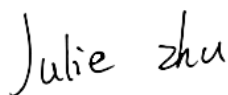


TEST REPORT

Applicant: CenTrak Inc.
Address: 826 Newtown-Yardley Rd, Newtown, Pennsylvania
18940, United States
Equipment Type: BLE MultiMode Badge
Model Name: CTH-SB760
Brand Name: Centrak
FCC ID: ST2-CTHSB760
Test Standard: 47 CFR Part 15 Subpart C
(refer to section 3.1)
Sample Arrival Date: Nov. 01, 2023
Test Date: Nov. 08, 2023 - Nov. 14, 2023
Date of Issue: Mar. 18, 2024

ISSUED BY:

Shenzhen BALUN Technology Co., Ltd.

Tested by: Julie Zhu**Checked by:** Ye Hongji**Approved by:** Liao Jianming
(Technical Director)

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Jan. 05, 2024</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>Mar. 18, 2024</u>	<u>1. Corrected the antenna type in Section 2.4.</u>
		<u>2. Updated the ANNEX D EUT INTERNAL PHOTOS.</u>

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1 GENERAL INFORMATION

1.1 Test Laboratory

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

1.2 Test Location

Name	Shenzhen BALUN Technology Co., Ltd.
Location	☒ Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China
	☐ 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	CenTrak Inc.
Address	826 Newtown-Yardley Rd, Newtown, Pennsylvania 18940, United States

2.2 Manufacturer Information

Manufacturer	CenTrak Inc.
Address	826 Newtown-Yardley Rd, Newtown, Pennsylvania 18940, United States

2.3 General Description for Equipment under Test (EUT)

EUT Name	BLE MultiMode Badge
Model Name Under Test	CTH-SB760
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	Rev B
Software Version	V1.0
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	Bluetooth (BLE), RFID
-----------------------------------	-----------------------

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

Modulation Technology	RFID
Modulation Type	2GFSK
Product Type	☐ Mobile ☒ Portable ☐ Fix Location
Frequency Range	The frequency range used is 904 MHz to 926 MHz.
Number of channel	4
Tested Channel	Channel 1 (904 MHz), Channel 2 (915 MHz), Channel 3 (922 MHz), Channel 4 (926 MHz)
Antenna Type	SMD Chip Antenna
Antenna Gain	-0.5 dBi

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	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

3.2 Test Verdict

No.	Description	FCC Part No.	Test Result	Verdict	Remark
1	Antenna Requirement	15.203	--	Pass	Note ¹
2	20 dB and 99% Bandwidth	15.215(c)	ANNEX A.1	Pass	--
3	AC Conducted Emission	15.207	ANNEX A.2	N/A	Note ²
4	Radiated Spurious Emission	15.249(a)	ANNEX A.3	Pass	--
5	Band Edge(Restricted-band band-edge)	15.249(a)	ANNEX A.4	Pass	--
6	Field Strength of Fundamental Emissions	15.249(a)	ANNEX A.5	Pass	--

Note ¹: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203.

Note ²: The EUT only powered by battery, so the Conducted Emission test is not applicable.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	48% to 65%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+21.9°C to +24.4°C
Working Voltage of the EUT	NV (Normal Voltage)	3 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY50330200	2023.05.16	2024.05.15
Spectrum Analyzer	ROHDE&SCHWARZ	FSV-40	101544	2022.12.28	2023.12.27
Spectrum Analyzer	KEYSIGHT	N9020A	MY52510065	2023.09.05	2024.09.04
Signaling Unit	ROHDE&SCHWARZ	CMW500	171150	2023.06.19	2024.06.18
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	01631	2022.02.03	2025.02.02
Test Antenna-Horn	A-INFO	LB-180400KF	J211060273	2021.07.02	2024.07.01
Anechoic Chamber	RAINFORD	9m*6m*6m	144	2022.02.19	2024.09.03
Amplifier	COM-MV	ZT30-1000M	18110850	2023.09.05	2024.09.04
Amplifier	COM-MV	LSCX_LNA1-12G-01	180602	2023.09.05	2024.09.04
Amplifier	COM-MV	XKu_LNA7-18G-01	180601	2023.09.05	2024.09.04
Amplifier	COM-MV	KA LNA18 40G-01	18050001	2022.12.07	2023.12.06
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2023.09.05	2024.09.04
Test Antenna-Loop	SCHWARZBECK	FMZB 1519	1519-037	2021.04.16	2024.04.15
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	130	2021.08.15	2024.08.14
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	00884	2021.03.08	2024.03.07

4.3 Test Software List

Description	Manufacturer	Software Version	Serial No.	Applicable test Setup
BL410R	BALUN	V2.1.1.488	N/A	The section 4.5.1
BL410E	BALUN	V22.930	N/A	The section 4.5.2&4.5.3&4.5.4&4.5.5

4.4 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Parameters	Uncertainty
Occupied Channel Bandwidth	2.8%
RF output power, conducted	1.28 dB
Power Spectral Density, conducted	1.30 dB
Unwanted Emissions, conducted	1.84 dB
All emissions, radiated	5.36 dB
Temperature	0.8°C
Humidity	4%

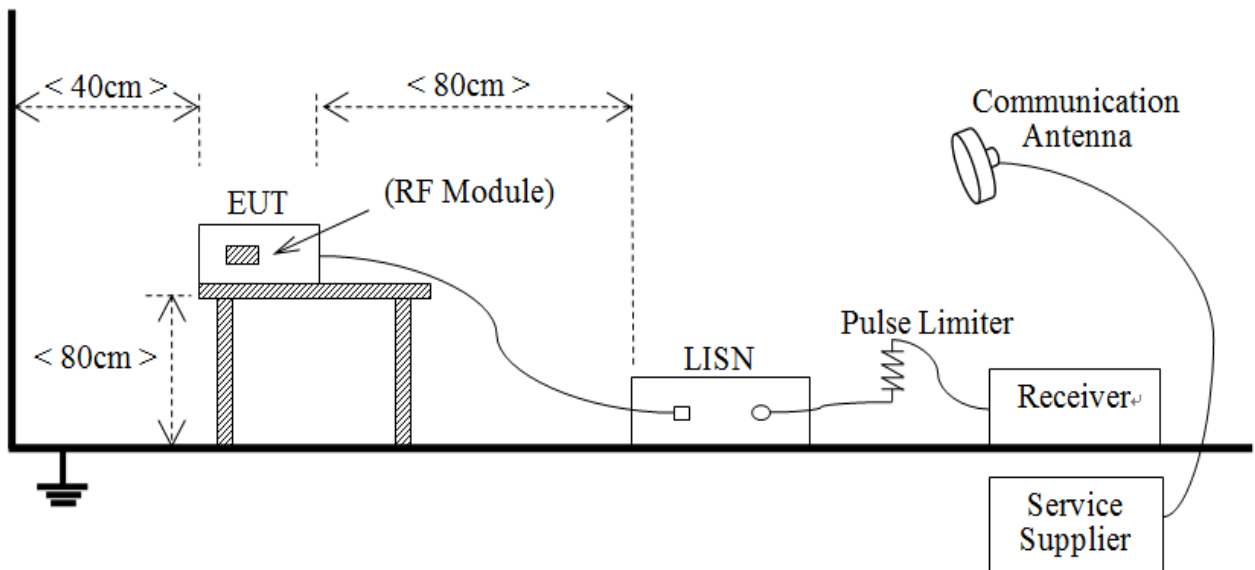
4.5 Description of Test Setup

4.5.1 For Antenna Port Test



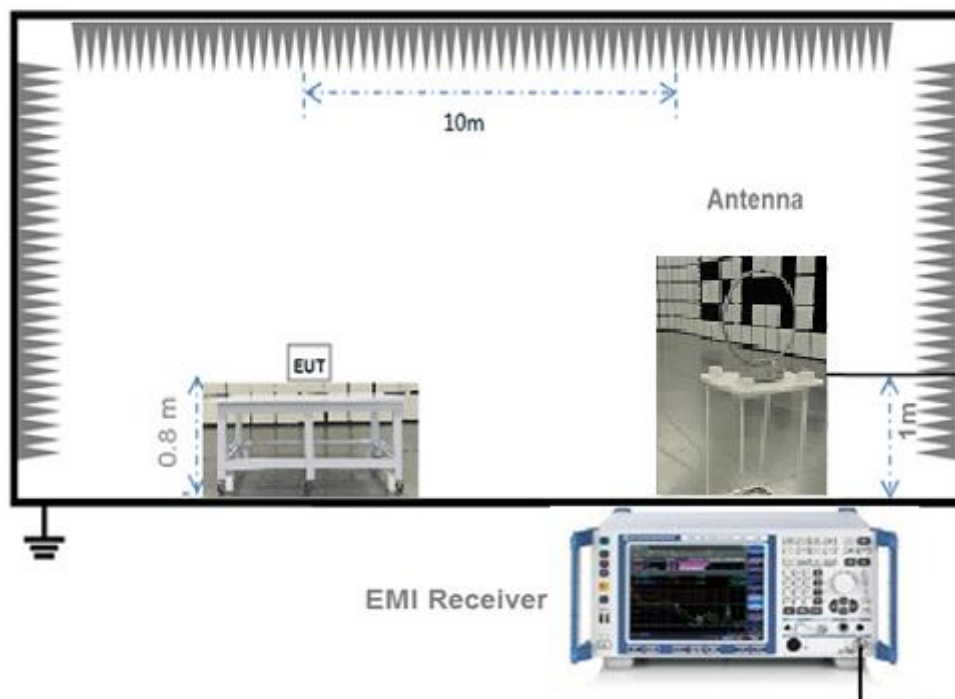
(Diagram 1)

4.5.2 For AC Power Supply Port Test



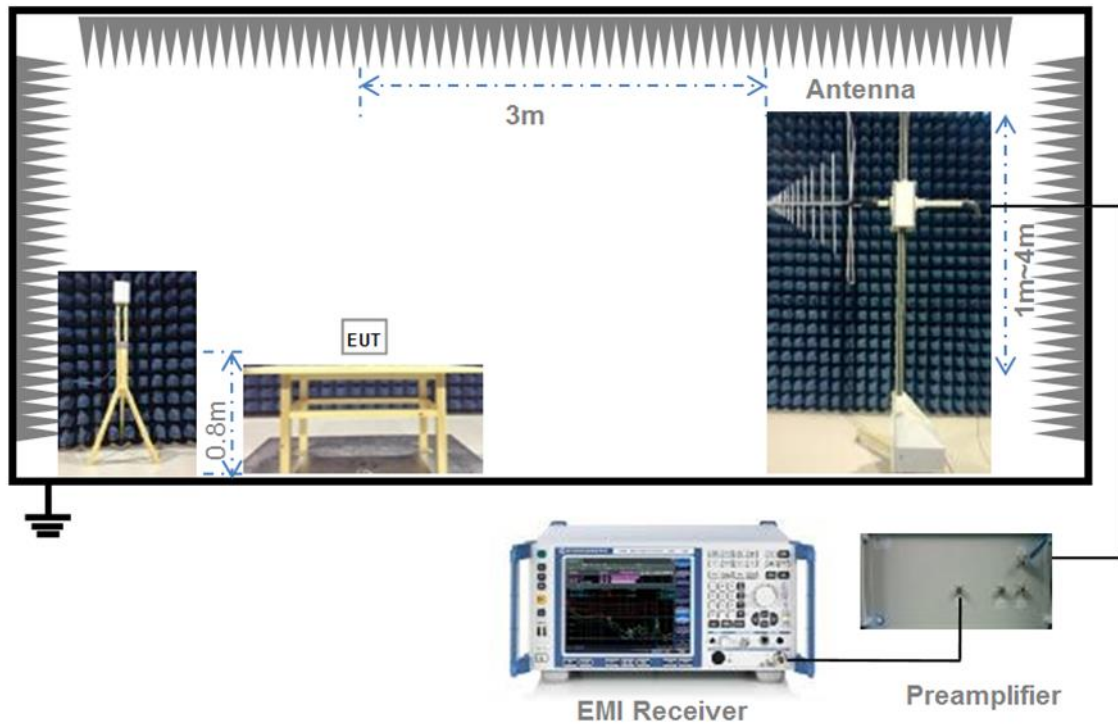
(Diagram 2)

4.5.3 For Radiated Test (Below 30 MHz)



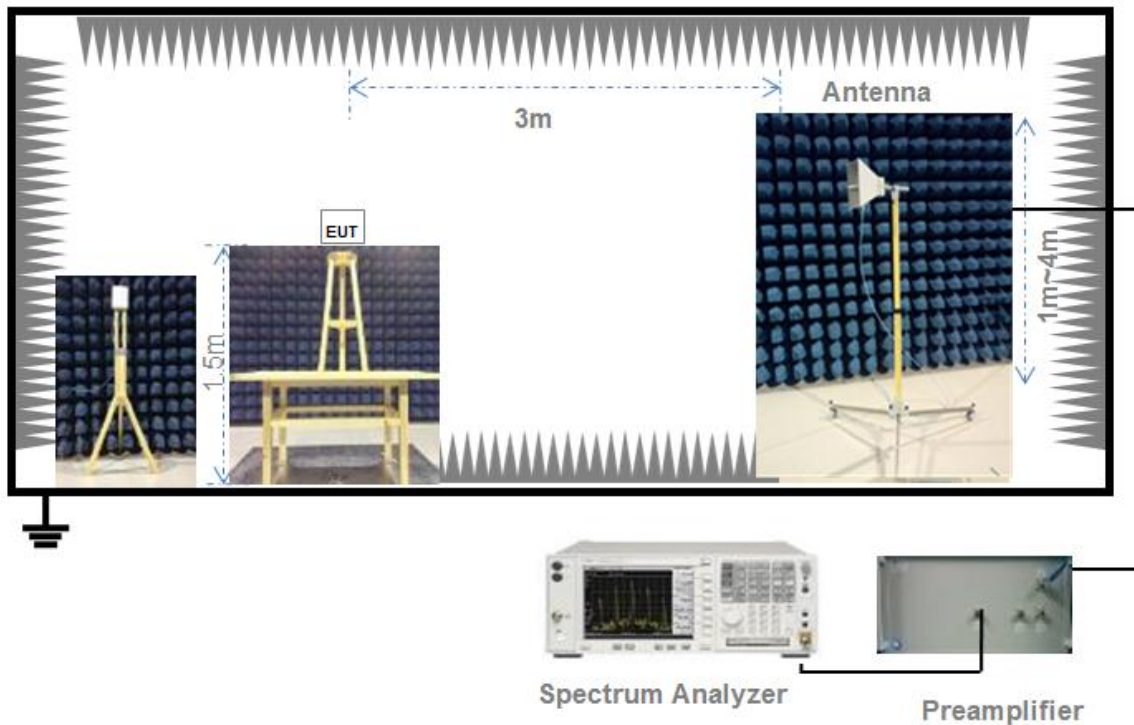
(Diagram 3)

4.5.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.5.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

5 TEST ITEMS

5.1 Antenna Requirements

5.1.1 Relevant Standards

FCC §15.203 & 15.247(b)

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)

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.

RSS-Gen 6.6

The emission bandwidth ($\times$ dB) is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated $\times$ dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least $3\times$ the resolution bandwidth.

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99% emission bandwidth, as calculated or measured

5.2.2 Test Setups

See section 4.5.1 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 AC Conducted Emission

5.3.1 Limit

FCC §15.207

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)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

5.3.2 Test Setups

See section 4.5.1 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 Radiated Spurious Emission

5.4.1 Limit

FCC §15.249(a)

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

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:

1. 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.
2. For above 1000 MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).

5.4.2 Test Setups

See section 4.5.2-4.5.5 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 Band Edge (Restricted-band band-edge)

5.5.1 Limit

FCC §15.249(a)

Radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

5.5.2 Test Setups

See section 4.5.3 to 4.5.5 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

For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported, Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

5.5.4 Test Result

Please refer to ANNEX A.4.

5.6 Field Strength of Fundamental Emissions

5.6.1 Limit

FCC&15.249(a)

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.

5.6.2 Test Setups

See section 4.5.3-4.5.5 for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

5.6.3 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

5.6.4 Test Result

Please refer to ANNEX A.5.

ANNEX A TEST RESULT

A.1 20 dB and 99% Bandwidth

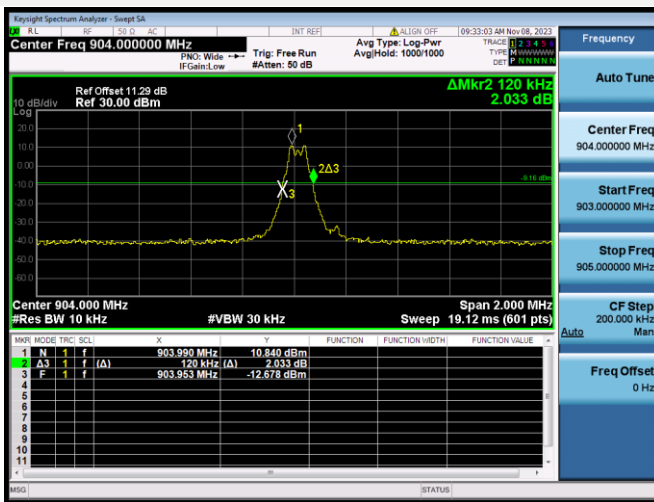
Test Data

Frequency (MHz)	20 dB Bandwidth (kHz)	99% Bandwidth (kHz)	Verdict
904 MHz	120.000	99.662	Pass
915 MHz	120.000	99.977	Pass
922 MHz	117.000	95.330	Pass
926 MHz	120.000	96.178	Pass

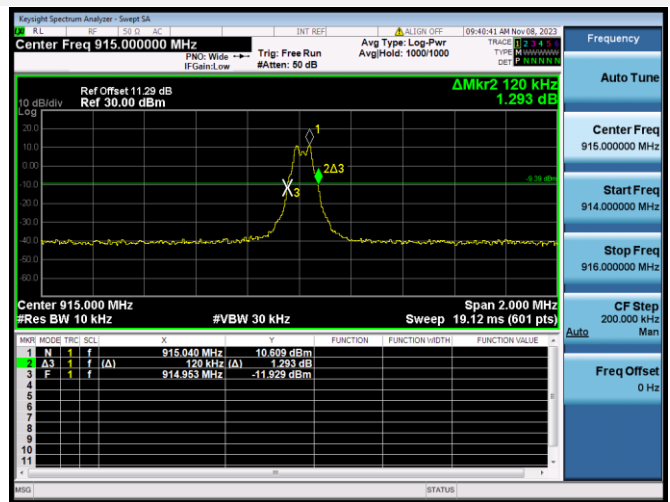
Test Plots

20 dB Bandwidth

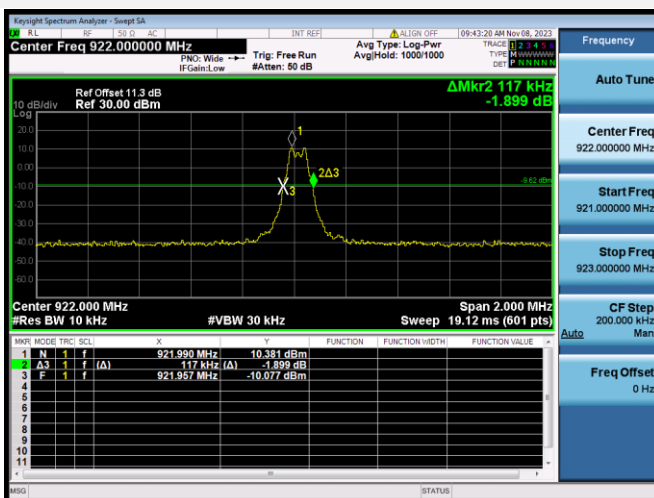
904 MHz



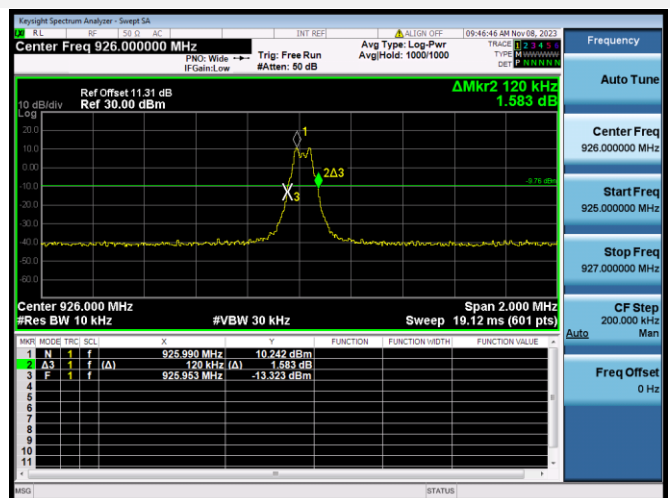
915 MHz



922 MHz

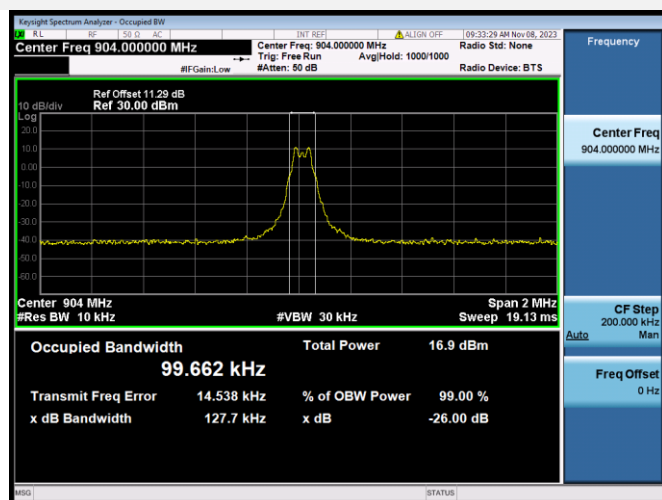


926 MHz

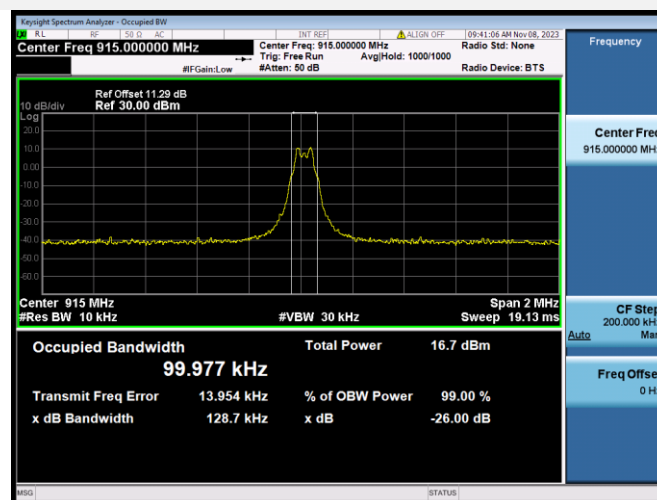


99% Bandwidth

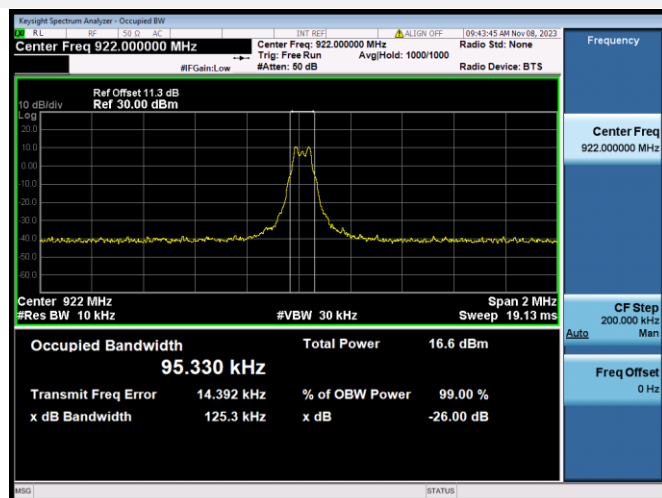
904 MHz



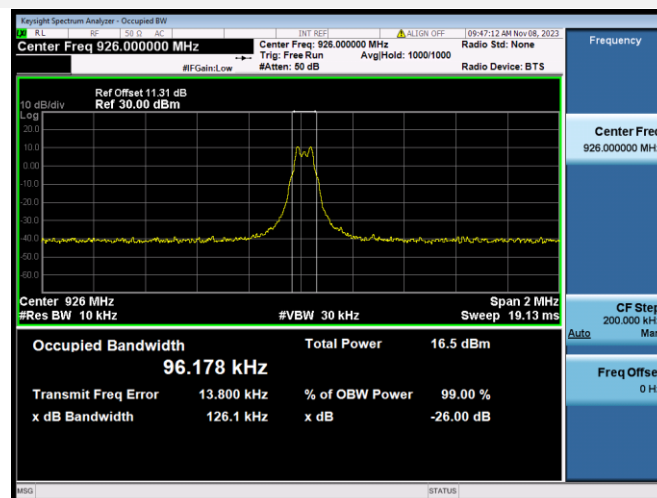
915 MHz



922 MHz



926 MHz



A.2 AC Conducted Emissions

Note: Not applicable.

A.3 Radiated Emission

Note ¹: The symbol of “--” in the table which means not application.

Note ²: For the test data above 1 GHz, 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.

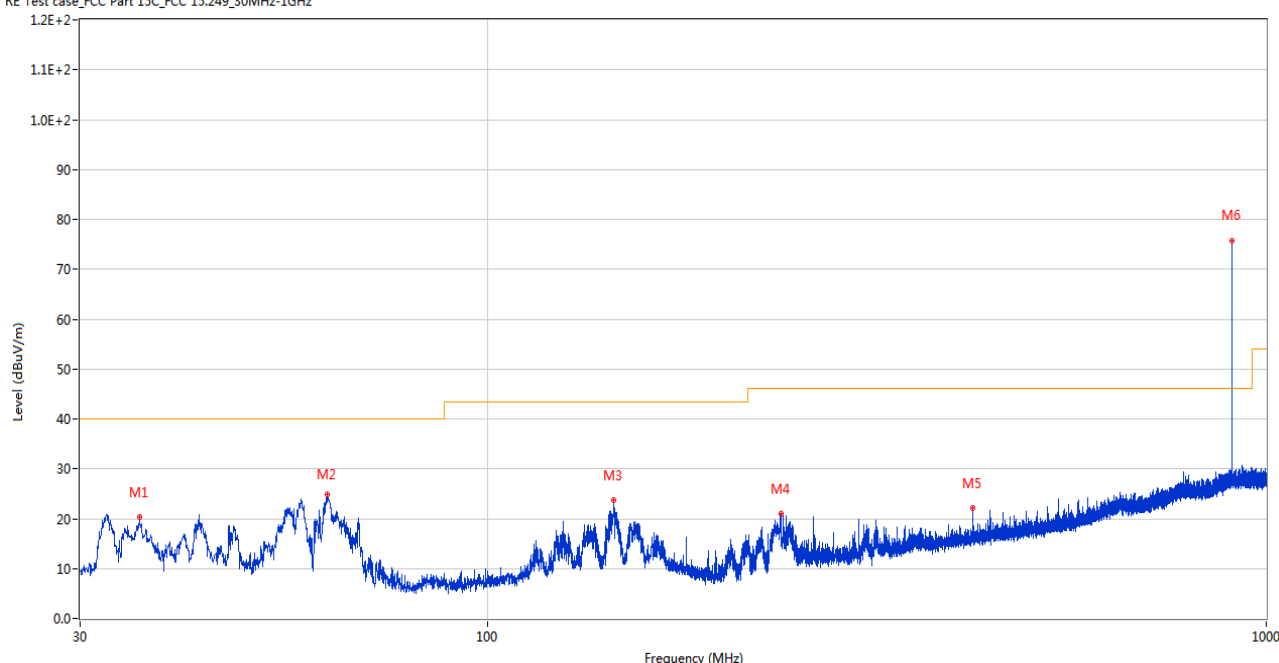
Note ³: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

Note ⁴: The marked spikes near 900 MHz with circle should be ignored because they are Fundamental signal.

Test Data and Plots

904 MHz, 30 MHz to 1 GHz, ANT H

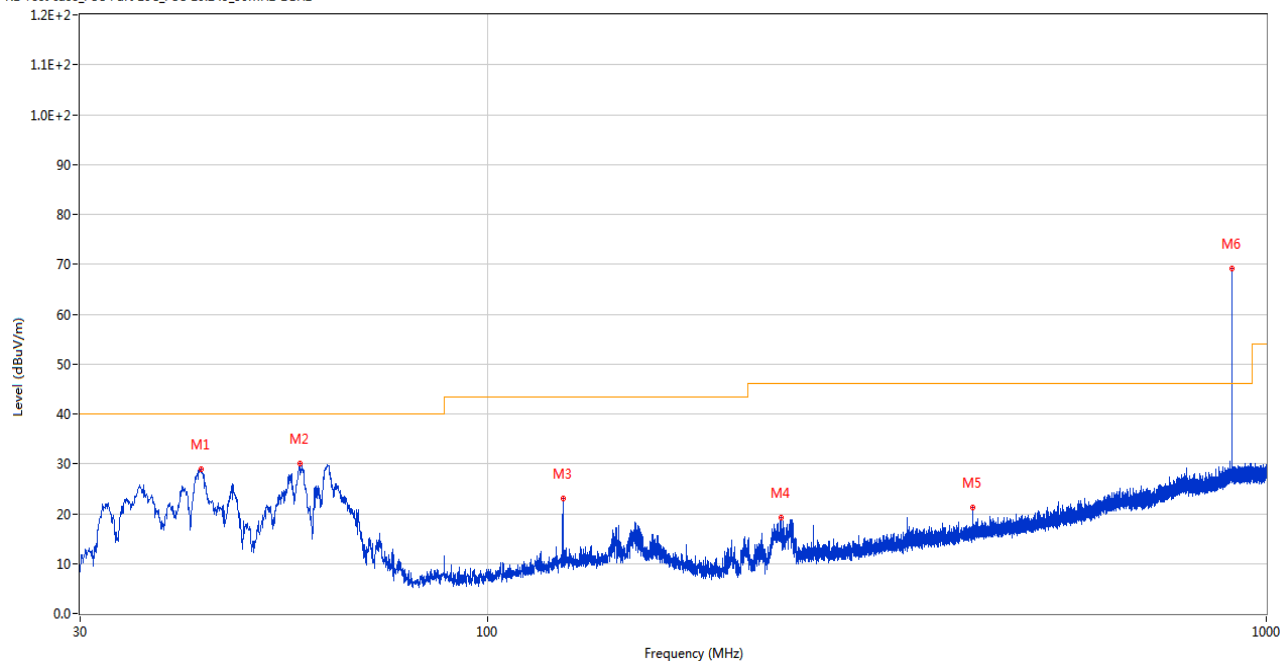
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	35.772	20.26	-26.43	40.0	19.74	Peak	181.00	150	Horizontal	Pass
2	62.349	24.90	-27.34	40.0	15.10	Peak	172.00	150	Horizontal	Pass
3	145.382	23.64	-24.73	43.5	19.86	Peak	67.00	150	Horizontal	Pass
4	237.968	20.96	-25.90	46.0	25.04	Peak	57.00	150	Horizontal	Pass
5	420.037	22.14	-20.41	46.0	23.86	Peak	114.00	200	Horizontal	Pass
6	904.018	75.80	-7.51	94.0	18.2	Peak	0.00	150	Horizontal	Pass

904 MHz, 30 MHz to 1 GHz, ANT V

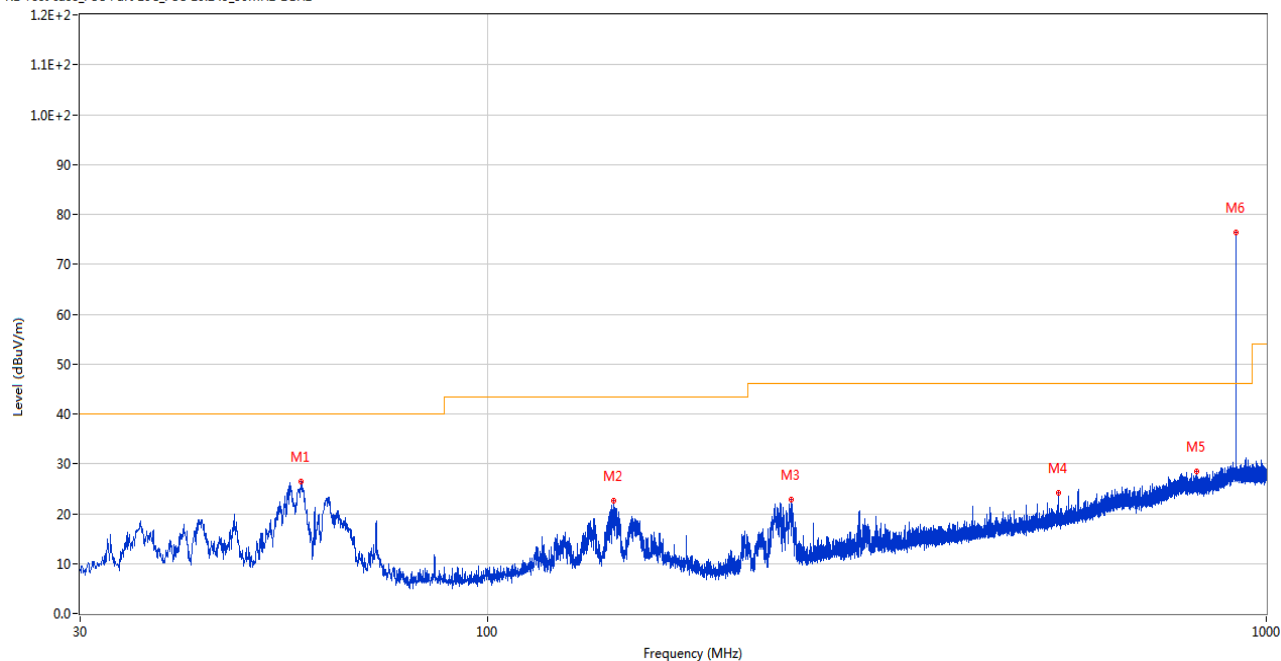
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	42.852	29.00	-26.06	40.0	11.00	Peak	243.00	100	Vertical	Pass
2	57.499	30.06	-26.71	40.0	9.94	Peak	276.00	150	Vertical	Pass
3	125.011	22.94	-26.17	43.5	20.56	Peak	161.00	150	Vertical	Pass
4	238.162	19.10	-25.87	46.0	26.90	Peak	200.00	200	Vertical	Pass
5	420.037	21.28	-20.41	46.0	24.72	Peak	121.00	150	Vertical	Pass
6	904.018	69.07	-7.51	94.0	24.93	Peak	188.00	100	Vertical	Pass

915 MHz, 30 MHz to 1 GHz, ANT H

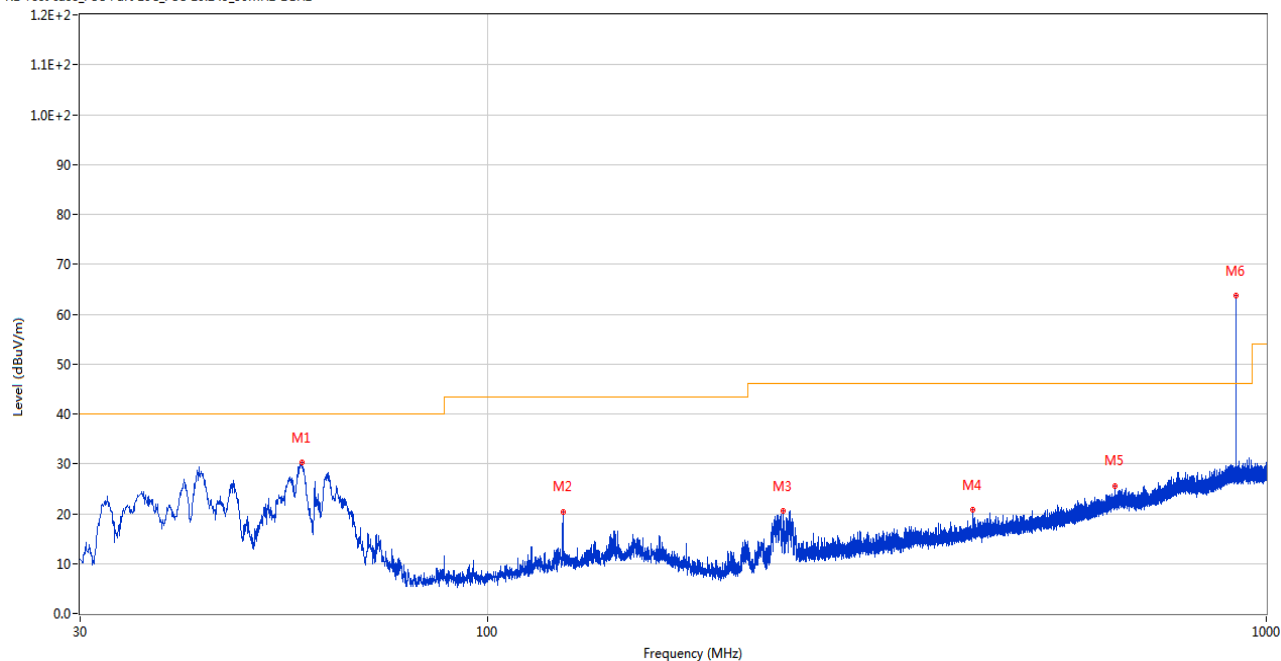
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	57.694	26.39	-26.73	40.0	13.61	Peak	161.00	100	Horizontal	Pass
2	145.382	22.49	-24.73	43.5	21.01	Peak	62.00	100	Horizontal	Pass
3	245.825	22.85	-25.90	46.0	23.15	Peak	34.00	100	Horizontal	Pass
4	540.657	24.12	-17.26	46.0	21.88	Peak	357.00	100	Horizontal	Pass
5	814.391	28.41	-10.22	46.0	17.59	Peak	213.00	100	Horizontal	Pass
6	915.028	76.30	-7.83	94.0	17.7	Peak	129.00	100	Horizontal	Pass

915 MHz, 30 MHz to 1 GHz, ANT V

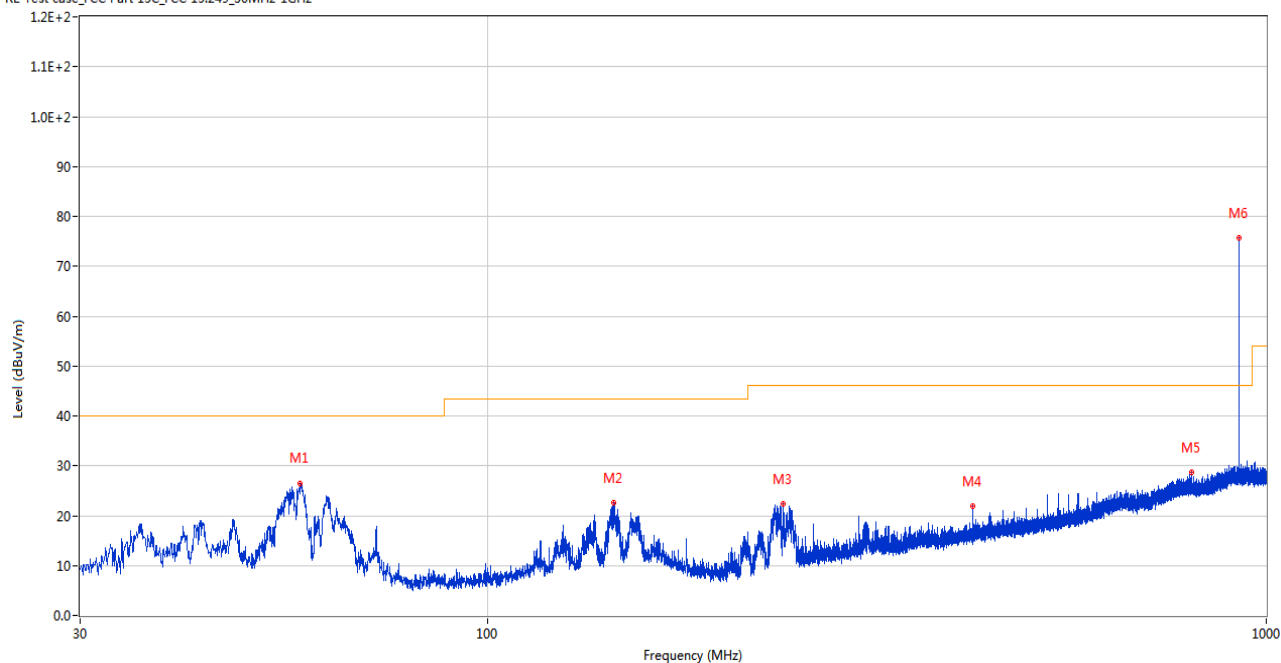
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	57.742	30.30	-26.73	40.0	9.70	Peak	265.00	100	Vertical	Pass
2	125.011	20.43	-26.17	43.5	23.07	Peak	284.00	150	Vertical	Pass
3	240.005	20.48	-25.83	46.0	25.52	Peak	186.00	150	Vertical	Pass
4	420.037	20.74	-20.41	46.0	25.26	Peak	67.00	200	Vertical	Pass
5	639.015	25.65	-13.42	46.0	20.35	Peak	170.00	100	Vertical	Pass
6	915.028	63.74	-7.83	94.0	30.26	Peak	268.00	100	Vertical	Pass

922 MHz, 30 MHz to 1 GHz, ANT H

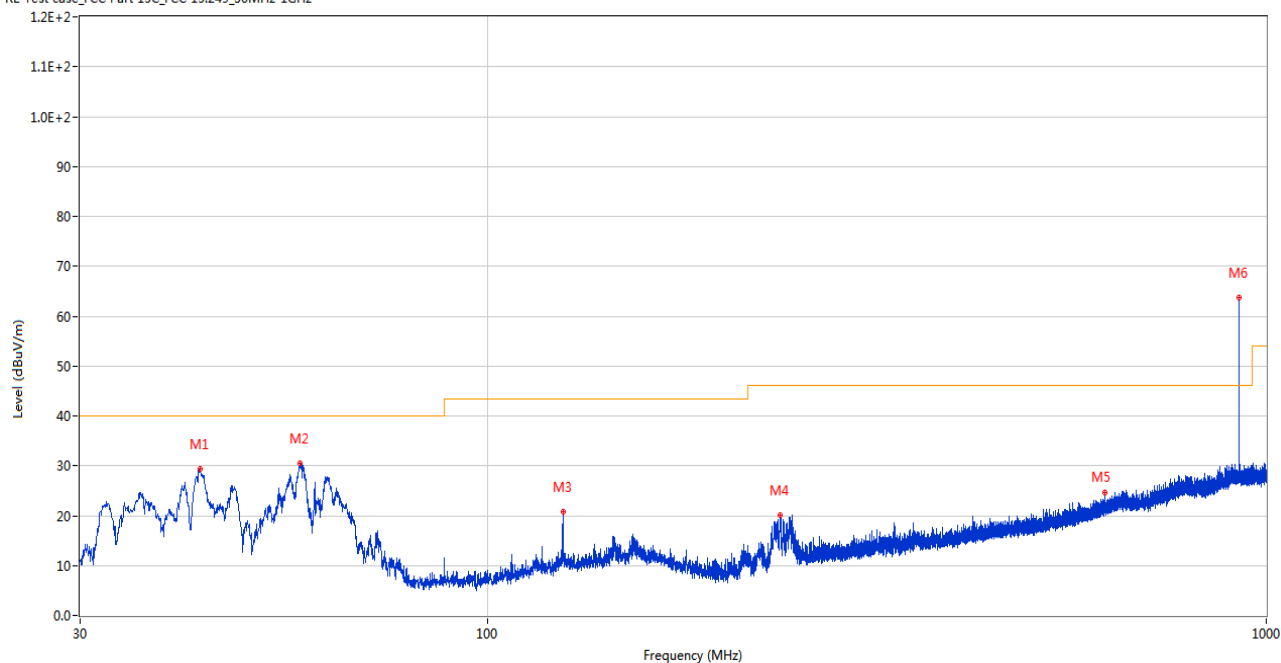
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	57.548	26.55	-26.72	40.0	13.45	Peak	175.00	100	Horizontal	Pass
2	145.430	22.60	-24.73	43.5	20.90	Peak	60.00	100	Horizontal	Pass
3	240.005	22.42	-25.83	46.0	23.58	Peak	25.00	150	Horizontal	Pass
4	420.037	21.81	-20.41	46.0	24.19	Peak	129.00	150	Horizontal	Pass
5	803.041	28.68	-10.13	46.0	17.32	Peak	278.00	200	Horizontal	Pass
6	922.06	75.75	-7.85	94.0	18.25	Peak	129.00	100	Horizontal	Pass

922 MHz, 30 MHz to 1 GHz, ANT V

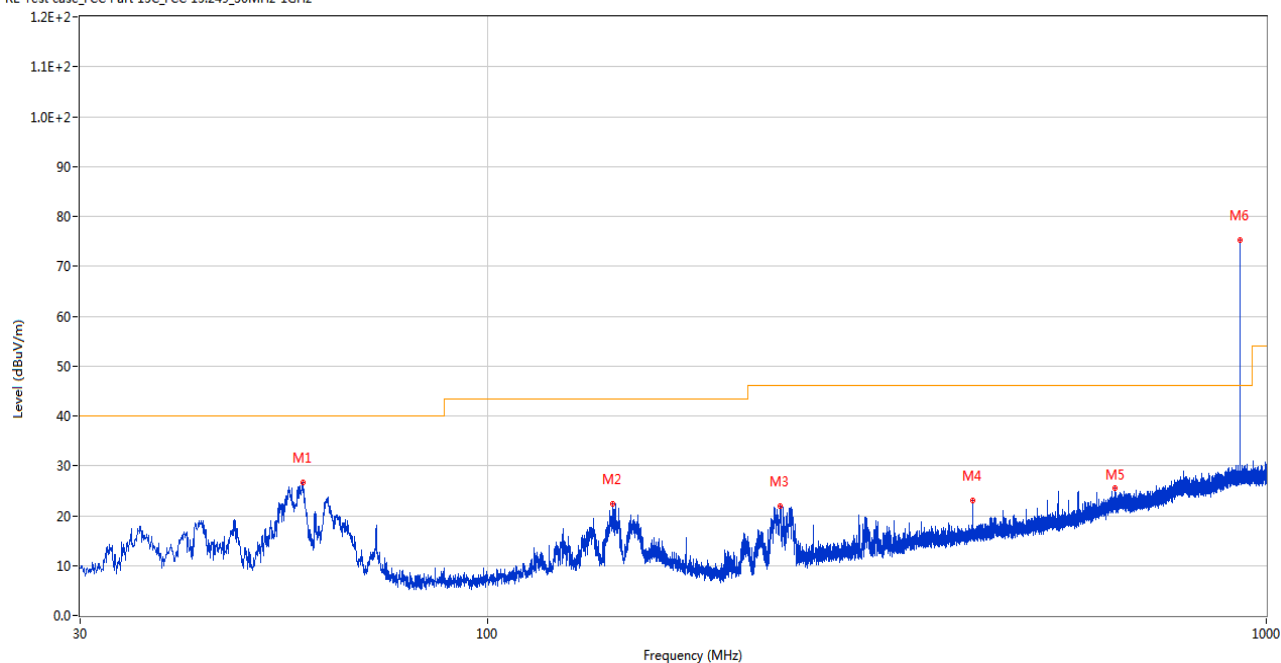
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	42.755	29.36	-26.06	40.0	10.64	Peak	344.00	150	Vertical	Pass
2	57.548	30.58	-26.72	40.0	9.42	Peak	288.00	150	Vertical	Pass
3	125.011	20.79	-26.17	43.5	22.71	Peak	68.00	200	Vertical	Pass
4	237.774	20.11	-25.92	46.0	25.89	Peak	159.00	100	Vertical	Pass
5	620.002	24.68	-14.03	46.0	21.32	Peak	262.00	100	Vertical	Pass
6	922.012	63.67	-7.85	94.0	30.33	Peak	45.00	100	Vertical	Pass

926 MHz, 30 MHz to 1 GHz, ANT H

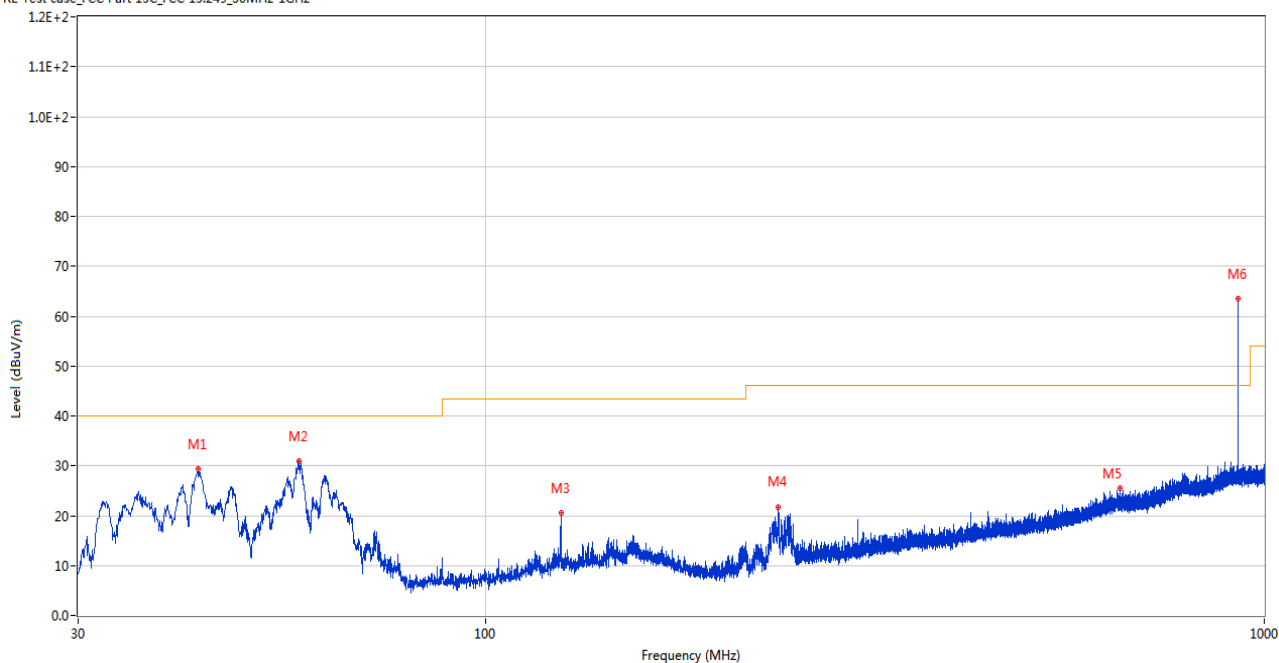
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	57.936	26.72	-26.72	40.0	13.28	Peak	169.00	100	Horizontal	Pass
2	144.945	22.45	-24.74	43.5	21.05	Peak	58.00	150	Horizontal	Pass
3	237.386	21.88	-25.98	46.0	24.12	Peak	23.00	150	Horizontal	Pass
4	420.037	22.96	-20.41	46.0	23.04	Peak	126.00	200	Horizontal	Pass
5	639.015	25.48	-13.42	46.0	20.52	Peak	146.00	100	Horizontal	Pass
6	926.038	75.19	-7.8	94.0	18.81	Peak	123.00	100	Horizontal	Pass

926 MHz, 30 MHz to 1 GHz, ANT V

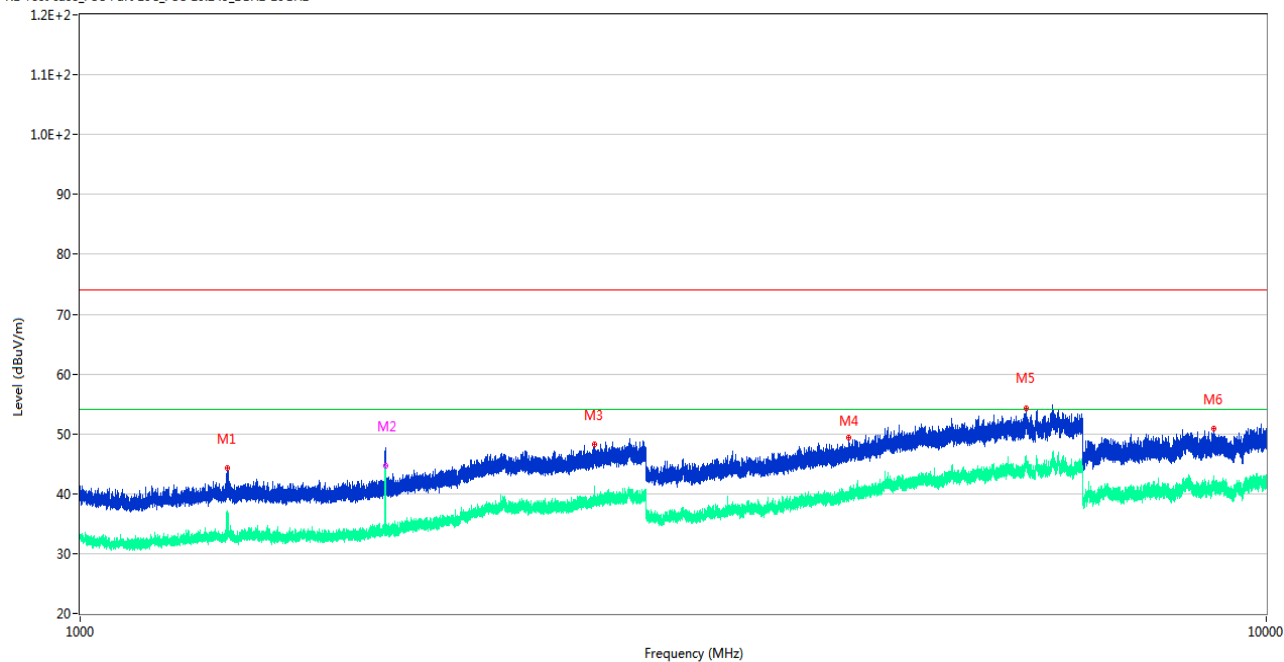
RE Test case_FCC Part 15C_FCC 15.249_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	42.755	29.36	-26.06	40.0	10.64	Peak	321.00	100	Vertical	Pass
2	57.596	30.86	-26.72	40.0	9.14	Peak	289.00	100	Vertical	Pass
3	125.011	20.58	-26.17	43.5	22.92	Peak	35.00	150	Vertical	Pass
4	237.677	21.79	-25.94	46.0	24.21	Peak	184.00	150	Vertical	Pass
5	652.643	25.47	-13.12	46.0	20.53	Peak	279.00	200	Vertical	Pass
6	926.038	63.51	-7.8	94.0	30.49	Peak	48.00	100	Vertical	Pass

904 MHz, 1 GHz to 10 GHz, ANT H

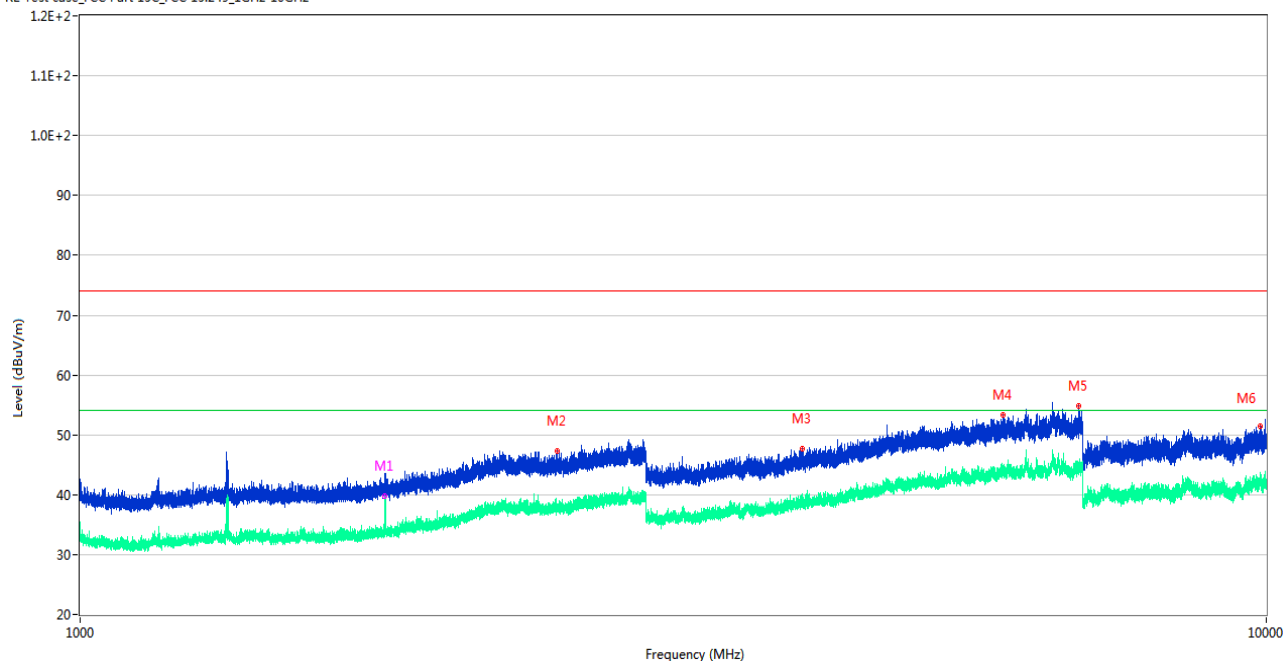
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1331.300	44.21	-13.37	74.0	29.79	Peak	60.00	400	Horizontal	Pass
1**	1331.300	33.71	-13.37	54.0	20.29	AV	60.00	400	Horizontal	Pass
2	1808.200	47.29	-13.16	74.0	26.71	Peak	54.00	100	Horizontal	Pass
2**	1808.200	44.69	-13.16	54.0	9.31	AV	54.00	100	Horizontal	Pass
3	2712.700	48.23	-6.72	74.0	25.77	Peak	54.00	200	Horizontal	Pass
3**	2712.700	39.51	-6.72	54.0	14.49	AV	54.00	200	Horizontal	Pass
4	4448.200	49.47	-4.04	74.0	24.53	Peak	352.00	100	Horizontal	Pass
4**	4448.200	40.13	-4.04	54.0	13.87	AV	352.00	100	Horizontal	Pass
5	6272.200	54.28	0.56	74.0	19.72	Peak	307.00	100	Horizontal	Pass
5**	6272.200	46.07	0.56	54.0	7.93	AV	307.00	100	Horizontal	Pass
6	9028.000	50.81	-0.72	74.0	23.19	Peak	117.00	200	Horizontal	Pass
6**	9028.000	41.45	-0.72	54.0	12.55	AV	117.00	200	Horizontal	Pass

904 MHz, 1 GHz to 10 GHz, ANT V

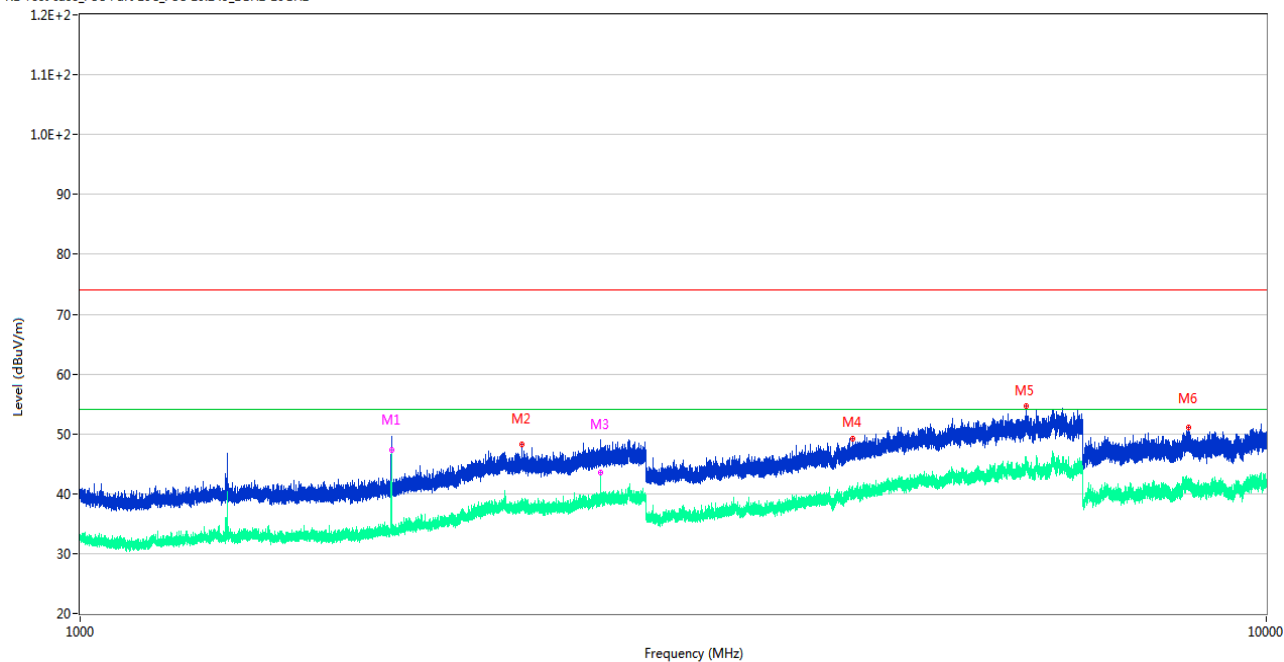
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1808.100	43.22	-13.16	74.0	30.78	Peak	83.00	100	Vertical	Pass
1**	1808.100	39.82	-13.16	54.0	14.18	AV	83.00	100	Vertical	Pass
2	2525.800	47.31	-7.70	74.0	26.69	Peak	313.00	100	Vertical	Pass
2**	2525.800	37.64	-7.70	54.0	16.36	AV	313.00	100	Vertical	Pass
3	4060.800	47.75	-5.02	74.0	26.25	Peak	203.00	100	Vertical	Pass
3**	4060.800	38.77	-5.02	54.0	15.23	AV	203.00	100	Vertical	Pass
4	5999.800	53.42	-0.26	74.0	20.58	Peak	322.00	300	Vertical	Pass
4**	5999.800	43.47	-0.26	54.0	10.53	AV	322.00	300	Vertical	Pass
5	6951.200	54.76	0.85	74.0	19.24	Peak	30.00	100	Vertical	Pass
5**	6951.200	43.73	0.85	54.0	10.27	AV	30.00	100	Vertical	Pass
6	9881.950	51.44	-0.95	74.0	22.56	Peak	210.00	400	Vertical	Pass
6**	9881.950	41.75	-0.95	54.0	12.25	AV	210.00	400	Vertical	Pass

915 MHz, 1 GHz to 10 GHz, ANT H

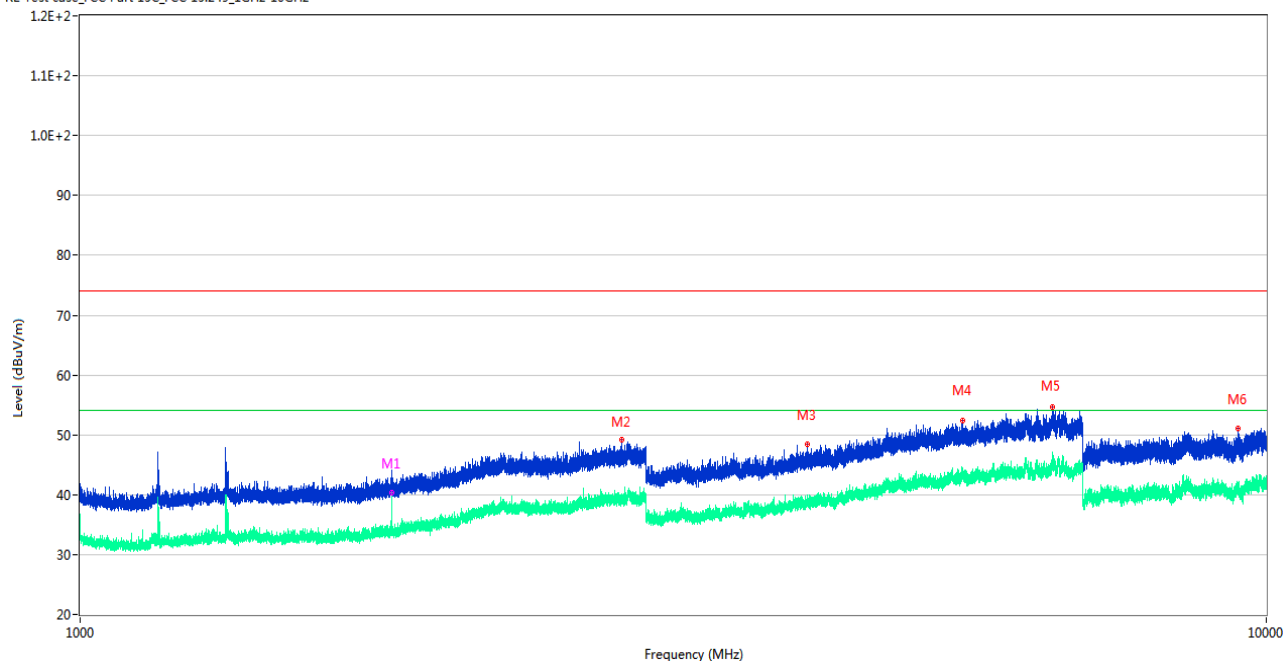
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1830.100	49.15	-12.55	74.0	24.85	Peak	323.00	400	Horizontal	Pass
1**	1830.100	47.33	-12.55	54.0	6.67	AV	323.00	400	Horizontal	Pass
2	2358.500	48.30	-7.91	74.0	25.70	Peak	107.00	100	Horizontal	Pass
2**	2358.500	38.02	-7.91	54.0	15.98	AV	107.00	100	Horizontal	Pass
3	2745.000	48.61	-6.84	74.0	25.39	Peak	157.00	200	Horizontal	Pass
3**	2745.000	43.53	-6.84	54.0	10.47	AV	157.00	200	Horizontal	Pass
4	4481.200	49.28	-4.01	74.0	24.72	Peak	209.00	200	Horizontal	Pass
4**	4481.200	39.99	-4.01	54.0	14.01	AV	209.00	200	Horizontal	Pass
5	6269.600	54.72	0.41	74.0	19.28	Peak	36.00	100	Horizontal	Pass
5**	6269.600	45.92	0.41	54.0	8.08	AV	36.00	100	Horizontal	Pass
6	8595.550	51.00	-2.20	74.0	23.00	Peak	0.00	200	Horizontal	Pass
6**	8595.550	41.30	-2.20	54.0	12.70	AV	0.00	200	Horizontal	Pass

915 MHz, 1 GHz to 10 GHz, ANT V

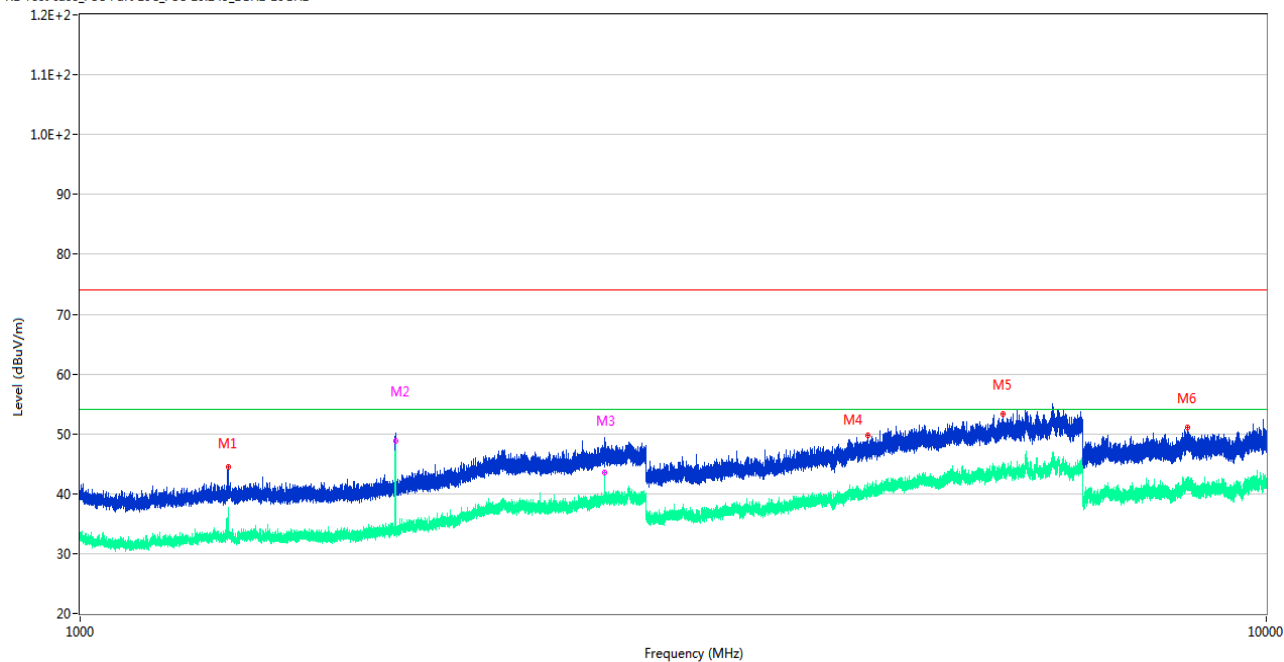
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1830.000	43.87	-12.56	74.0	30.13	Peak	329.00	300	Vertical	Pass
1**	1830.000	40.28	-12.56	54.0	13.72	AV	329.00	300	Vertical	Pass
2	2860.400	49.14	-5.93	74.0	24.86	Peak	51.00	100	Vertical	Pass
2**	2860.400	39.45	-5.93	54.0	14.55	AV	51.00	100	Vertical	Pass
3	4106.800	48.37	-5.20	74.0	25.63	Peak	96.00	100	Vertical	Pass
3**	4106.800	39.09	-5.20	54.0	14.91	AV	96.00	100	Vertical	Pass
4	5547.800	52.47	-1.50	74.0	21.53	Peak	162.00	300	Vertical	Pass
4**	5547.800	44.54	-1.50	54.0	9.46	AV	162.00	300	Vertical	Pass
5	6606.000	54.64	1.35	74.0	19.36	Peak	257.00	100	Vertical	Pass
5**	6606.000	46.33	1.35	54.0	7.67	AV	257.00	100	Vertical	Pass
6	9471.250	51.01	-0.65	74.0	22.99	Peak	205.00	400	Vertical	Pass
6**	9471.250	41.71	-0.65	54.0	12.29	AV	205.00	400	Vertical	Pass

922 MHz, 1 GHz to 10 GHz, ANT H

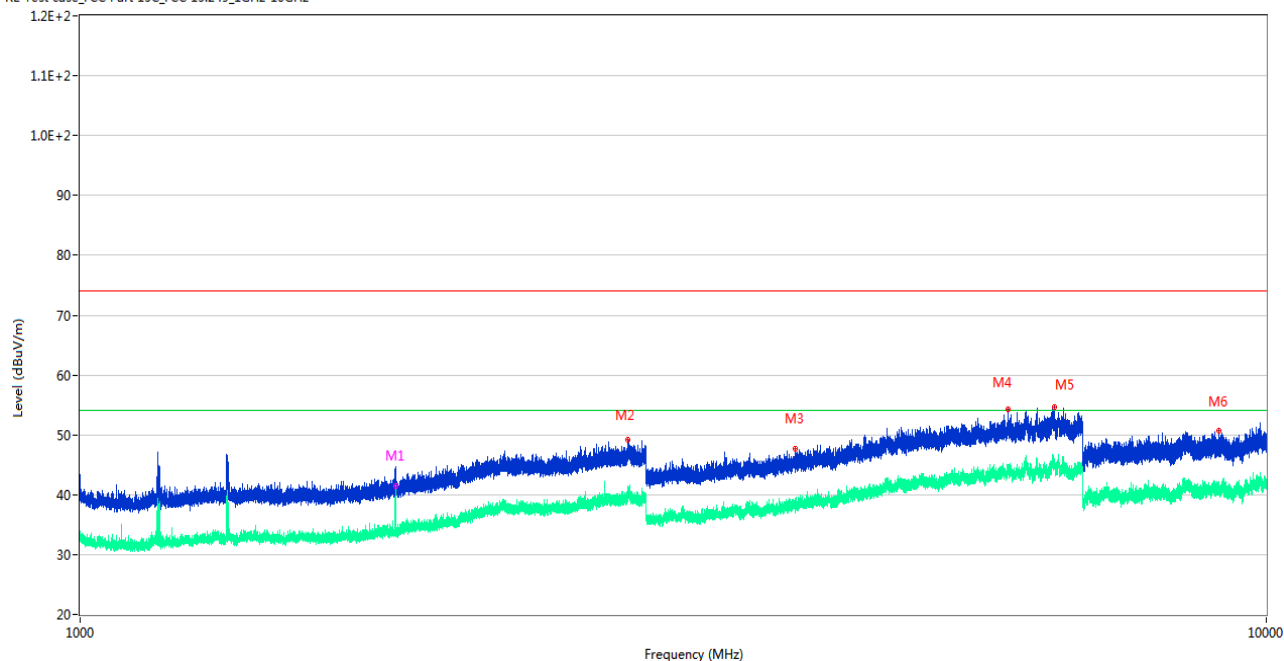
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1333.400	44.56	-13.28	74.0	29.44	Peak	44.00	200	Horizontal	Pass
1**	1333.400	32.99	-13.28	54.0	21.01	AV	44.00	200	Horizontal	Pass
2	1844.100	50.06	-12.79	74.0	23.94	Peak	331.00	100	Horizontal	Pass
2**	1844.100	48.79	-12.79	54.0	5.21	AV	331.00	100	Horizontal	Pass
3	2765.900	48.89	-6.11	74.0	25.11	Peak	63.00	150	Horizontal	Pass
3**	2765.900	43.60	-6.11	54.0	10.40	AV	63.00	150	Horizontal	Pass
4	4617.800	49.66	-3.93	74.0	24.34	Peak	20.00	400	Horizontal	Pass
4**	4617.800	40.19	-3.93	54.0	13.81	AV	20.00	400	Horizontal	Pass
5	5995.400	53.26	-0.32	74.0	20.74	Peak	360.00	100	Horizontal	Pass
5**	5995.400	43.79	-0.32	54.0	10.21	AV	360.00	100	Horizontal	Pass
6	8587.900	51.04	-2.10	74.0	22.96	Peak	153.00	200	Horizontal	Pass
6**	8587.900	41.59	-2.10	54.0	12.41	AV	153.00	200	Horizontal	Pass

922 MHz, 1 GHz to 10 GHz, ANT V

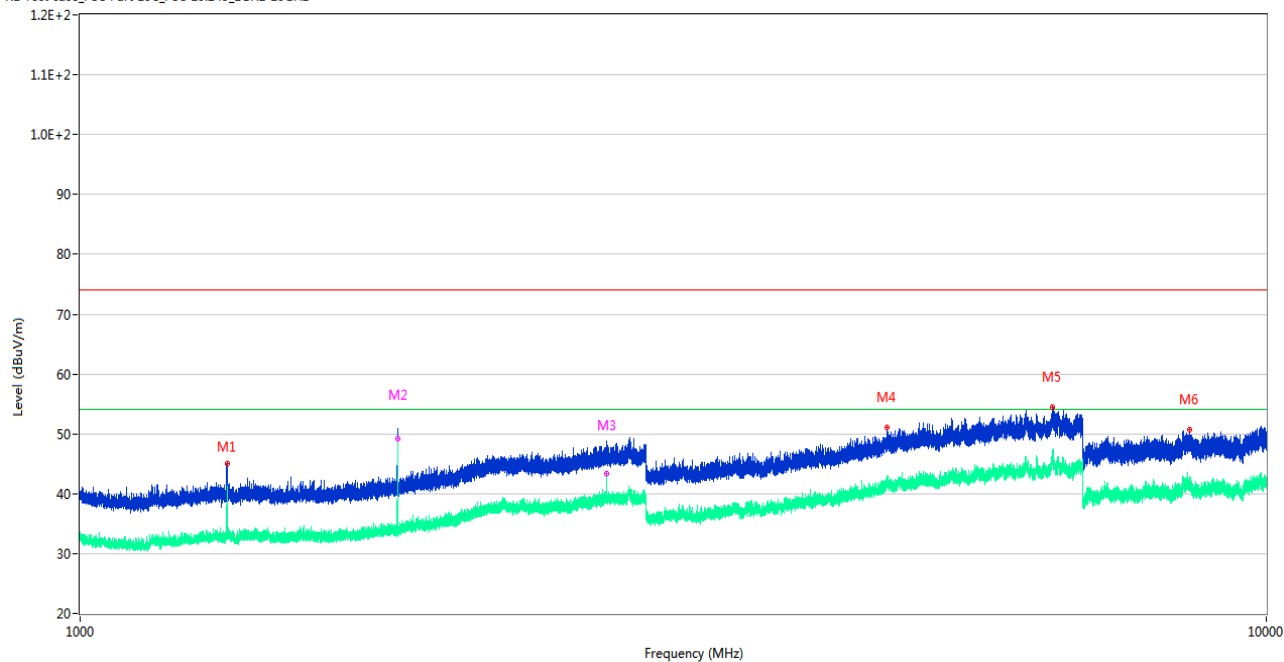
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1844.200	43.64	-12.80	74.0	30.36	Peak	61.00	200	Vertical	Pass
1**	1844.200	41.53	-12.80	54.0	12.47	AV	61.00	200	Vertical	Pass
2	2893.500	49.19	-5.13	74.0	24.81	Peak	245.00	100	Vertical	Pass
2**	2893.500	39.21	-5.13	54.0	14.79	AV	245.00	100	Vertical	Pass
3	4005.600	47.76	-5.25	74.0	26.24	Peak	54.00	150	Vertical	Pass
3**	4005.600	39.03	-5.25	54.0	14.97	AV	54.00	150	Vertical	Pass
4	6054.600	54.24	-1.23	74.0	19.76	Peak	326.00	400	Vertical	Pass
4**	6054.600	44.42	-1.23	54.0	9.58	AV	326.00	400	Vertical	Pass
5	6634.200	54.62	0.45	74.0	19.38	Peak	257.00	100	Vertical	Pass
5**	6634.200	45.31	0.45	54.0	8.69	AV	257.00	100	Vertical	Pass
6	9125.200	50.66	-1.33	74.0	23.34	Peak	66.00	200	Vertical	Pass
6**	9125.200	40.85	-1.33	54.0	13.15	AV	66.00	200	Vertical	Pass

926 MHz, 1 GHz to 10 GHz, ANT H

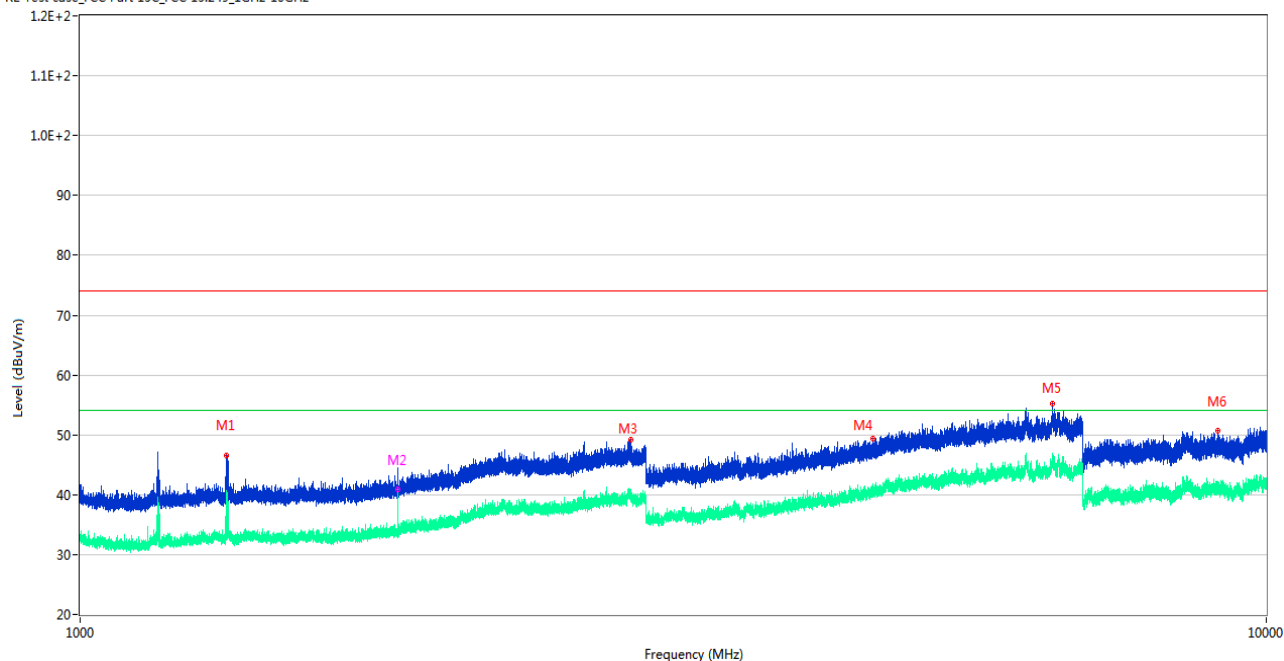
RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1331.900	45.01	-13.39	74.0	28.99	Peak	90.00	200	Horizontal	Pass
1**	1331.900	35.36	-13.39	54.0	18.64	AV	90.00	200	Horizontal	Pass
2	1852.100	50.21	-12.80	74.0	23.79	Peak	340.00	100	Horizontal	Pass
2**	1852.100	49.15	-12.80	54.0	4.85	AV	340.00	100	Horizontal	Pass
3	2778.000	48.13	-6.34	74.0	25.87	Peak	239.00	150	Horizontal	Pass
3**	2778.000	43.40	-6.34	54.0	10.60	AV	239.00	200	Horizontal	Pass
4	4787.600	51.09	-2.64	74.0	22.91	Peak	78.00	200	Horizontal	Pass
4**	4787.600	41.16	-2.64	54.0	12.84	AV	78.00	100	Horizontal	Pass
5	6601.800	54.51	0.63	74.0	19.49	Peak	246.00	100	Horizontal	Pass
5**	6601.800	45.54	0.63	54.0	8.46	AV	246.00	150	Horizontal	Pass
6	8619.550	50.74	-2.05	74.0	23.26	Peak	323.00	400	Horizontal	Pass
6**	8619.550	41.34	-2.05	54.0	12.66	AV	323.00	400	Horizontal	Pass

926 MHz, 1 GHz to 10 GHz, ANT V

RE Test case_FCC Part 15C_FCC 15.249_1GHz-10GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1328.900	46.58	-13.44	74.0	27.42	Peak	25.00	150	Vertical	Pass
1**	1328.900	38.82	-13.44	54.0	15.18	AV	25.00	150	Vertical	Pass
2	1852.300	43.71	-12.80	74.0	30.29	Peak	61.00	150	Vertical	Pass
2**	1852.300	40.81	-12.80	54.0	13.19	AV	61.00	150	Vertical	Pass
3	2910.700	49.26	-4.24	74.0	24.74	Peak	0.00	150	Vertical	Pass
3**	2910.700	39.53	-4.24	54.0	14.47	AV	0.00	200	Vertical	Pass
4	4656.600	49.37	-3.47	74.0	24.63	Peak	342.00	200	Vertical	Pass
4**	4656.600	40.15	-3.47	54.0	13.85	AV	342.00	100	Vertical	Pass
5	6607.200	55.14	1.50	74.0	18.86	Peak	320.00	100	Vertical	Pass
5**	6607.200	46.96	1.50	54.0	7.04	AV	320.00	150	Vertical	Pass
6	9101.350	50.64	-1.18	74.0	23.36	Peak	1.00	150	Vertical	Pass
6**	9101.350	41.15	-1.18	54.0	12.85	AV	1.00	150	Vertical	Pass

A.4 Band Edge (Restricted-band 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.

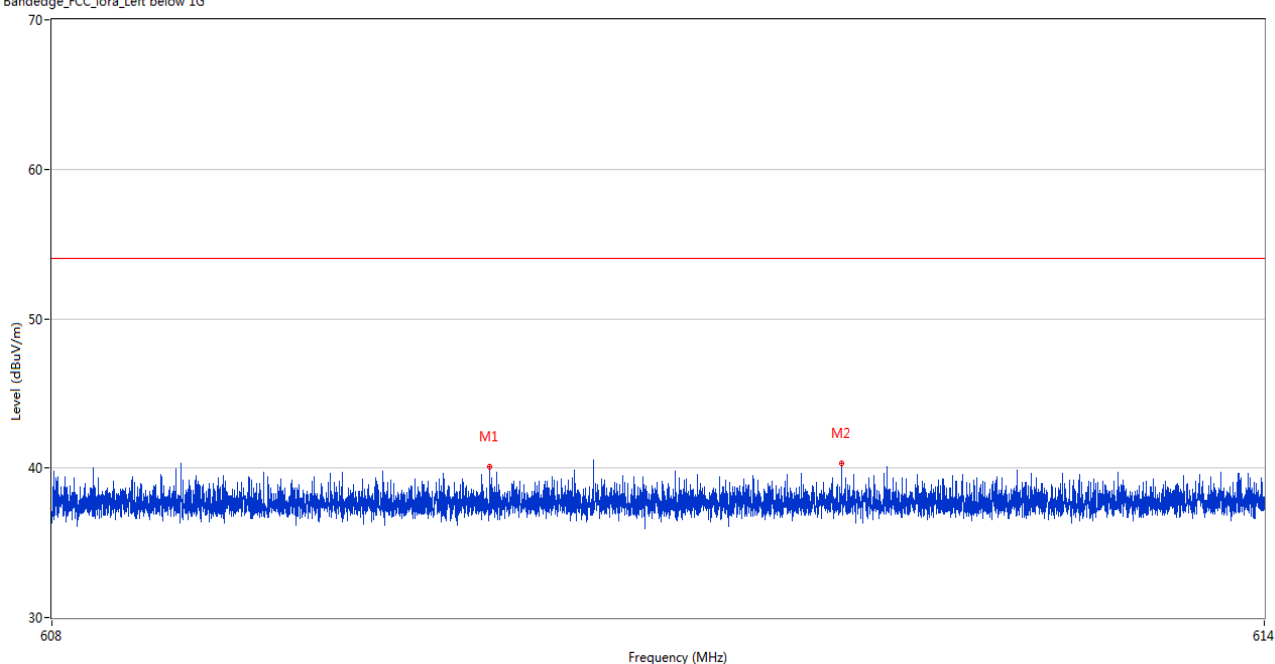
Note ²: The test data all are tested in the vertical and horizontal antenna which the trace is max hold. So these plots have shown the worst case.

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.

Test Data and Plots

904 MHz

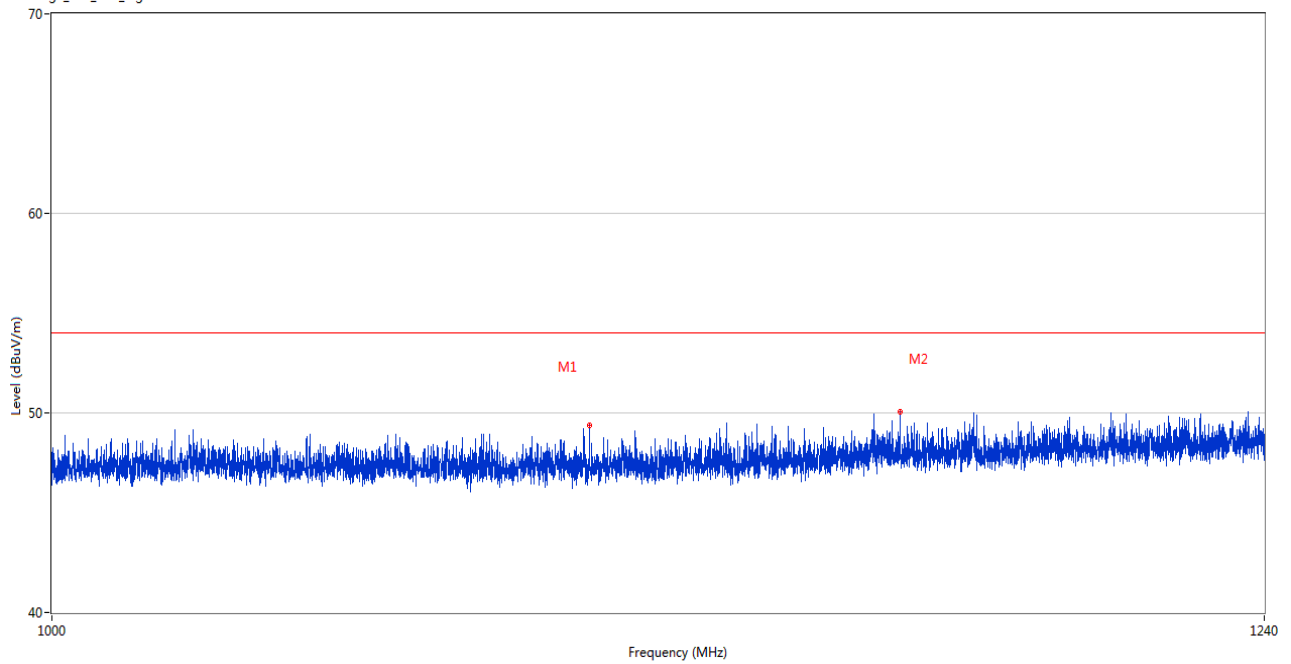
Bandedge_FCC_Jora_Left below 1G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	610.161	40.07	3.09	54.0	13.93	Peak	69.00	150	Horizontal	Pass
2	611.901	40.34	3.09	54.0	13.66	Peak	289.00	150	Horizontal	Pass

926 MHz

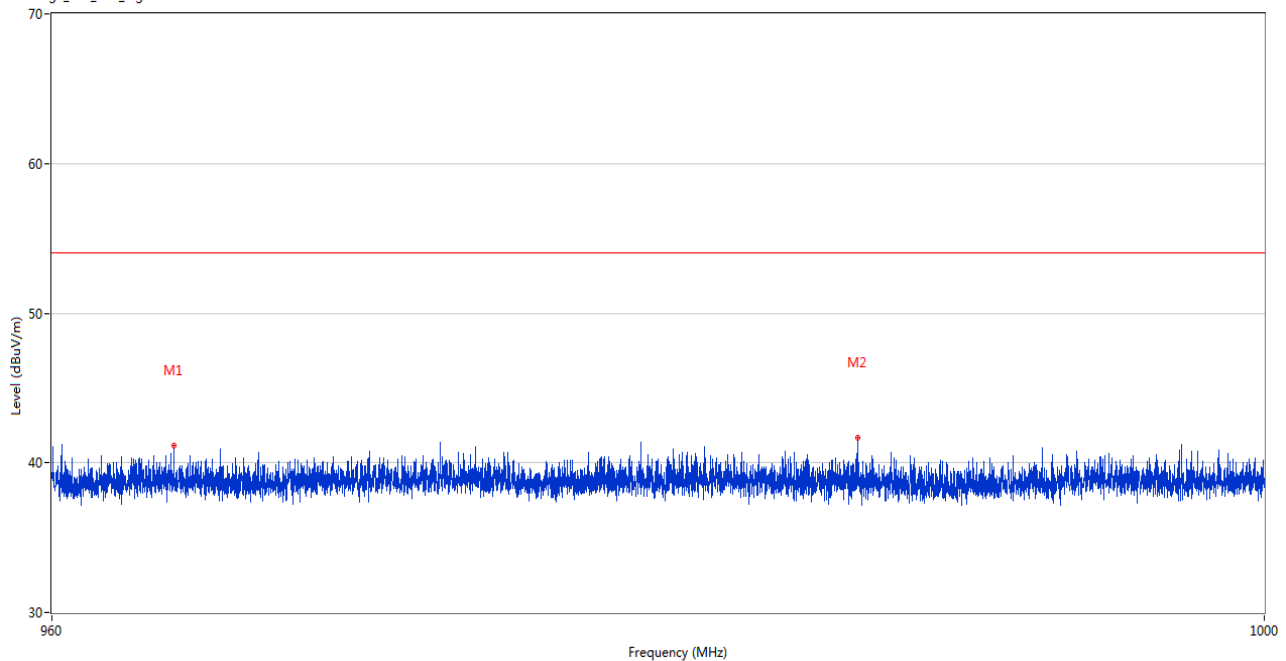
Bandedge_FCC_Jora_Right above 1G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1100.120	49.38	-6.68	54.0	4.62	Peak	118.00	150	Horizontal	Pass
2	1162.480	50.07	-5.93	54.0	3.93	Peak	54.00	150	Horizontal	Pass

926 MHz

Bandedge_FCC_Jora_Right below 1G



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	963.953	41.12	-3.48	54.0	12.88	Peak	55.00	150	Horizontal	Pass
2	986.420	41.69	-3.63	54.0	12.31	Peak	262.00	150	Horizontal	Pass

A.5 Field Strength of Fundamental Emissions

The Field Strength of Fundamental Emissions (Operating Frequency) is:
 $50000 \text{ uV/m} = 20 \cdot \log(50000) \text{ dBuV/m} = 94 \text{ dBuV/m}$

Test Data

Operating Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna	Verdict
904	75.80	-7.51	94	18.20	QP	Horizontal	Pass
	69.07	-7.51	94	24.93	QP	Vertical	Pass
915	76.30	-7.83	94	17.70	QP	Horizontal	Pass
	63.74	-7.83	94	30.26	QP	Vertical	Pass
922	75.75	-7.85	94	18.25	QP	Horizontal	Pass
	63.67	-7.85	94	30.33	QP	Vertical	Pass
926	75.19	-7.80	94	18.81	QP	Horizontal	Pass
	63.51	7.80	94	30.49	QP	Vertical	Pass

ANNEX B TEST SETUP PHOTOS

Please refer the document “BL-SZ23B0232-AR.PDF”.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document “BL-SZ23B0232-AW.PDF”.

ANNEX D EUT INTERNAL PHOTOS

Please refer the document “BL-SZ23B0232-AI.PDF”.

Statement

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--END OF REPORT--