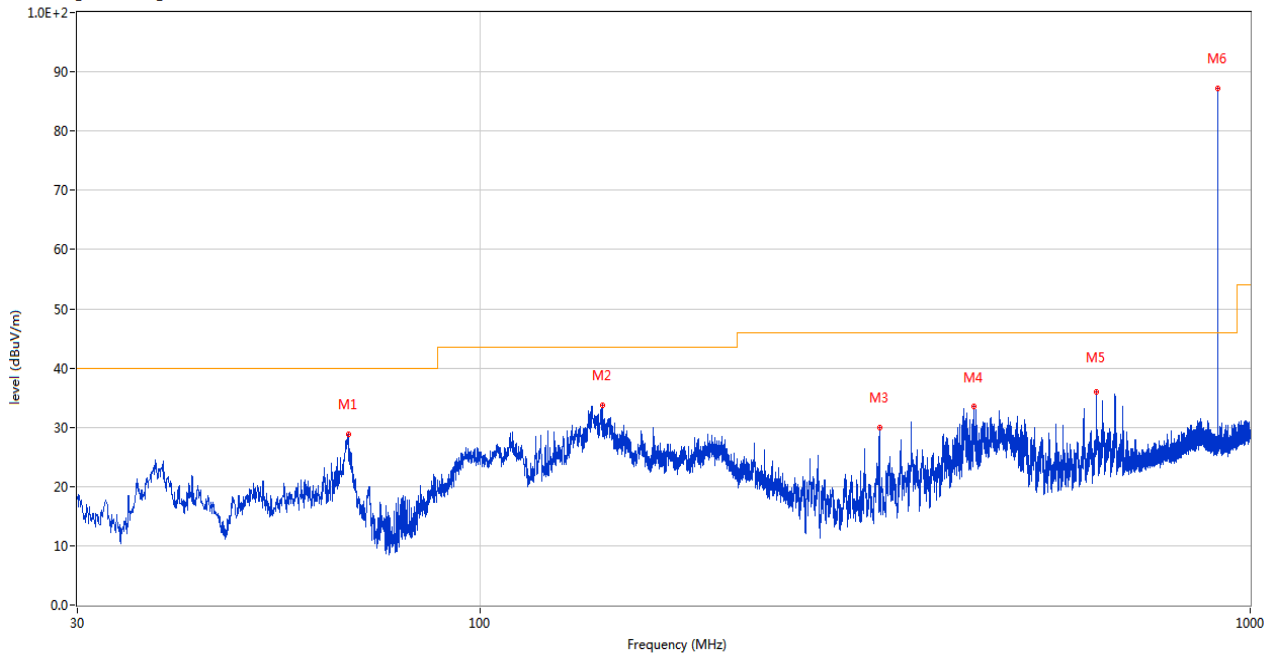
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	67.297	24.54	-28.54	40.0	-15.46	Peak	259.00	200	Horizontal	Pass
2	99.646	32.93	-29.22	43.5	-10.57	Peak	72.00	200	Horizontal	Pass
3	168.031	38.29	-25.34	43.5	-5.21	Peak	360.00	200	Horizontal	Pass
4	330.021	38.01	-23.49	46.0	-7.99	Peak	329.00	100	Horizontal	Pass
5	619.760	35.04	-15.98	46.0	-10.96	Peak	31.00	100	Horizontal	Pass
6	908.432	90.89	-11.31	94.0	-3.11	Peak	88.00	100	Horizontal	Pass

Middle Channel 30 MHz to 1 GHz, ANT V

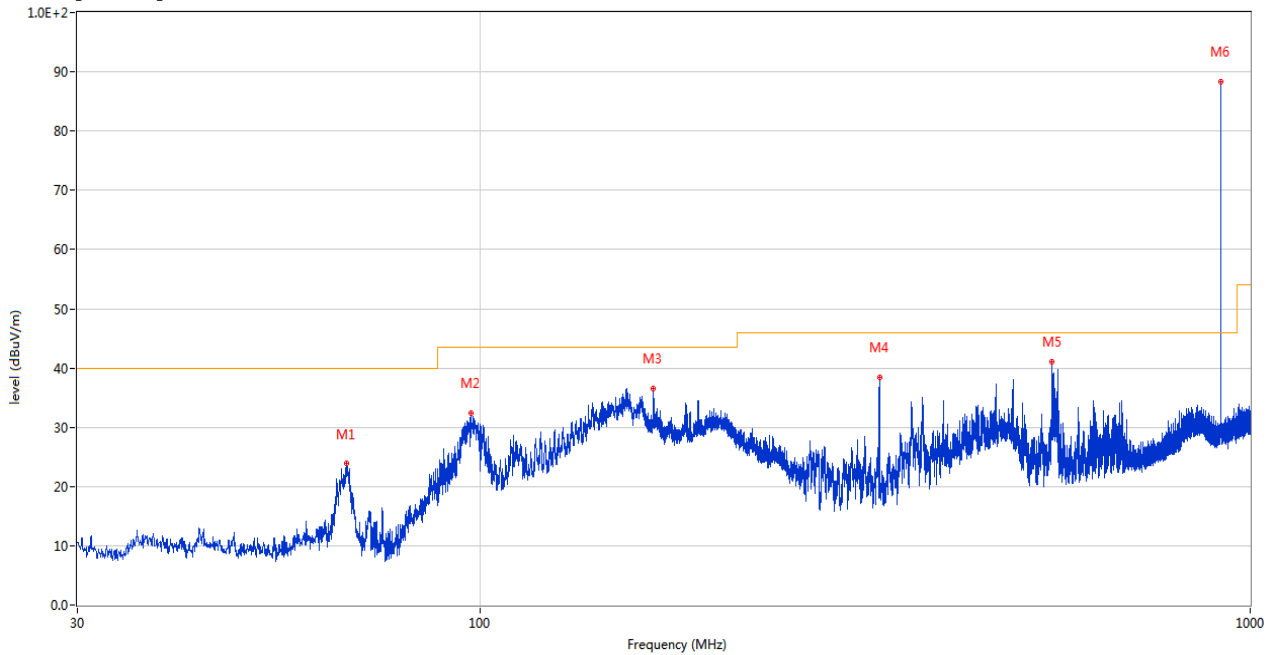
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	67.539	28.78	-28.58	40.0	-11.22	Peak	252.00	100	Vertical	Pass
2	144.024	33.62	-25.39	43.5	-9.88	Peak	228.00	100	Vertical	Pass
3	329.973	30.02	-23.49	46.0	-15.98	Peak	329.00	200	Vertical	Pass
4	437.642	33.59	-20.23	46.0	-12.41	Peak	159.00	100	Vertical	Pass
5	631.594	36.02	-15.50	46.0	-9.98	Peak	0.00	100	Vertical	Pass
6	908.432	87.10	-11.31	94.0	-6.90	Peak	171.00	100	Vertical	Pass

High Channel 30 MHz to 1 GHz, ANT H

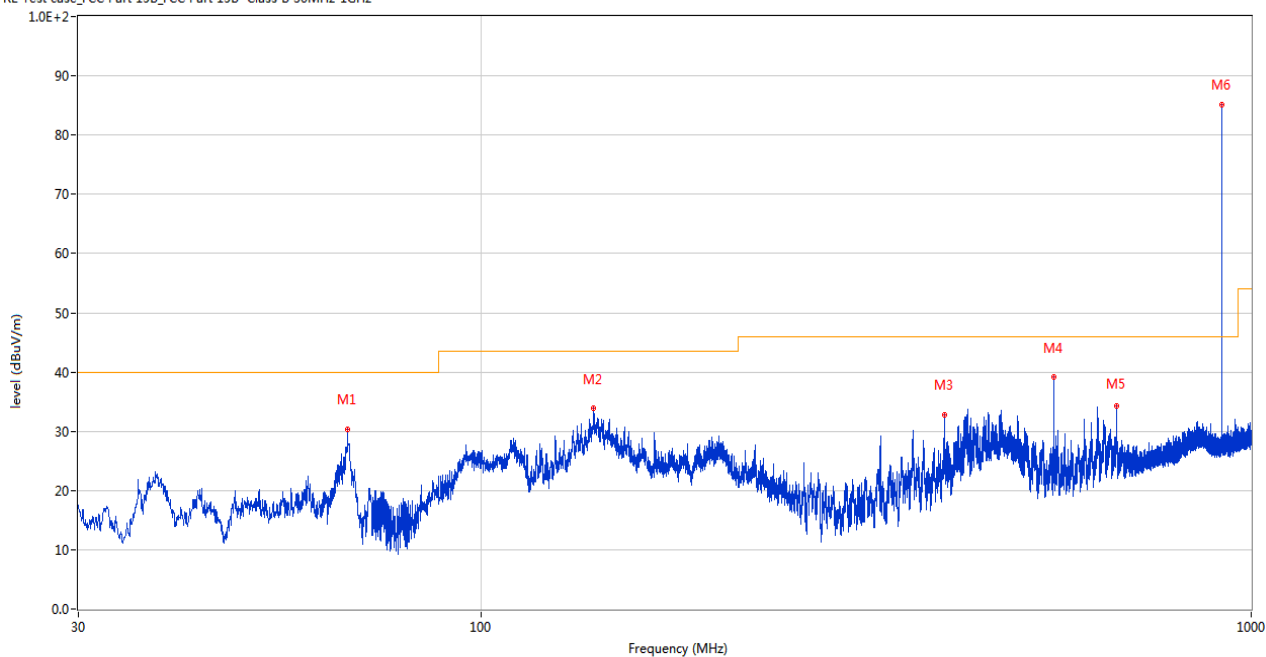
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	67.151	23.82	-28.51	40.0	-16.18	Peak	266.00	200	Horizontal	Pass
2	97.221	32.47	-29.48	43.5	-11.03	Peak	67.00	200	Horizontal	Pass
3	167.982	36.55	-25.34	43.5	-6.95	Peak	360.00	200	Horizontal	Pass
4	330.021	38.38	-23.49	46.0	-7.62	Peak	342.00	100	Horizontal	Pass
5	552.006	41.07	-17.53	46.0	-4.93	Peak	0.00	200	Horizontal	Pass
6	915.998	88.35	-10.72	94.0	-5.65	Peak	88.00	100	Horizontal	Pass

High Channel 30 MHz to 1 GHz, ANT V

RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz

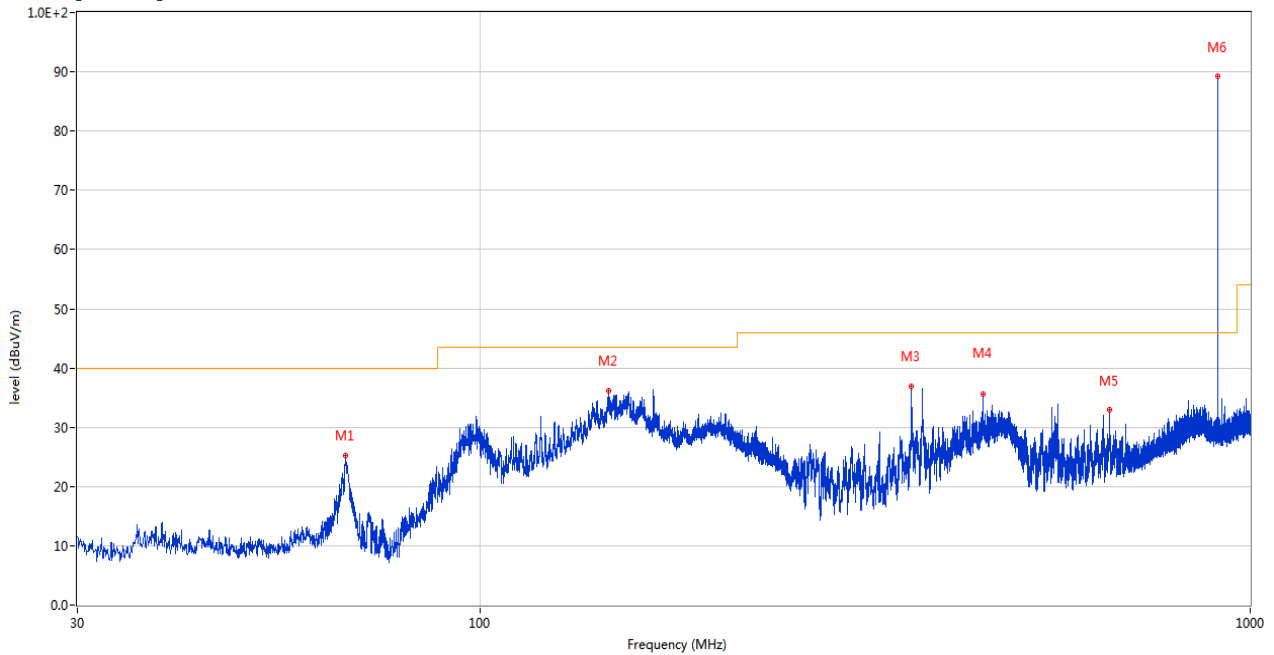


No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	67.103	30.40	-28.50	40.0	-9.60	Peak	281.00	100	Vertical	Pass
2	140.095	33.82	-25.55	43.5	-9.68	Peak	294.00	100	Vertical	Pass
3	399.813	32.84	-21.54	46.0	-13.16	Peak	174.00	100	Vertical	Pass
4	553.897	39.17	-17.57	46.0	-6.83	Peak	302.00	200	Vertical	Pass
5	668.308	34.28	-14.85	46.0	-11.72	Peak	56.00	100	Vertical	Pass
6	915.998	85.17	-10.72	94.0	-8.83	Peak	174.00	100	Vertical	Pass

2# circuit

Low Channel 30 MHz to 1 GHz, ANT H

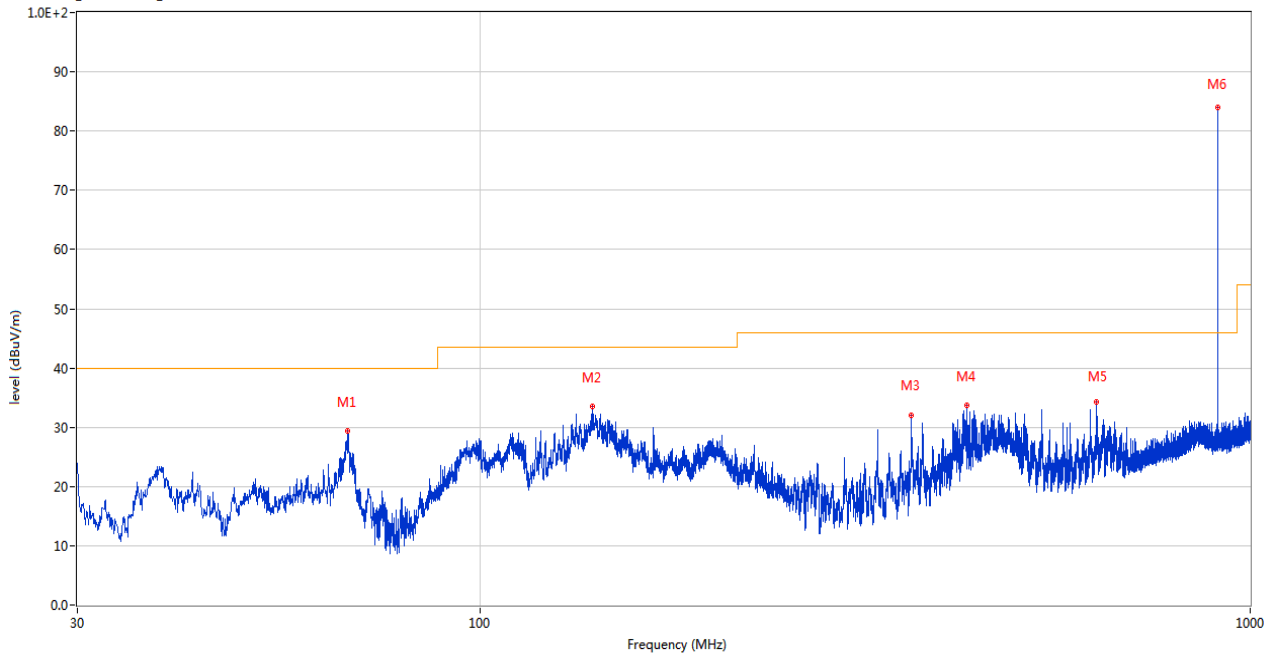
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	66.811	25.18	-28.45	40.0	-14.82	Peak	277.00	200	Horizontal	Pass
2	146.982	36.08	-25.14	43.5	-7.42	Peak	360.00	200	Horizontal	Pass
3	363.001	36.83	-22.31	46.0	-9.17	Peak	99.00	100	Horizontal	Pass
4	450.253	35.61	-19.92	46.0	-10.39	Peak	136.00	200	Horizontal	Pass
5	657.008	32.95	-15.16	46.0	-13.05	Peak	319.00	100	Horizontal	Pass
6	908.383	89.24	-11.33	94.0	-4.76	Peak	87.00	100	Horizontal	Pass

Low Channel 30 MHz to 1 GHz, ANT V

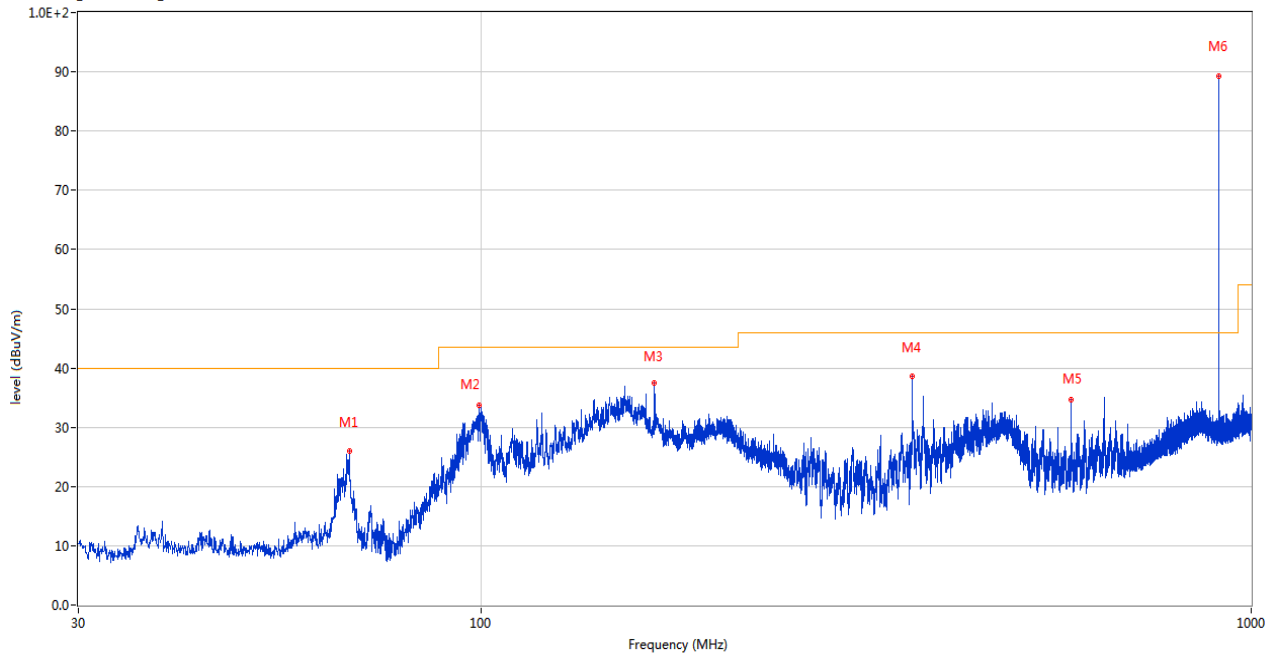
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	67.297	29.34	-28.54	40.0	-10.66	Peak	218.00	100	Vertical	Pass
2	139.852	33.59	-25.56	43.5	-9.91	Peak	218.00	100	Vertical	Pass
3	363.001	32.04	-22.31	46.0	-13.96	Peak	360.00	200	Vertical	Pass
4	428.961	33.66	-20.36	46.0	-12.34	Peak	181.00	100	Vertical	Pass
5	632.225	34.29	-15.52	46.0	-11.71	Peak	360.00	100	Vertical	Pass
6	908.383	83.96	-11.33	94.0	-10.04	Peak	181.00	100	Vertical	Pass

Middle Channel 30 MHz to 1 GHz, ANT H

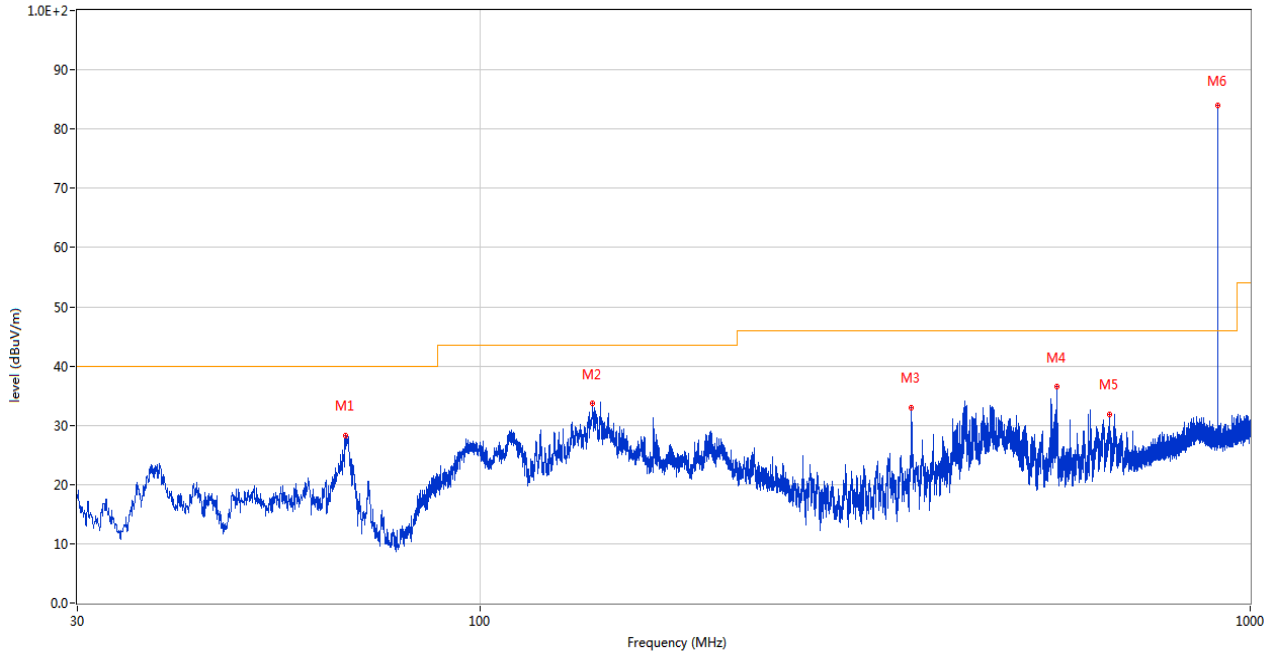
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	67.394	26.01	-28.55	40.0	-13.99	Peak	265.00	200	Horizontal	Pass
2	99.549	33.70	-29.23	43.5	-9.80	Peak	60.00	200	Horizontal	Pass
3	167.982	37.44	-25.34	43.5	-6.06	Peak	360.00	200	Horizontal	Pass
4	363.001	38.69	-22.31	46.0	-7.31	Peak	121.00	100	Horizontal	Pass
5	584.064	34.61	-17.11	46.0	-11.39	Peak	34.00	100	Horizontal	Pass
6	908.432	89.21	-11.31	94.0	-4.79	Peak	83.00	100	Horizontal	Pass

Middle Channel 30 MHz to 1 GHz, ANT V

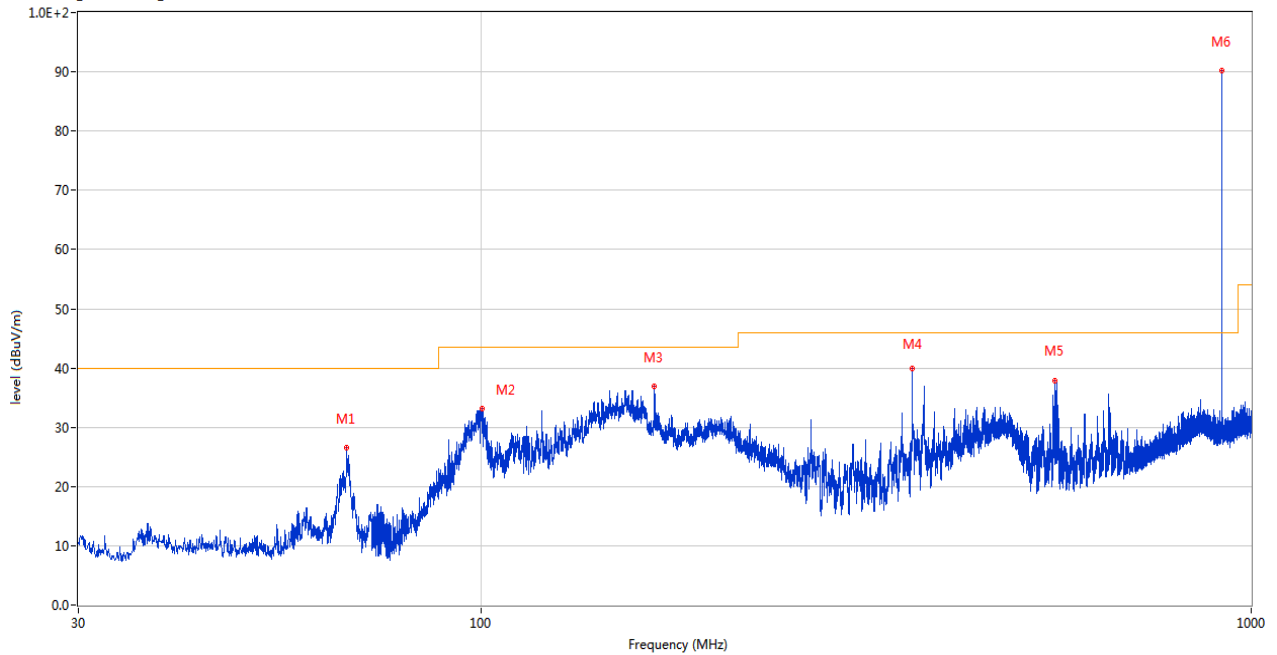
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	66.909	28.34	-28.47	40.0	-11.66	Peak	268.00	100	Vertical	Pass
2	139.998	33.62	-25.55	43.5	-9.88	Peak	281.00	100	Vertical	Pass
3	363.001	32.91	-22.31	46.0	-13.09	Peak	360.00	200	Vertical	Pass
4	560.542	36.52	-17.47	46.0	-9.48	Peak	162.00	200	Vertical	Pass
5	656.135	31.73	-15.20	46.0	-14.27	Peak	216.00	100	Vertical	Pass
6	908.432	84.06	-11.31	94.0	-9.94	Peak	178.00	100	Vertical	Pass

High Channel 30 MHz to 1 GHz, ANT H

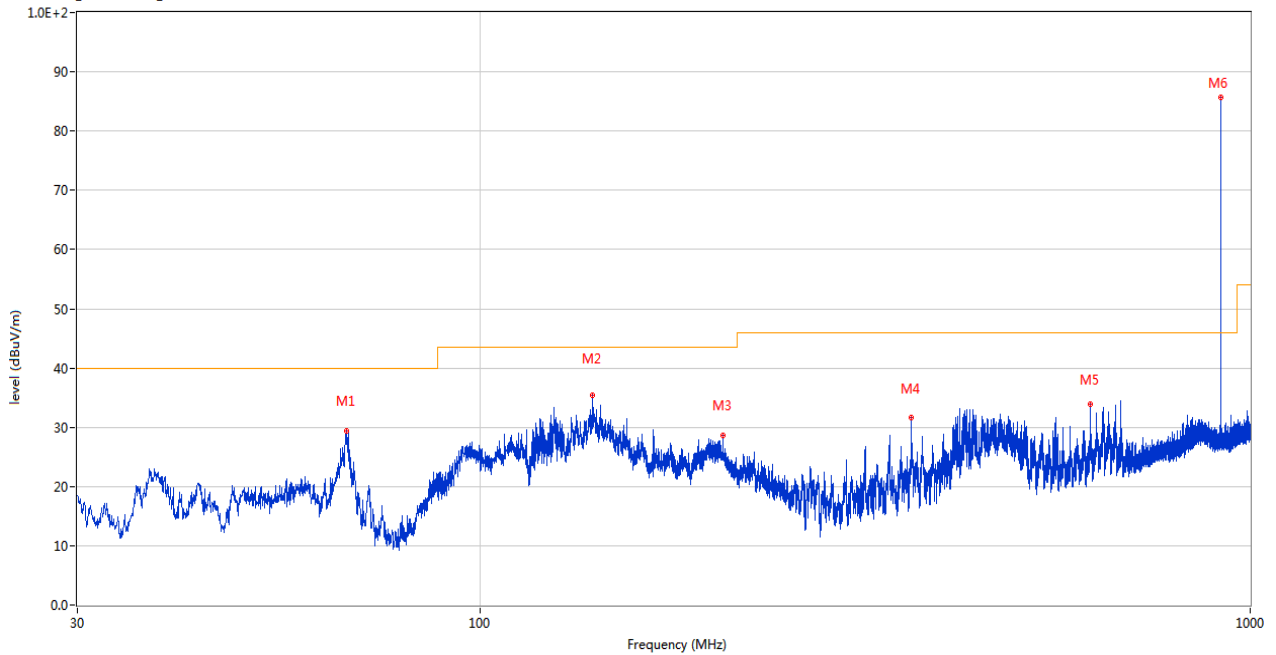
RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	66.909	26.47	-28.47	40.0	-13.53	Peak	272.00	200	Horizontal	Pass
2	100.228	33.06	-29.16	43.5	-10.44	Peak	80.00	200	Horizontal	Pass
3	167.982	36.84	-25.34	43.5	-6.66	Peak	0.00	200	Horizontal	Pass
4	363.001	39.96	-22.31	46.0	-6.04	Peak	154.00	100	Horizontal	Pass
5	556.419	37.86	-17.51	46.0	-8.14	Peak	312.00	200	Horizontal	Pass
6	915.998	90.18	-10.72	94.0	-3.82	Peak	89.00	100	Horizontal	Pass

High Channel 30 MHz to 1 GHz, ANT V

RE Test case_FCC Part 15B_FCC Part 15B Class B 30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	67.005	29.38	-28.48	40.0	-10.62	Peak	232.00	100	Vertical	Pass
2	140.095	35.47	-25.55	43.5	-8.03	Peak	218.00	100	Vertical	Pass
3	206.637	28.71	-28.58	43.5	-14.79	Peak	360.00	200	Vertical	Pass
4	363.001	31.65	-22.31	46.0	-14.35	Peak	360.00	200	Vertical	Pass
5	620.099	33.93	-16.01	46.0	-12.07	Peak	247.00	100	Vertical	Pass
6	915.998	85.72	-10.72	94.0	-8.28	Peak	179.00	100	Vertical	Pass

Test Data and Plots (1 GHz ~ 10th Harmonic)

Note ¹: The marked is the harmonic signal.

Note ²: Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Note ³: Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

Note ⁴: Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20 dB from the applicable limit) and considered that's already beyond the background noise floor.

Note ⁵: Radiated emissions measured in frequency above 1000 MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

1# circuit

LOW CHANNEL 1 GHz to 12.75 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1362.300	40.85	-11.33	74.0	-33.15	Peak	169.00	150	Vertical	Pass
1**	1362.300	29.27	-11.33	54.0	-24.73	AV	169.00	150	Vertical	Pass
2	1799.800	42.39	-10.91	74.0	-31.61	Peak	360.00	150	Vertical	Pass
2**	1799.800	33.64	-10.91	54.0	-20.36	AV	360.00	150	Vertical	Pass
3	3481.400	43.89	-6.01	74.0	-30.11	Peak	210.00	150	Vertical	Pass
3**	3481.400	33.78	-6.01	54.0	-20.22	AV	210.00	150	Vertical	Pass
4	6061.200	50.52	2.71	74.0	-23.48	Peak	95.00	150	Vertical	Pass
4**	6061.200	42.00	2.71	54.0	-12.00	AV	95.00	150	Vertical	Pass
5	7974.338	47.93	17.84	74.0	-26.07	Peak	280.00	150	Vertical	Pass
5**	7974.338	37.18	17.84	54.0	-16.82	AV	280.00	150	Vertical	Pass
6	11025.287	48.33	18.90	74.0	-25.67	Peak	22.00	150	Vertical	Pass
6**	11025.287	37.09	18.90	54.0	-16.91	AV	22.00	150	Vertical	Pass

LOW CHANNEL 1 GHz to 12.75 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1327.300	40.52	-11.23	74.0	-33.48	Peak	294.00	150	Horizontal	Pass
1**	1327.300	30.12	-11.23	54.0	-23.88	AV	294.00	150	Horizontal	Pass
2	1957.600	43.01	-9.50	74.0	-30.99	Peak	210.00	150	Horizontal	Pass
2**	1957.600	31.42	-9.50	54.0	-22.58	AV	210.00	150	Horizontal	Pass
3	3483.400	43.21	-6.00	74.0	-30.79	Peak	257.00	150	Horizontal	Pass
3**	3483.400	34.08	-6.00	54.0	-19.92	AV	257.00	150	Horizontal	Pass
4	6564.800	51.60	3.01	74.0	-22.40	Peak	257.00	150	Horizontal	Pass
4**	6564.800	41.31	3.01	54.0	-12.69	AV	257.00	150	Horizontal	Pass
5	8031.263	47.81	18.14	74.0	-26.19	Peak	212.00	150	Horizontal	Pass
5**	8031.263	37.13	18.14	54.0	-16.87	AV	212.00	150	Horizontal	Pass
6	12466.525	49.75	18.61	74.0	-24.25	Peak	360.00	150	Horizontal	Pass
6**	12466.525	37.62	18.61	54.0	-16.38	AV	360.00	150	Horizontal	Pass

MIDDLE CHANNEL 1 GHz to 12.75 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1215.500	40.44	-11.28	74.0	-33.56	Peak	30.00	150	Vertical	Pass
1**	1215.500	28.98	-11.28	54.0	-25.02	AV	30.00	150	Vertical	Pass
2	2670.900	49.18	-4.49	74.0	-24.82	Peak	0.00	150	Vertical	Pass
2**	2670.900	37.09	-4.49	54.0	-16.91	AV	0.00	150	Vertical	Pass
3	3844.000	44.54	-5.22	74.0	-29.46	Peak	243.00	150	Vertical	Pass
3**	3844.000	34.90	-5.22	54.0	-19.10	AV	243.00	150	Vertical	Pass
4	6643.800	52.09	4.21	74.0	-21.91	Peak	67.00	150	Vertical	Pass
4**	6643.800	41.20	4.21	54.0	-12.80	AV	67.00	150	Vertical	Pass
5	8044.200	48.21	18.05	74.0	-25.79	Peak	26.00	150	Vertical	Pass
5**	8044.200	37.19	18.05	54.0	-16.81	AV	26.00	150	Vertical	Pass
6	11598.562	49.32	20.11	74.0	-24.68	Peak	141.00	150	Vertical	Pass
6**	11598.562	37.51	20.11	54.0	-16.49	AV	141.00	150	Vertical	Pass

MIDDLE CHANNEL 1 GHz to 12.75 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1302.900	40.78	-11.31	74.0	-33.22	Peak	133.00	150	Horizontal	Pass
1**	1302.900	30.81	-11.31	54.0	-23.19	AV	133.00	150	Horizontal	Pass
2	2671.300	47.30	-4.46	74.0	-26.70	Peak	68.00	150	Horizontal	Pass
2**	2671.300	36.15	-4.46	54.0	-17.85	AV	68.00	150	Horizontal	Pass
3	3593.000	43.27	-5.78	74.0	-30.73	Peak	270.00	150	Horizontal	Pass
3**	3593.000	34.32	-5.78	54.0	-19.68	AV	270.00	150	Horizontal	Pass
4	6401.400	51.59	3.10	74.0	-22.41	Peak	177.00	150	Horizontal	Pass
4**	6401.400	40.23	3.10	54.0	-13.77	AV	177.00	150	Horizontal	Pass
5	8076.112	48.09	18.51	74.0	-25.91	Peak	93.00	150	Horizontal	Pass
5**	8076.112	36.60	18.51	54.0	-17.40	AV	93.00	150	Horizontal	Pass
6	12112.612	50.33	19.55	74.0	-23.67	Peak	306.00	150	Horizontal	Pass
6**	12112.612	37.97	19.55	54.0	-16.03	AV	306.00	150	Horizontal	Pass

HIGH CHANNEL 1 GHz to 12.75 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1227.800	39.67	-11.38	74.0	-34.33	Peak	231.00	150	Vertical	Pass
1**	1227.800	29.39	-11.38	54.0	-24.61	AV	231.00	150	Vertical	Pass
2	2880.600	48.91	-3.74	74.0	-25.09	Peak	207.00	150	Vertical	Pass
2**	2880.600	38.86	-3.74	54.0	-15.14	AV	207.00	150	Vertical	Pass
3	3976.400	45.91	-4.11	74.0	-28.09	Peak	0.00	150	Vertical	Pass
3**	3976.400	36.05	-4.11	54.0	-17.95	AV	0.00	150	Vertical	Pass
4	6142.000	51.98	2.95	74.0	-22.02	Peak	358.00	150	Vertical	Pass
4**	6142.000	40.63	2.95	54.0	-13.37	AV	358.00	150	Vertical	Pass
5	7592.538	47.68	17.10	74.0	-26.32	Peak	105.00	150	Vertical	Pass
5**	7592.538	35.85	17.10	54.0	-18.15	AV	105.00	150	Vertical	Pass
6	10495.425	48.89	18.42	74.0	-25.11	Peak	206.00	150	Vertical	Pass
6**	10495.425	37.66	18.42	54.0	-16.34	AV	206.00	150	Vertical	Pass

HIGH CHANNEL 1 GHz to 12.75 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1860.500	42.51	-9.78	74.0	-31.49	Peak	204.00	150	Horizontal	Pass
1**	1860.500	31.54	-9.78	54.0	-22.46	AV	204.00	150	Horizontal	Pass
2	2550.900	47.58	-4.83	74.0	-26.42	Peak	69.00	150	Horizontal	Pass
2**	2550.900	36.39	-4.83	54.0	-17.61	AV	69.00	150	Horizontal	Pass
3	3979.200	45.65	-4.05	74.0	-28.35	Peak	20.00	150	Horizontal	Pass
3**	3979.200	37.00	-4.05	54.0	-17.00	AV	20.00	150	Horizontal	Pass
4	6412.200	51.47	3.97	74.0	-22.53	Peak	20.00	150	Horizontal	Pass
4**	6412.200	41.81	3.97	54.0	-12.19	AV	20.00	150	Horizontal	Pass
5	8039.312	48.26	18.15	74.0	-25.74	Peak	243.00	150	Horizontal	Pass
5**	8039.312	37.02	18.15	54.0	-16.98	AV	243.00	150	Horizontal	Pass
6	10595.474	49.08	18.53	74.0	-24.92	Peak	340.00	150	Horizontal	Pass
6**	10595.474	37.53	18.53	54.0	-16.47	AV	340.00	150	Horizontal	Pass

2# circuit

LOW CHANNEL 1 GHz to 12.75 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1319.800	40.28	-11.23	74.0	-33.72	Peak	206.00	150	Vertical	Pass
1**	1319.800	28.63	-11.23	54.0	-25.37	AV	206.00	150	Vertical	Pass
2	2285.300	48.16	-5.67	74.0	-25.84	Peak	171.00	150	Vertical	Pass
2**	2285.300	34.73	-5.67	54.0	-19.27	AV	171.00	150	Vertical	Pass
3	4274.000	46.44	-3.60	74.0	-27.56	Peak	23.00	150	Vertical	Pass
3**	4274.000	36.62	-3.60	54.0	-17.38	AV	23.00	150	Vertical	Pass
4	6632.000	52.37	3.64	74.0	-21.63	Peak	305.00	150	Vertical	Pass
4**	6632.000	41.39	3.64	54.0	-12.61	AV	305.00	150	Vertical	Pass
5	8515.125	48.67	18.01	74.0	-25.33	Peak	168.00	150	Vertical	Pass
5**	8515.125	35.86	18.01	54.0	-18.14	AV	168.00	150	Vertical	Pass
6	12126.125	49.25	19.70	74.0	-24.75	Peak	315.00	150	Vertical	Pass
6**	12126.125	38.15	19.70	54.0	-15.85	AV	315.00	150	Vertical	Pass

LOW CHANNEL 1 GHz to 12.75 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1300.100	40.80	-11.29	74.0	-33.20	Peak	266.00	150	Horizontal	Pass
1**	1300.100	32.96	-11.29	54.0	-21.04	AV	266.00	150	Horizontal	Pass
2	1755.800	44.20	-11.56	74.0	-29.80	Peak	58.00	150	Horizontal	Pass
2**	1755.800	33.05	-11.56	54.0	-20.95	AV	58.00	150	Horizontal	Pass
3	2807.800	48.13	-4.39	74.0	-25.87	Peak	197.00	150	Horizontal	Pass
3**	2807.800	37.46	-4.39	54.0	-16.54	AV	197.00	150	Horizontal	Pass
4	4432.600	46.25	-2.19	74.0	-27.75	Peak	67.00	150	Horizontal	Pass
4**	4432.600	37.25	-2.19	54.0	-16.75	AV	67.00	150	Horizontal	Pass
5	6419.400	52.58	4.02	74.0	-21.42	Peak	94.00	150	Horizontal	Pass
5**	6419.400	42.84	4.02	54.0	-11.16	AV	94.00	150	Horizontal	Pass
6	9368.713	48.11	17.21	74.0	-25.89	Peak	312.00	150	Horizontal	Pass
6**	9368.713	36.95	17.21	54.0	-17.05	AV	312.00	150	Horizontal	Pass

MIDDLE CHANNEL 1 GHz to 12.75 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1280.600	39.94	-11.39	74.0	-34.06	Peak	149.00	150	Vertical	Pass
1**	1280.600	27.88	-11.39	54.0	-26.12	AV	149.00	150	Vertical	Pass
2	2558.900	46.80	-5.54	74.0	-27.20	Peak	76.00	150	Vertical	Pass
2**	2558.900	34.82	-5.54	54.0	-19.18	AV	76.00	150	Vertical	Pass
3	3467.000	43.50	-6.23	74.0	-30.50	Peak	202.00	150	Vertical	Pass
3**	3467.000	34.74	-6.23	54.0	-19.26	AV	202.00	150	Vertical	Pass
4	6182.400	51.38	2.72	74.0	-22.62	Peak	177.00	150	Vertical	Pass
4**	6182.400	40.16	2.72	54.0	-13.84	AV	177.00	150	Vertical	Pass
5	8076.687	47.99	18.48	74.0	-26.01	Peak	178.00	150	Vertical	Pass
5**	8076.687	36.22	18.48	54.0	-17.78	AV	178.00	150	Vertical	Pass
6	10900.513	48.89	18.33	74.0	-25.11	Peak	299.00	150	Vertical	Pass
6**	10900.513	36.42	18.33	54.0	-17.58	AV	299.00	150	Vertical	Pass

MIDDLE CHANNEL 1 GHz to 12.75 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1301.000	40.48	-11.30	74.0	-33.52	Peak	360.00	150	Horizontal	Pass
1**	1301.000	29.58	-11.30	54.0	-24.42	AV	360.00	150	Horizontal	Pass
2	2545.800	47.01	-5.29	74.0	-26.99	Peak	101.00	150	Horizontal	Pass
2**	2545.800	35.60	-5.29	54.0	-18.40	AV	101.00	150	Horizontal	Pass
3	4055.800	45.70	-3.87	74.0	-28.30	Peak	36.00	150	Horizontal	Pass
3**	4055.800	36.94	-3.87	54.0	-17.06	AV	36.00	150	Horizontal	Pass
4	6415.800	51.62	4.00	74.0	-22.38	Peak	218.00	150	Horizontal	Pass
4**	6415.800	43.01	4.00	54.0	-10.99	AV	218.00	150	Horizontal	Pass
5	8241.425	46.88	16.12	74.0	-27.12	Peak	-1.00	150	Horizontal	Pass
5**	8241.425	37.52	16.12	54.0	-16.48	AV	-1.00	150	Horizontal	Pass
6	11591.950	49.57	20.03	74.0	-24.43	Peak	347.00	150	Horizontal	Pass
6**	11591.950	37.67	20.03	54.0	-16.33	AV	347.00	150	Horizontal	Pass

HIGH CHANNEL 1 GHz to 12.75 GHz, ANT V

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1126.700	40.30	-11.59	74.0	-33.70	Peak	92.00	150	Vertical	Pass
1**	1126.700	28.51	-11.59	54.0	-25.49	AV	92.00	150	Vertical	Pass
2	2383.000	46.41	-5.91	74.0	-27.59	Peak	131.00	150	Vertical	Pass
2**	2383.000	35.32	-5.91	54.0	-18.68	AV	131.00	150	Vertical	Pass
3	3933.200	45.83	-4.77	74.0	-28.17	Peak	136.00	150	Vertical	Pass
3**	3933.200	36.23	-4.77	54.0	-17.77	AV	136.00	150	Vertical	Pass
4	6353.800	50.99	2.94	74.0	-23.01	Peak	74.00	150	Vertical	Pass
4**	6353.800	41.65	2.94	54.0	-12.35	AV	74.00	150	Vertical	Pass
5	8011.138	48.68	18.63	74.0	-25.32	Peak	269.00	150	Vertical	Pass
5**	8011.138	36.53	18.63	54.0	-17.47	AV	269.00	150	Vertical	Pass
6	11549.688	49.14	19.70	74.0	-24.86	Peak	-1.00	150	Vertical	Pass
6**	11549.688	38.25	19.70	54.0	-15.75	AV	-1.00	150	Vertical	Pass

HIGH CHANNEL 1 GHz to 12.75 GHz, ANT H

No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (o)	Height (cm)	ANT	Verdict
1	1300.400	42.22	-11.30	74.0	-31.78	Peak	125.00	150	Horizontal	Pass
1**	1300.400	32.61	-11.30	54.0	-21.39	AV	125.00	150	Horizontal	Pass
2	2614.900	48.72	-4.14	74.0	-25.28	Peak	150.00	150	Horizontal	Pass
2**	2614.900	36.69	-4.14	54.0	-17.31	AV	150.00	150	Horizontal	Pass
3	3765.400	44.44	-4.45	74.0	-29.56	Peak	94.00	150	Horizontal	Pass
3**	3765.400	36.06	-4.45	54.0	-17.94	AV	94.00	150	Horizontal	Pass
4	6411.200	51.18	3.97	74.0	-22.82	Peak	188.00	150	Horizontal	Pass
4**	6411.200	41.72	3.97	54.0	-12.28	AV	188.00	150	Horizontal	Pass
5	7970.025	47.91	17.60	74.0	-26.09	Peak	235.00	150	Horizontal	Pass
5**	7970.025	37.40	17.60	54.0	-16.60	AV	235.00	150	Horizontal	Pass
6	11701.775	49.28	19.79	74.0	-24.72	Peak	253.00	150	Horizontal	Pass
6**	11701.775	37.14	19.79	54.0	-16.86	AV	253.00	150	Horizontal	Pass

Test Data and Plots (Band edge)

Note ¹: The lowest and highest channels are tested to verify the band edge emissions. Please refer to the following the plots for emissions values.

Note ²: The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.

Note ³: According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note ⁴: The Level (dBuV/m) has been corrected by factor.

Test Data

1# circuit

Test Mode	Test Channel	Frequency (MHz)	Level (dBuV/m)	Factor (dB)	Limit Line (dBuV/m)	Margin (dB)	Remark	Verdict
ZWAVE	Low	614	40.456	3.16	74	33.544	PEAK	Pass
		614	N/A	N/A	54	N/A	AVERAGE	Pass
ZWAVE	HIGH	960	49.278	3.16	74	24.722	PEAK	Pass
		960	N/A	N/A	54	N/A	AVERAGE	Pass

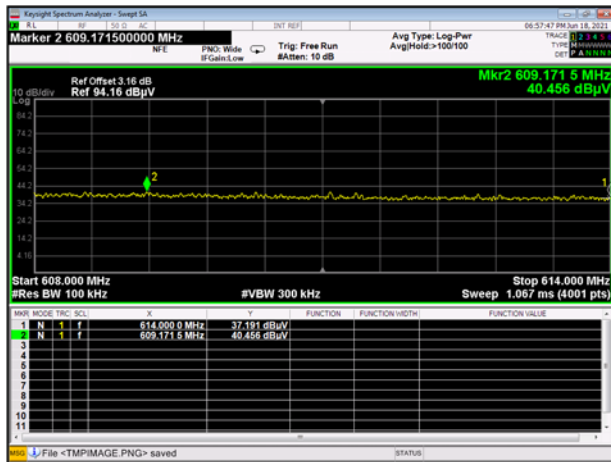
2# circuit

Test Mode	Test Channel	Frequency (MHz)	Level (dBuV/m)	Factor (dB)	Limit Line (dBuV/m)	Margin (dB)	Remark	Verdict
ZWAVE	Low	614	39.497	3.16	74	34.503	PEAK	Pass
		614	N/A	N/A	54	N/A	AVERAGE	Pass
ZWAVE	HIGH	960	48.081	28.00	74	25.919	PEAK	Pass
		960	N/A	N/A	54	N/A	AVERAGE	Pass

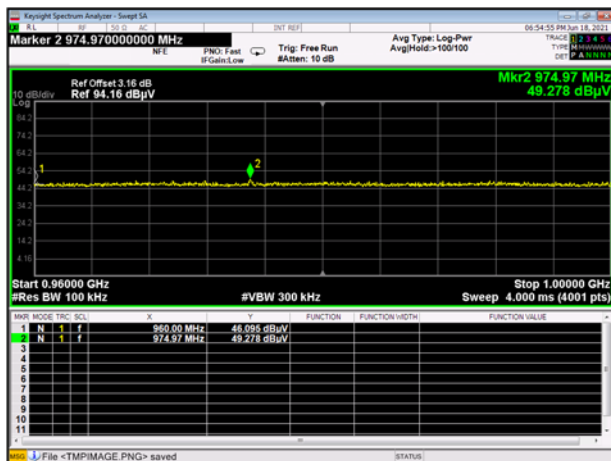
Test plots

1# circuit

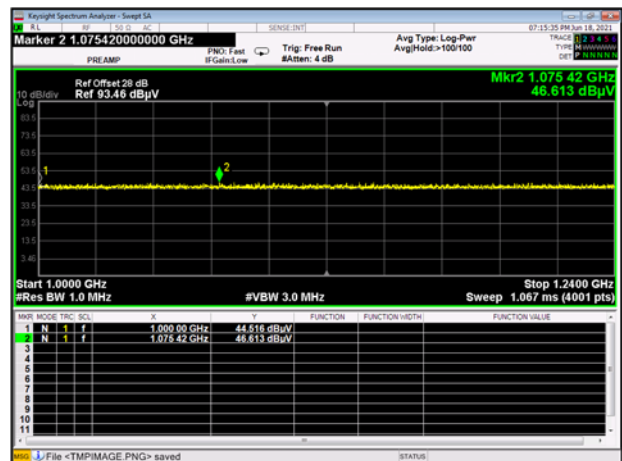
LOW CHANNEL, PEAK



HIGH CHANNEL, PEAK



HIGH CHANNEL, PEAK

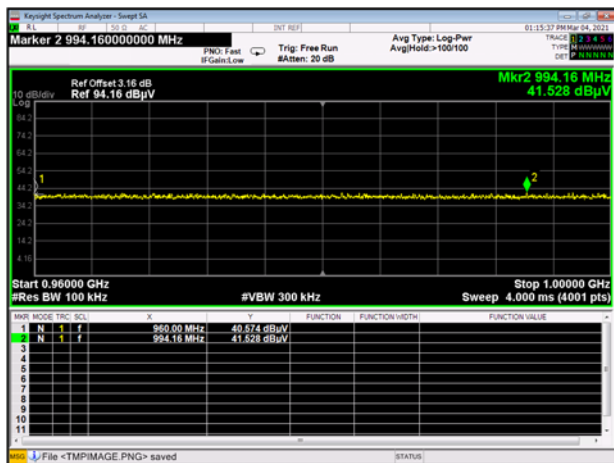


2# circuit

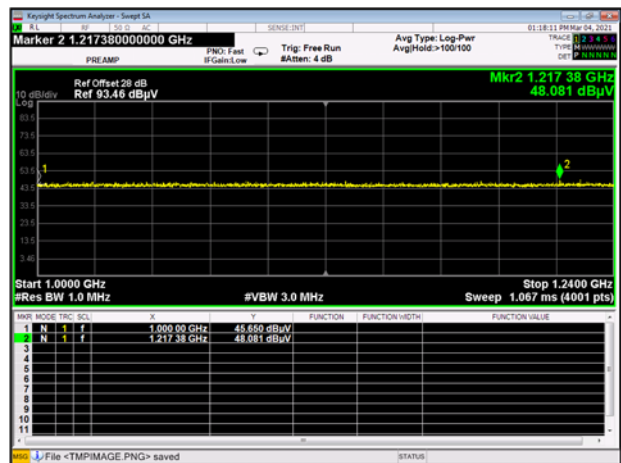
LOW CHANNEL, PEAK



HIGH CHANNEL, PEAK



HIGH CHANNEL, PEAK



ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ2120210-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ2120210-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ2120210-AI.PDF”.

--END OF REPORT--