Test Report of FCC CFR 47 Part 15 Subpart C

On Behalf of

gridComm Pte Ltd

71 Ayer Rajah Crescent Unit 03-23 Singapore 139951

Product Name:	**Hybrid Controller**
Model/Type No.:	**GC9838-VE**
FCC ID:	**2ALW7-GC9838VE-1**
Prepared By:	**Shenzhen Hongcai Testing Technology Co., Ltd.** 1st-3rd Floor, Building C, Shuanghuan Xin Yi Dai Hi-Tech Industrial Park, No.8 Baoqing Road, Baolong Industrial Zone, Longgang District, Shenzhen, Guangdong, China Tel: +86-755-86337020 Fax:+86-755-86337028
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1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	gridComm Pte Ltd
Address of Applicant:	71 Ayer Rajah Crescent Unit 03-23 Singapore 139951
Manufacturer:	Shenzhen Ju Yang Electronics Technology Co. Ltd.
Address of Manufacturer:	Room 384, FuYong Information Building, BaoAn District, ShenZhen City

General Description of E.U.T

Items	Description
EUT Description:	HYBRID CONTROLLER
Model No.:	GC9838-VE
Supplementary Model:	N/A
Trade Mark:	gridComm
Frequency Band:	914.5MHz~927.5MHz
Modulation Type:	FSK, FHSS
Channel Spacing:	250KHz
Number of Channels:	53 Channels
Antenna Type:	Permanently Fixed Antenna
Antenna Gain:	2.5dBi
Power Rating:	AC 100~240V, 50mA 60Hz

Remark: The test data gathered are from the production sample provided by the manufacturer.*

1.2 Test standards

FCC Rules Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
KDB558074 D01 V04: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.
RSS-GEN Issue 4: General Requirements for Compliance of Radio Apparatus.
RSS 247 Issue 2: Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices.

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1.3 Test Facility

All measurement required was performed at laboratory of Shenzhen CTL Testing Technology Co., Ltd. Floor 1-A, Baisha Technology Park, No. 3011, Shahexi Road, Nanshan, Shenzhen 518055 China. There is one 3m semi-anechoic chamber and two line conducted labs for final test. The Test Sites meet the requirements in documents ANSI C63.10-2013 and CISPR 22/EN 55022 requirements.

FCC – Registration No.: 970318
Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 970318, December, 2013.

IC Registration No.: 9618B
The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

1.4 Test Methodology

The tests documented in this report were performed in accordance with ANSI C63.10:2013 and FCC Part 15 C, Paragraph 15.247.

1.5 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, and to measure its highest
possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	Low Channel	914.50 MHz
TM2	Middle Channel	921.00 MHz
TM3	High Channel	927.50 MHz

1.6 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.
The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

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1.7 General Test Procedures

Conducted Emissions: The EUT is placed on the table, which is 0.8 m above ground plane According to the requirements in ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

Radiated Emissions: The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI C63.10-2013.

Accessories Equipment List and Details			
Description	**Manufacturer**	**Model No.**	**Serial Number**
/	/	/	/
Accessories Cable List and Details			
Cable Description	**Length (m)**	**Shielded/Unshielded**	**With Core/Without Core**
/	/	/	/

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.
Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Transmitter power conducted	+/- 0.57 dB
Transmitter power Radiated	+/- 2.20 dB
Conducted spurious emission 9KHz-40 GHz	+/- 2.20 dB
Occupied Bandwidth	+/- 0.01 dB
Power Line Conducted Emission	+/- 3.20 dB
Radiated Emission	+/- 4.32 dB

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

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1.9 Test Equipment List and Details

Test equipments list of Shenzhen CTL Testing Technology Co., Ltd.

No.	Equipment	Manufacturer	Model No.	S/N	Last Calculator	Due Calculator
1	EMI Test Receiver	R&S	ESCI	100687	2016-7-25	2017-7-24
2	EMI Test Receiver	R&S	ESPI	100097	2016-10-1	2017-10-31
3	Teo Line Single Phase Module	SCHWARZBECK	NSLK8128	8128247	2016-10-1	2017-10-31
4	Amplifier	HP	8447D	1937A02492	2016-7-25	2017-7-24
5	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2016-7-25	2017-7-24
6	Power Sensor	Anritsu	ML2438A	1241002	2016-7-25	2017-7-24
7	Power Sensor	Anritsu	MA2411B	1207366	2016-7-25	2017-7-24
8	10dB attenuator	ELECTRO-METRICS	EM-7600	836	2016-7-25	2017-7-24
9	Spectrum Analyzer	R&S	FSP	100397	2016-10-1	2017-10-31
10	Broadband preamplifier	SCH WARZBECK	BBV9718	9718-182	2016-7-25	2017-7-24
11	Horn Antenna	SCHWARZBECK	BBHA 9120D	0437	2016-7-25	2017-7-24
12	Horn Antenna	SCHWARZBECK	BBHA9170	0483	2016-7-25	2017-7-24

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2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§ 2.1093	RF Exposure	Compliant
§15.203;§15.247(b)(4)(i)	Antenna Requirement	Compliant
§15.207(a)	Conducted Emission	Compliant
§15.205	Restricted Band of Operation	Compliant
§15.209(a)	Radiated Spurious Emissions	Compliant
§15.247(a)(1)(i)	Quantity of Hopping Channel	Compliant
§15.247(a)(1)	Channel Separation	Compliant
§15.247(a)	20dB Bandwidth	Compliant
§15.247(a)(1)(i)	Time of Occupancy (Dwell time)	Compliant
§15.247(b)(3)	RF Power Output	Compliant
§15.247(d)	Band Edge (Out of Band Emissions)	Compliant
§15.247(a)(1)	Frequency Hopping Sequence	Compliant
§15.247(g), (h)	Frequency Hopping System	Compliant

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3. RF Exposure

3.1 Standard Applicable

According to §1.1307 and §2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the MPE Report.

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4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 15.203, 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.

4.2 Evaluation Information

This product has a Linear Terminal Antenna. It is through thread and glue to permanently fixed and can not be easily replaced. So it fulfill the requirement of this section.

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5. Frequency Hopping System Requirements

5.1 Standard Applicable

According to FCC Part 15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Part 15.247(a)(1) (i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Part 15.247(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

Part 15.247(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

5.2 Frequency Hopping System

This transmitter device is frequency hopping device which operates in 902-928 MHz band. It uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 50 bands (0.25 MHz each; centered from 914.5-927.5MHz) within the range 902-928 MHz.

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5.3 EUT Pseudorandom Frequency Hopping Sequence

914.5	916	917.5	919	920.5	922	923.5	925	926.5
914.75	916.25	917.75	919.25	920.75	922.25	923.75	925.25	926.75
915	916.5	918	919.5	921	922.5	924	925.5	927
915.25	916.75	918.25	919.75	921.25	922.75	924.25	925.75	927.25
915.5	917	918.5	920	921.5	923	924.5	926	927.5
915.75	917.25	918.75	920.25	921.75	923.25	924.75	926.25	

The system receiver has input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

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6. Quantity of Hopping Channels and Channel Separation

6.1 Standard Applicable

According to FCC 15.247(a)(1),Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

According to FCC 15.247(a)(1)(i), For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies. If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies.The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

6.2 Test Procedure

According to ANSI C63.10-2013 section 7.8.3, the number of hopping frequencies test method as follows.

1) Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
2) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3) VBW ≥ RBW.
4) Sweep: Auto.
5) Detector function: Peak.
6) Trace: Max hold.
7) Allow the trace to stabilize.

According to ANSI C63.10-2013 section 7.8.2, the EUT shall have its hopping function enabled, the Carrier frequency separation test method as follows:

1) Span: Wide enough to capture the peaks of two adjacent channels.
2) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3) Video (or average) bandwidth (VBW) ≥ RBW.
4) Sweep: Auto.
5) Detector function: Peak.
6) Trace: Max hold.
7) Allow the trace to stabilize.

Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

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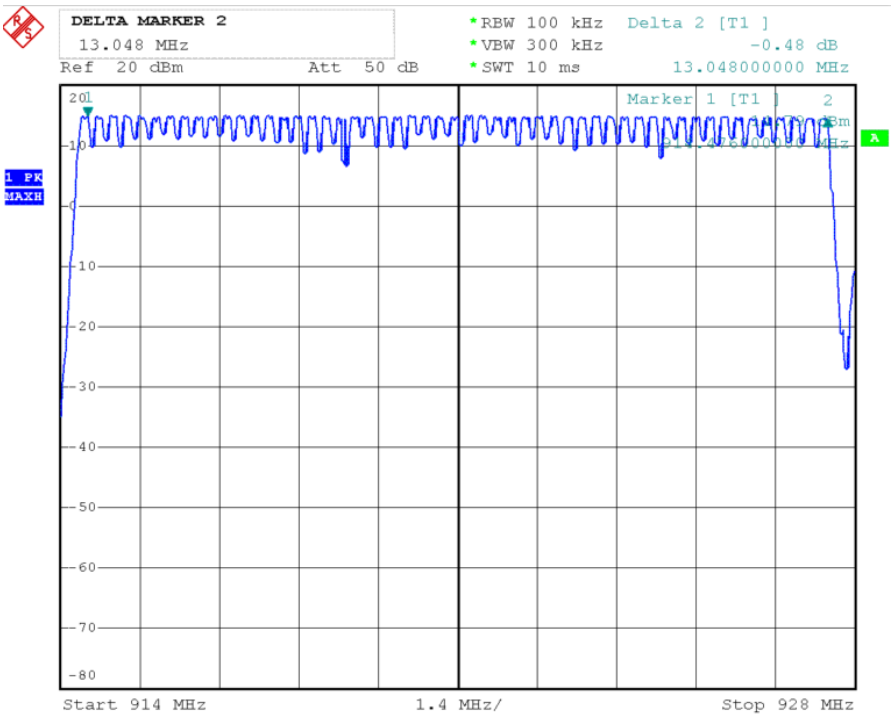
6.3 Environmental Conditions

Temperature (℃)	22~23
Humidity (%RH)	40~42
Barometric Pressure (mbar)	950~1000
Operating Mode	Normal Operating
Testing Mode	Conducted

6.4 Summary of Test Results/Plots

No. of Channel	53
Channel Separation	250kHz

No. of Channel:



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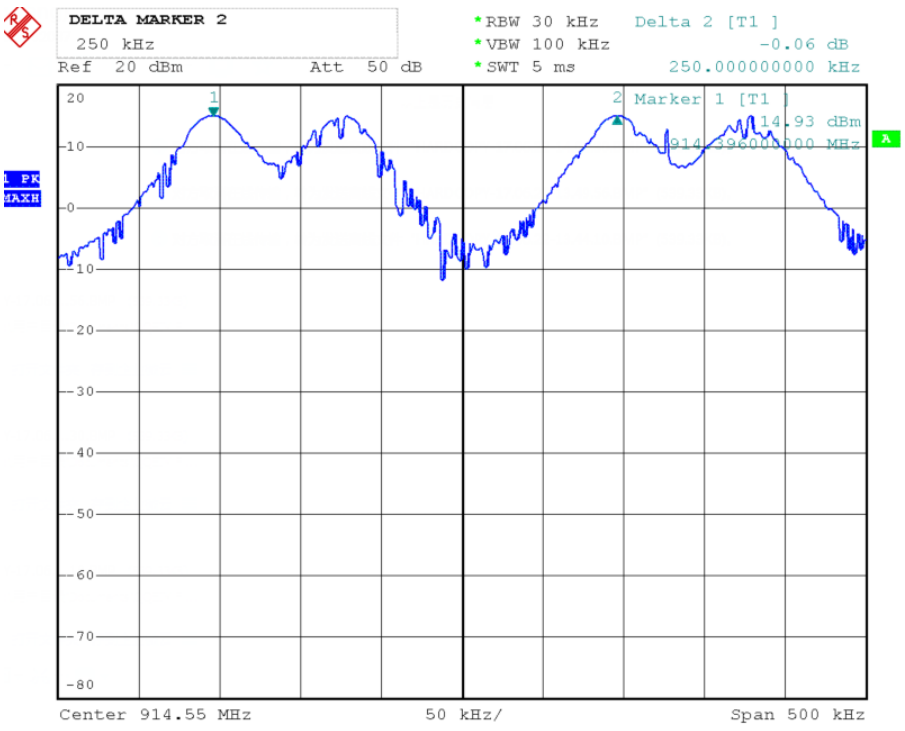
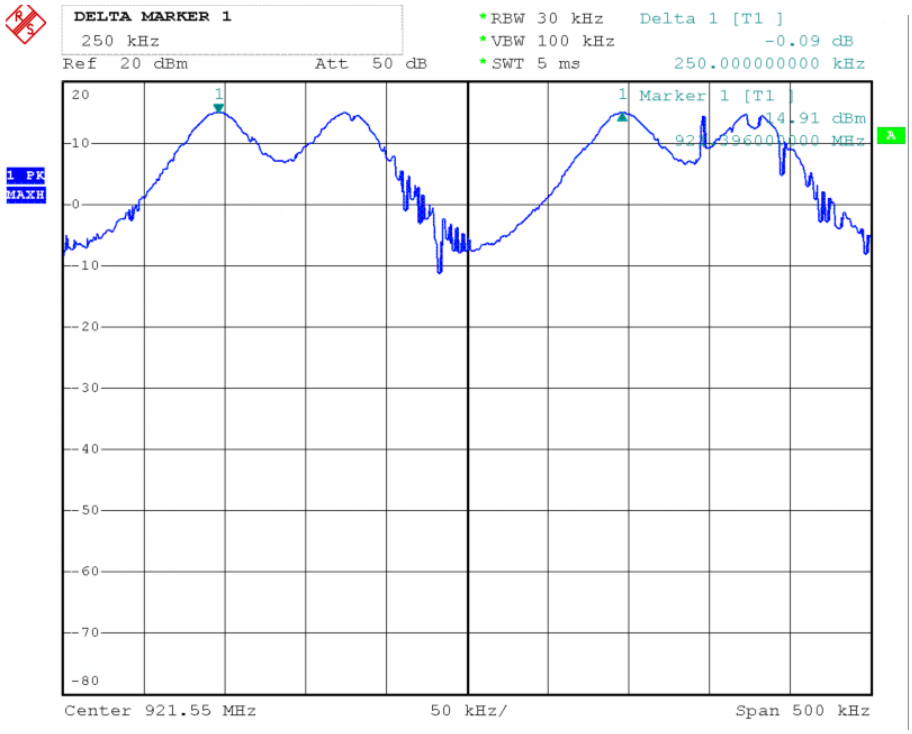
Low Channel:

Channel Separation=250 kHz



Middle Channel:

Channel Separation=250 kHz



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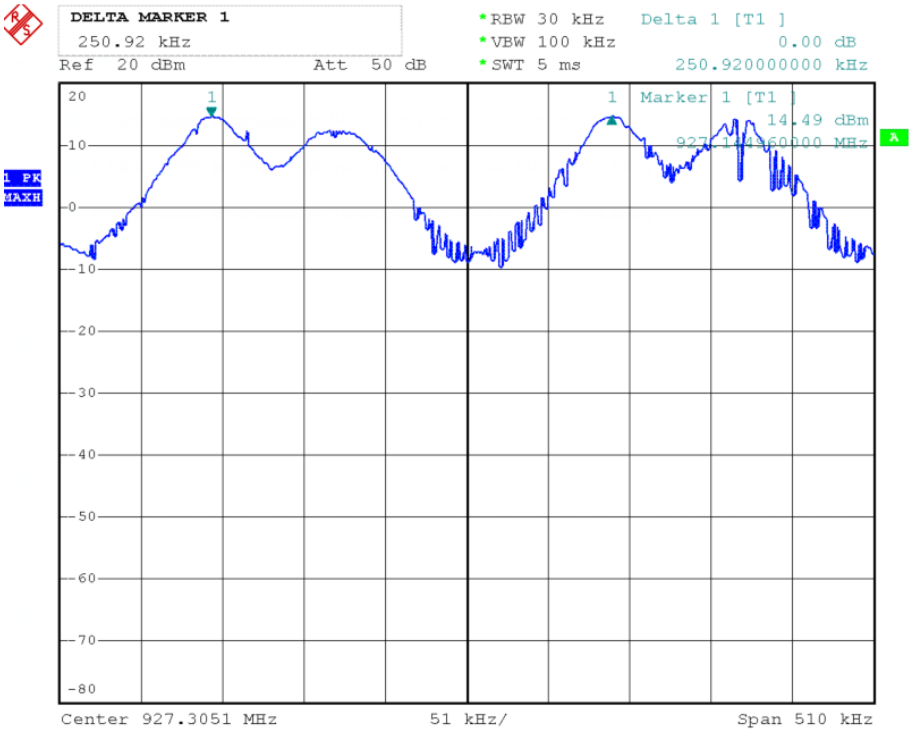
High Channel:

Channel Separation=250.92 kHz



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7. 20dB Bandwidth

7.1 Standard Applicable

According to 15.247(a)(1)(i), For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

According to 15.215(c). 20dB bandwidth is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

7.2 Test Procedure

According to ANSI C63.10-2013 section 6.9.2, the 20dB bandwidth test method as follows.

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level.
d) Steps a) through c) might require iteration to adjust within the specified tolerances.
e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “−xx dB down” requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
f) Set detection mode to peak and trace mode to max hold.
g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
h) Determine the “−xx dB down amplitude” using [(reference value) − xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument.
i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).
j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “−xx dB down

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amplitude" determined in step h). If a marker is below this "−xx dB down amplitude" value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the "−xx dB down amplitude" determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.
k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

7.3 Environmental Conditions

Temperature (℃)	22~23
Humidity (%RH)	40~42
Barometric Pressure (mbar)	950~1000
Operating Mode	Continuous Transmitting
Testing Mode	Conducted

7.4 Summary of Test Results/Plots

Test Channel MHz	20 dB Bandwidth kHz	99% Bandwidth kHz	Result
914.5	166.0	160.0	Pass
921	166.0	159.0	Pass
927.5	166.0	159.0	Pass

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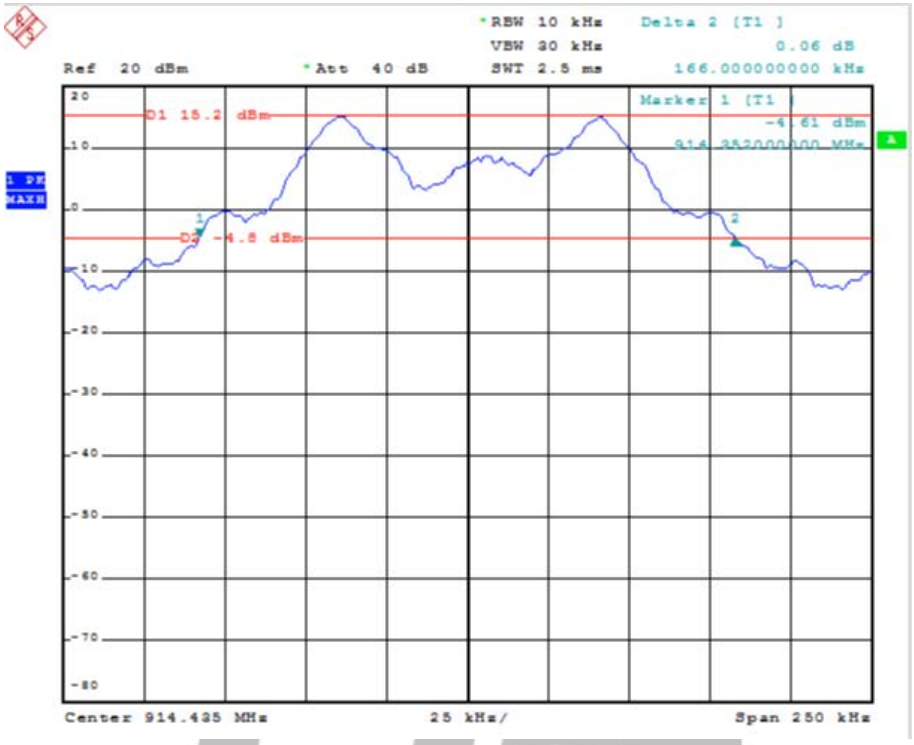
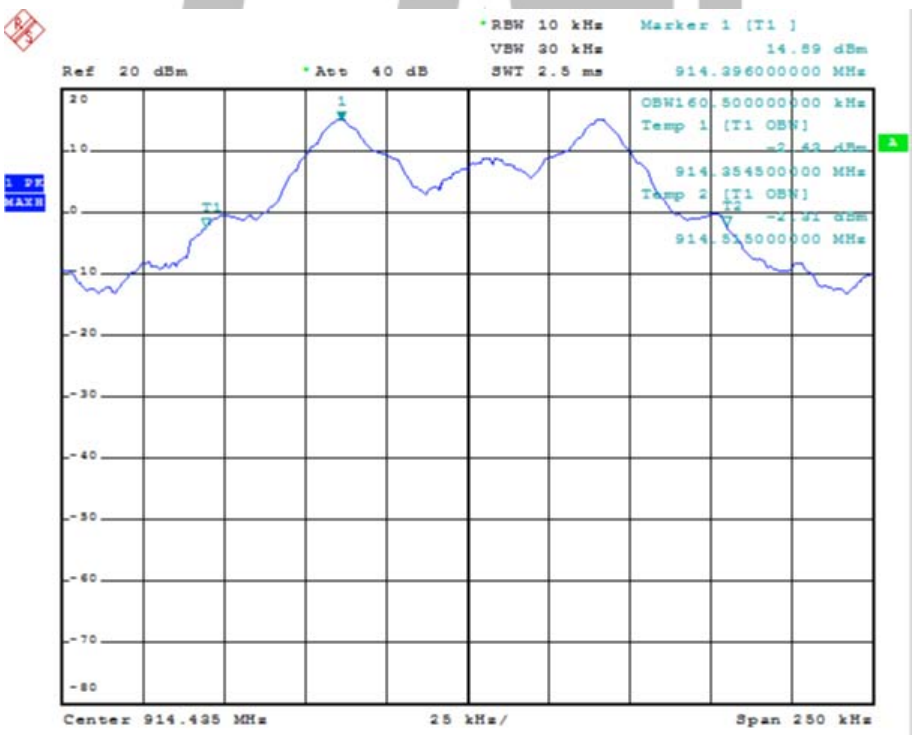
Low Channel:





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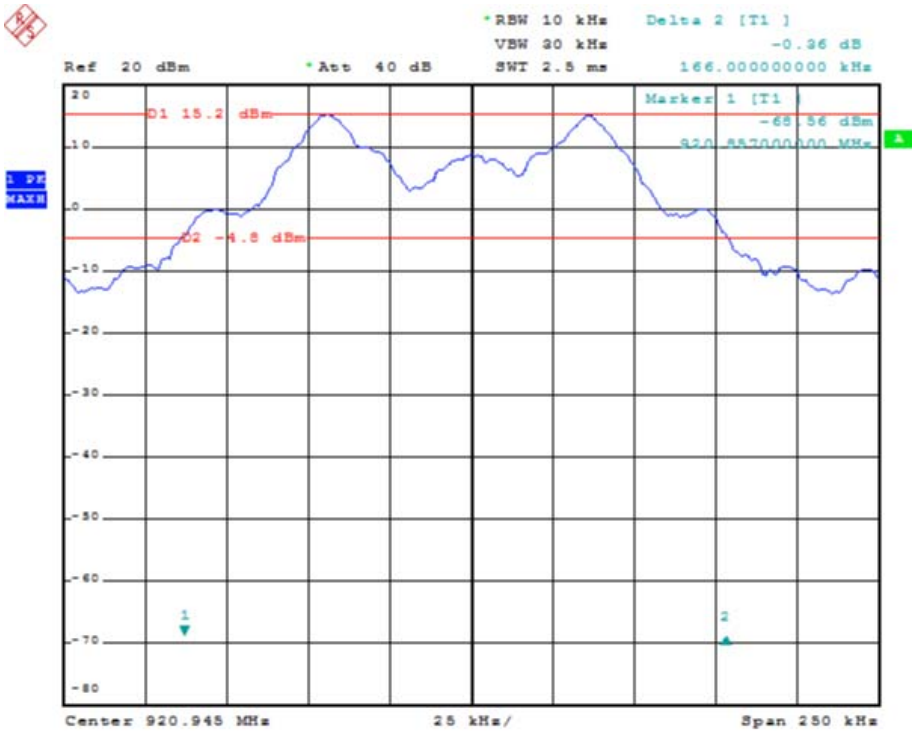
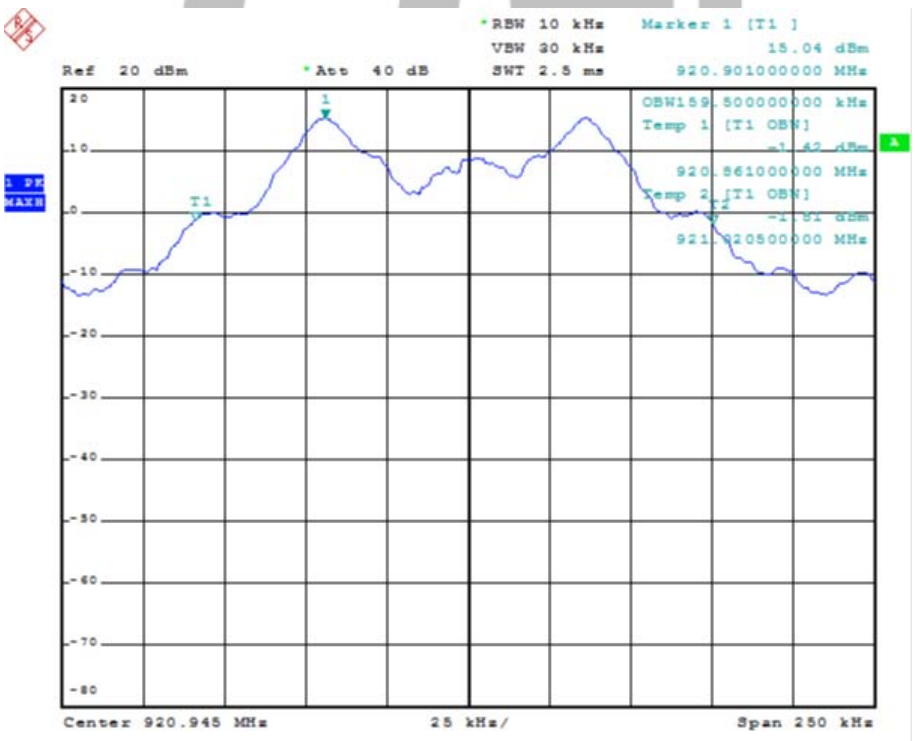
Middle Channel:





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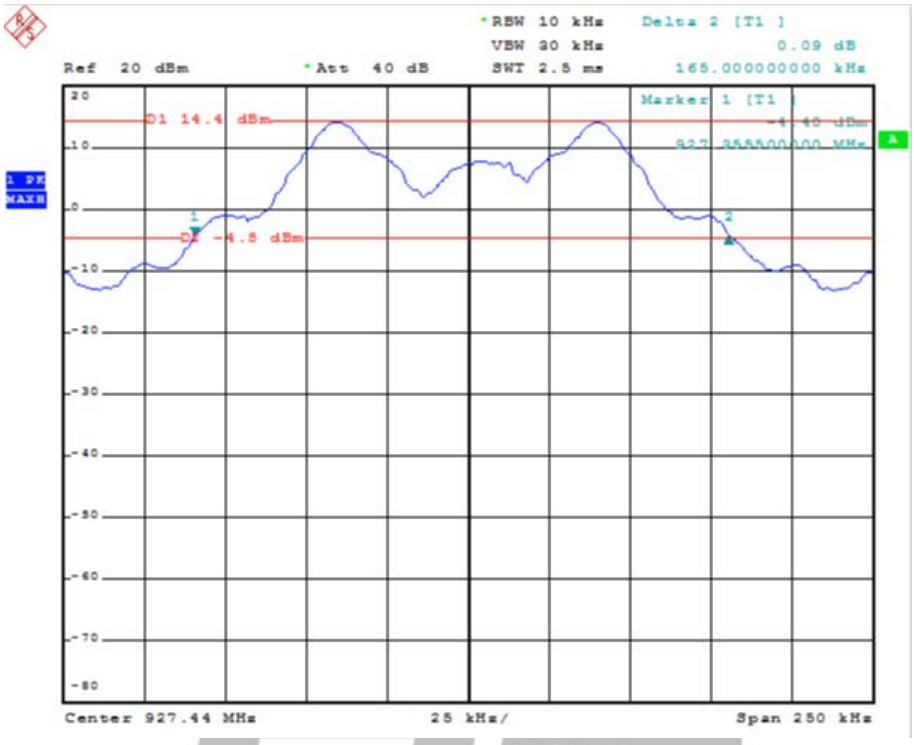
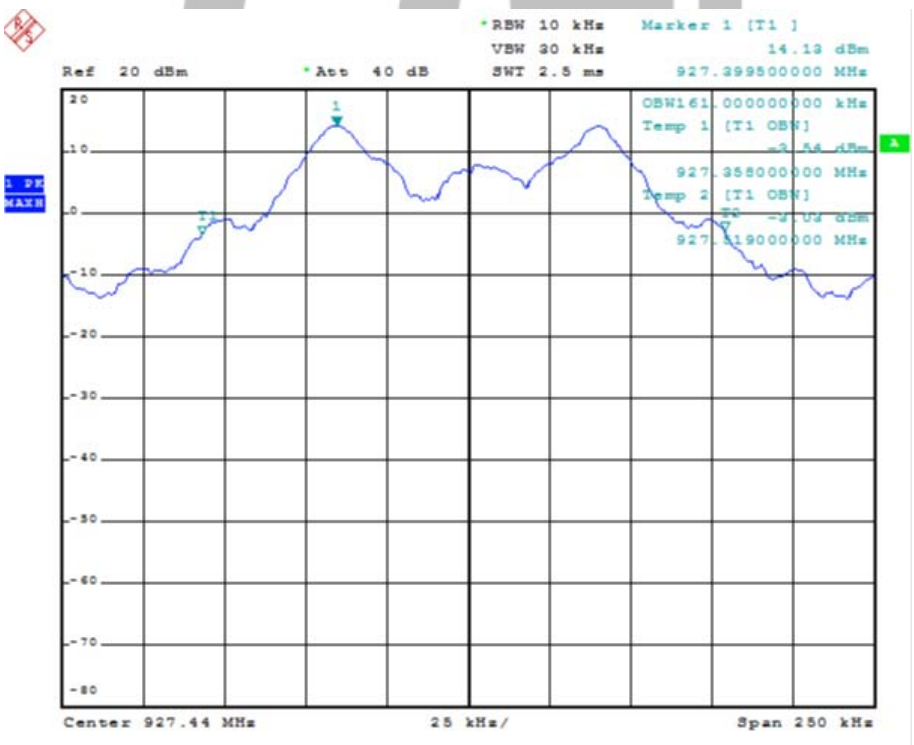
High Channel:





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8. Dwell Time of Hopping Channel

8.1 Standard Applicable

According to 15.247(a)(1)(i), For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

8.2 Test Procedure

According to ANSI C63.10-2013 section 7.8.4, the dwell time of a hopping channel test method as follows.

1) Span: Zero span, centered on a hopping channel.
2) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
3) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
4) Detector function: Peak.
5) Trace: Max hold.

Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.
Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:
(Number of hops in the period specified in the requirements) =
(number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time)
The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements. If the number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation.
The measured transmit time and time between hops shall be consistent with the values described in the operational description for the EUT.

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8.3 Environmental Conditions

Temperature (℃)	22~23
Humidity (%RH)	40~42
Barometric Pressure (mbar)	950~1000
Operating Mode	Normal Operating
Testing Mode	Conducted

8.4 Summary of Test Results/Plots

The dwell time within a period in data mode is independent from the packet type (packet length).

The test period: T = 20 s
Dwell time = time slot length* Number of Bursts

Frequency (MHz)	Test period (s)	Number of Bursts per Hopping Period	Burst Duration (ms)	Dwell time (ms)	Limit (ms)
914.5	20	56	6.04	338.24	400
921	20	56	6	336	400
927.5	20	56	6.04	338.24	400

Please refer to the test plots as below:

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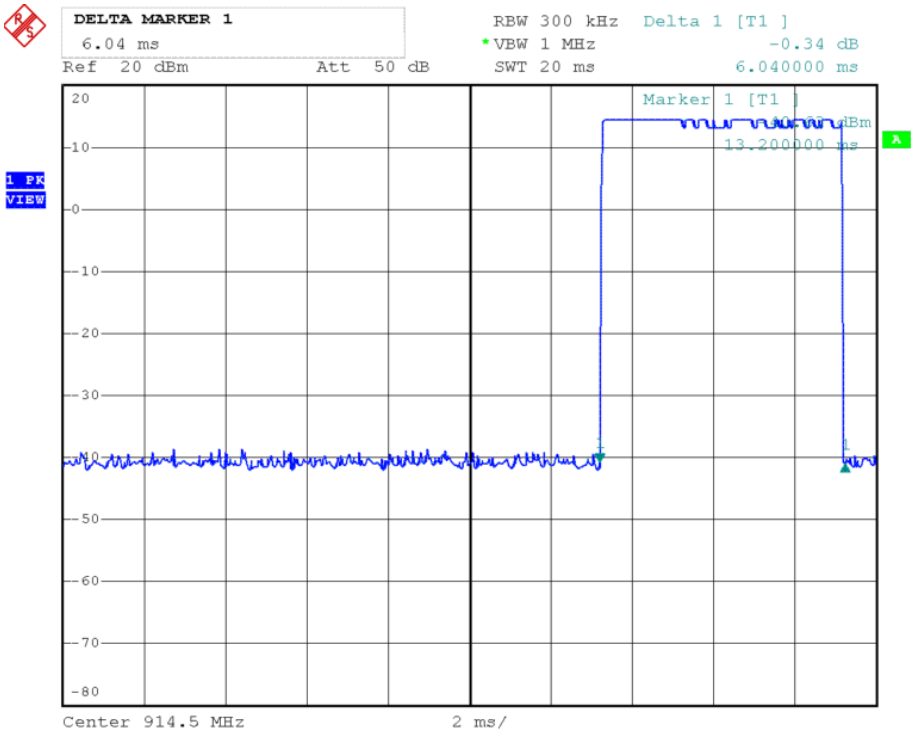
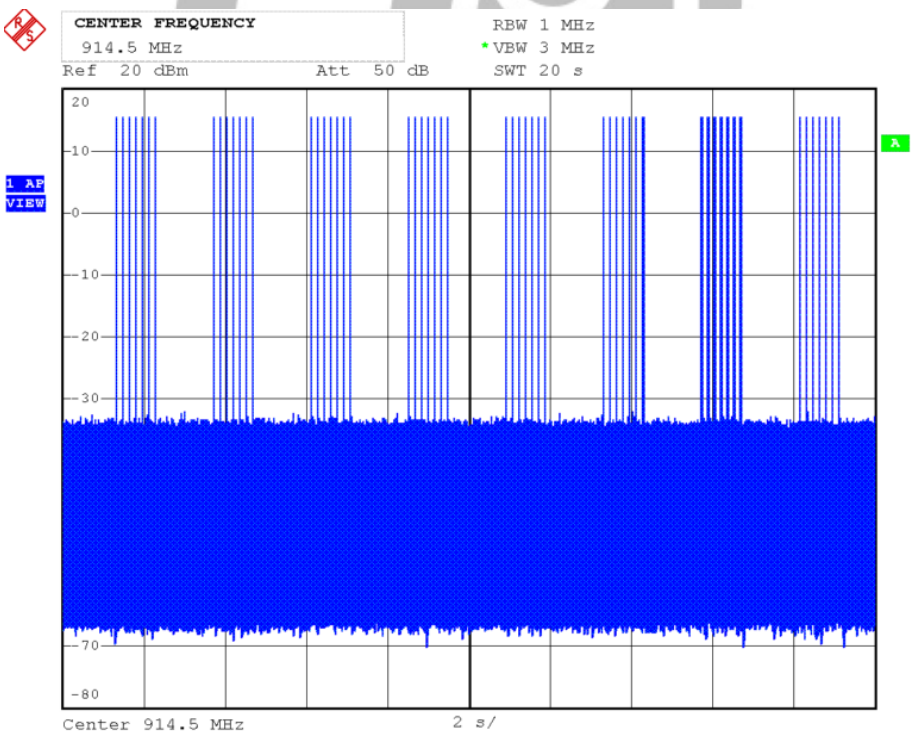
Low Channel

Dwell time, Burst Duration



Dwell Time, Number of Bursts



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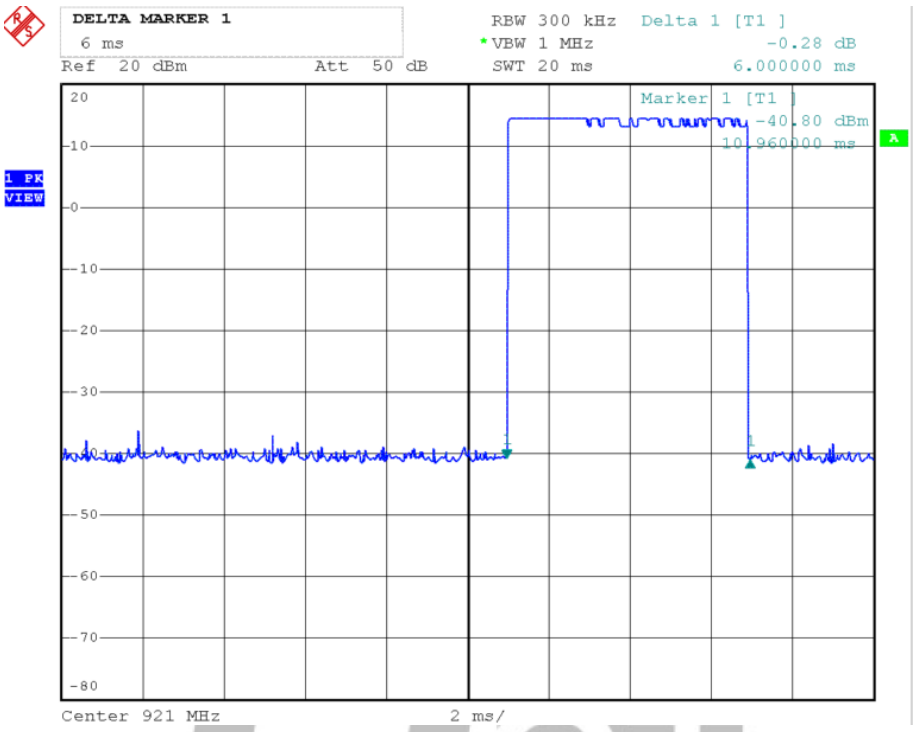
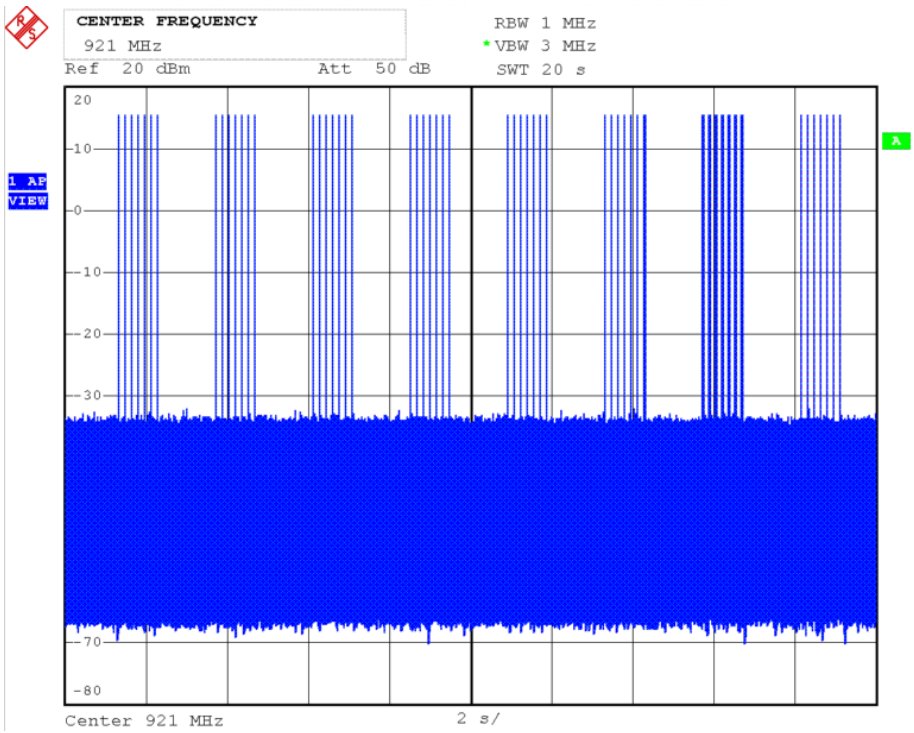
Middle Channel

Dwell time, Burst Duration



Dwell Time, Number of Bursts



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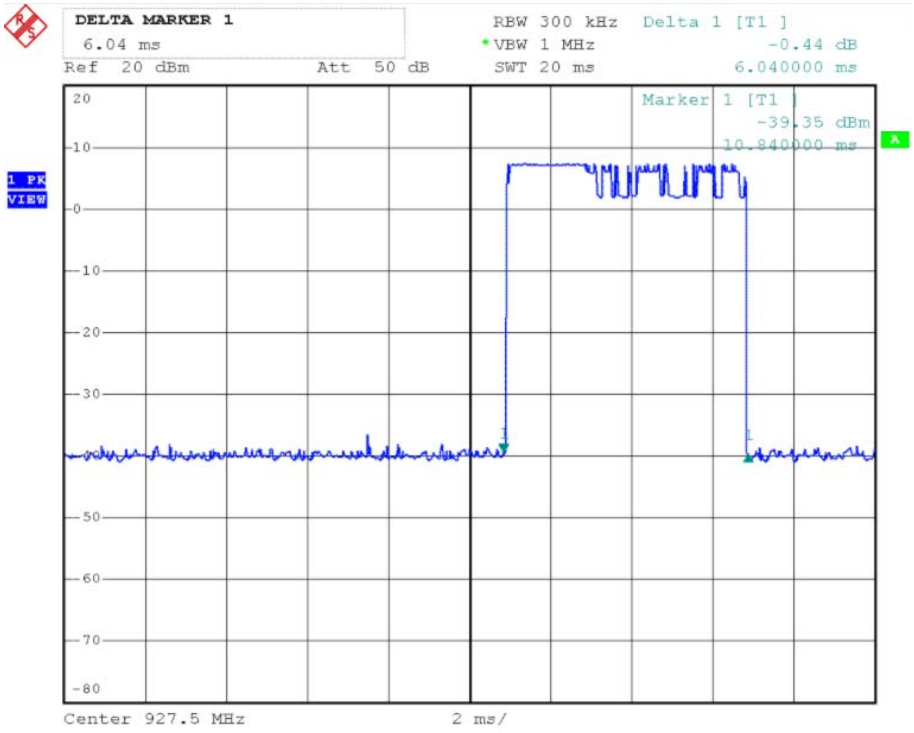
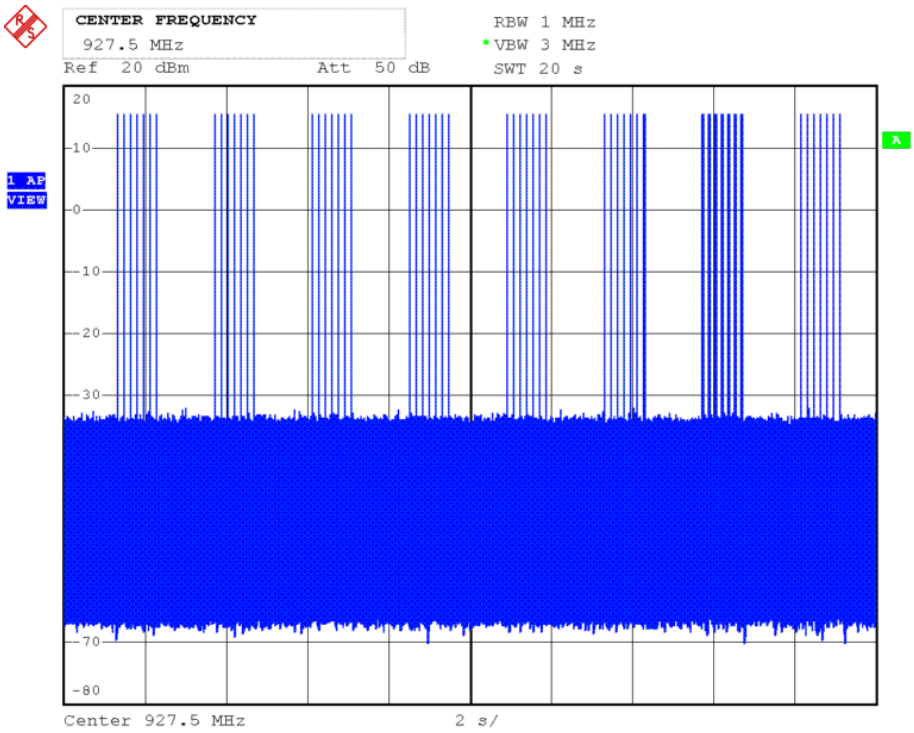
High Channel

Dwell time, Burst Duration



Dwell Time, Number of Bursts



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9. RF Output Power

9.1 Standard Applicable

According to 15.247(b)(2). For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

9.2 Test Procedure

According to ANSI C63.10-2013 section 7.8.5, the output power test method as follows.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test:
a) Use the following spectrum analyzer settings:
   1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.
   2) RBW > 20 dB bandwidth of the emission being measured.
   3) VBW ≥ RBW.
   4) Sweep: Auto.
   5) Detector function: Peak.
   6) Trace: Max hold.
b) Allow trace to stabilize.
c) Use the marker-to-peak function to set the marker to the peak of the emission.
d) The indicated level is the peak output power, after any corrections for external attenuators and cables.
e) A plot of the test results and setup description shall be included in the test report.

9.3 Environmental Conditions

Temperature (℃)	22~23
Humidity (%RH)	40~42
Barometric Pressure (mbar)	950~1000
Operating Mode	Continuous Transmitting
Testing Mode	Conducted

9.4 Summary of Test Results/Plots

Frequency MHz	Measured Value dBm	Output Power mW	Limit mW
914.75	15.10	32.4	1000
921.0	15.35	34.3	1000
927.25	14.36	27.3	1000

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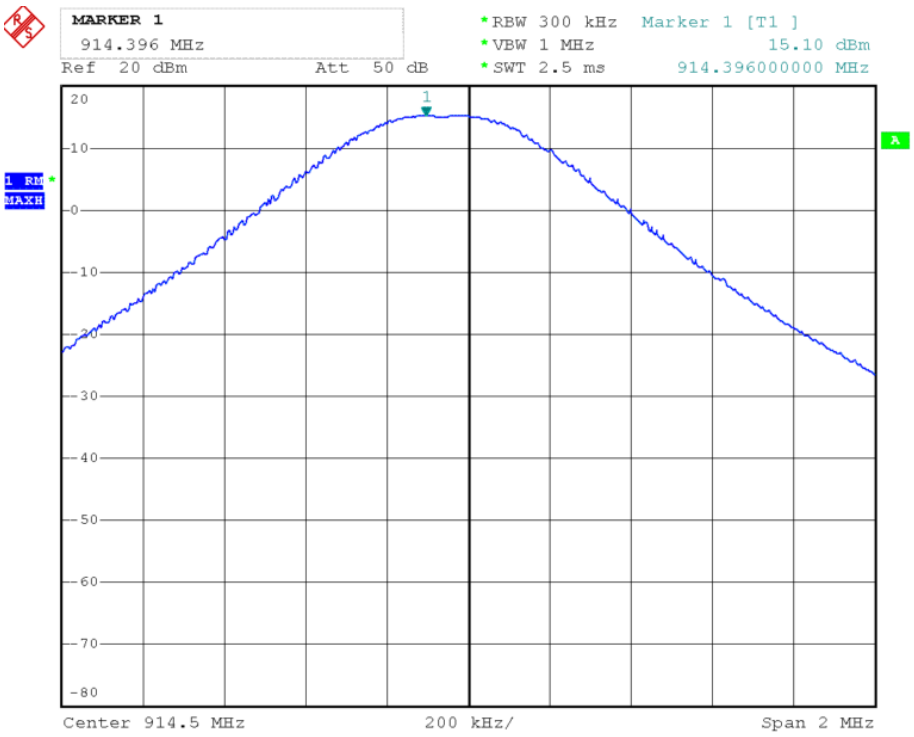
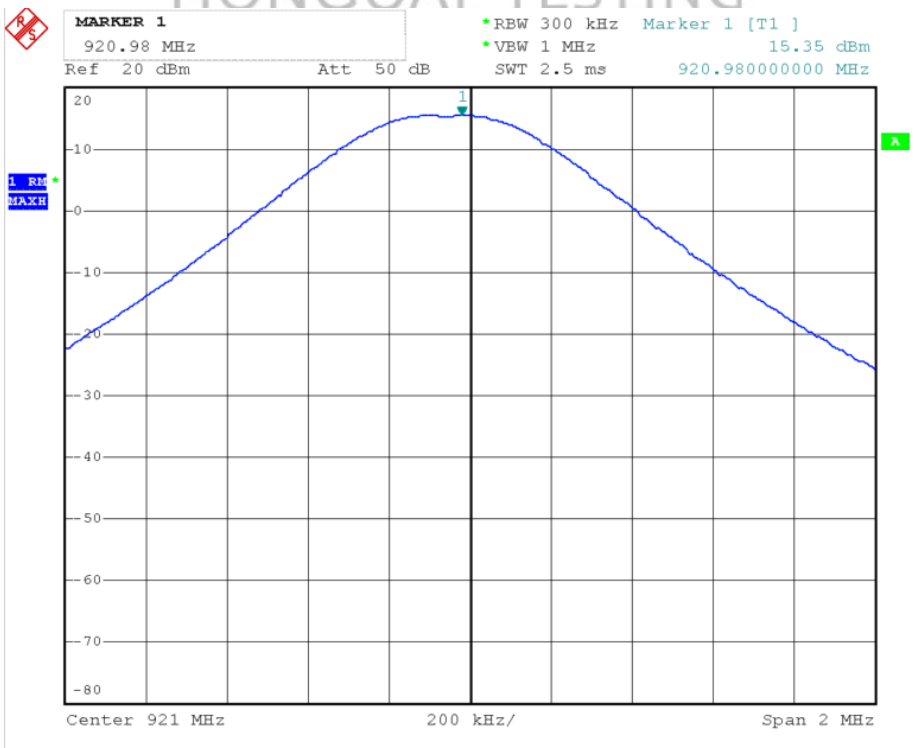
Note: the antenna gain is less than 6dBi maximum permission antenna gain value based on 1 watt peak output power limit.
Test Plots please see the following page

Low Channel



Middle Channel



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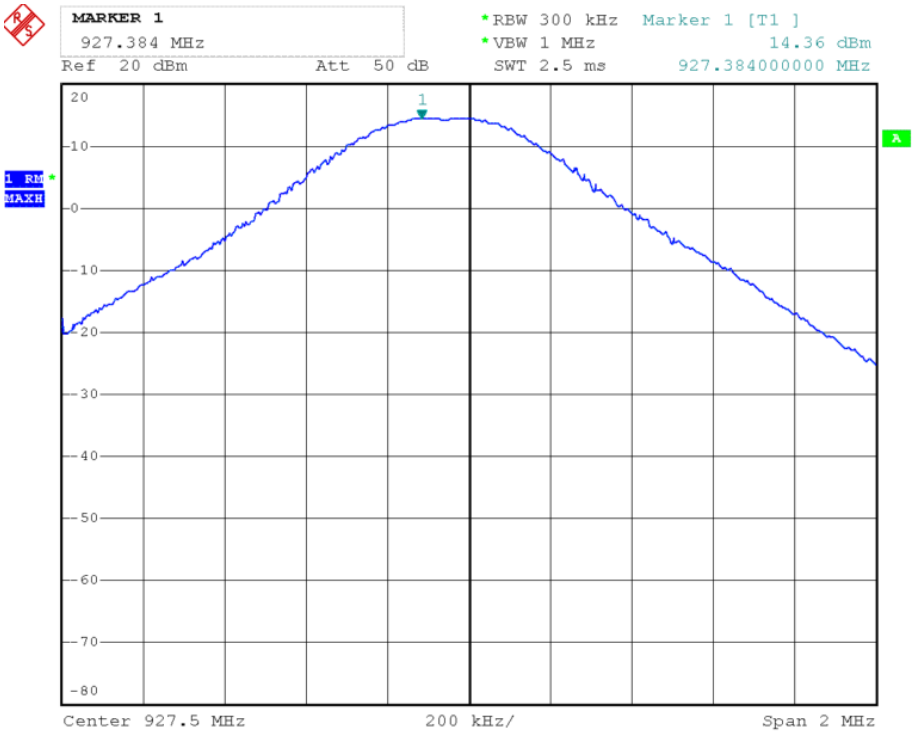
High Channel



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10. Field Strength of Spurious Emissions

10.1 Standard Applicable

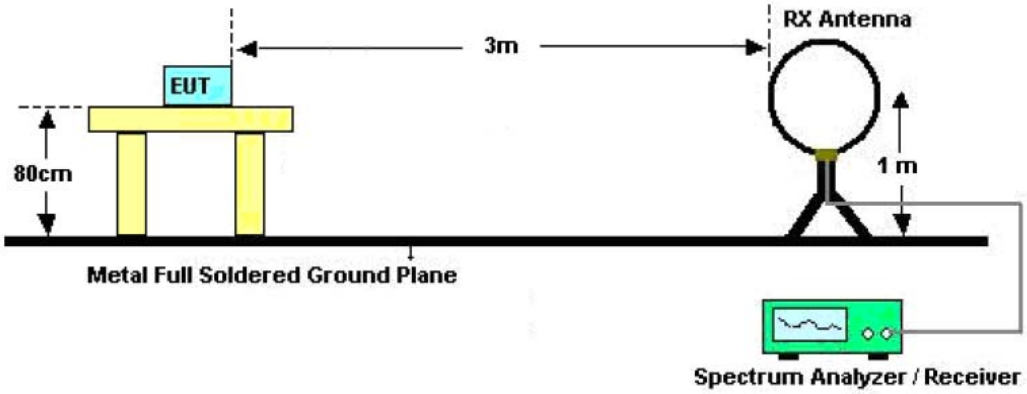
According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

10.2 Test Procedure

Radiated Measurement Setup

For radiated emission below 30MHz



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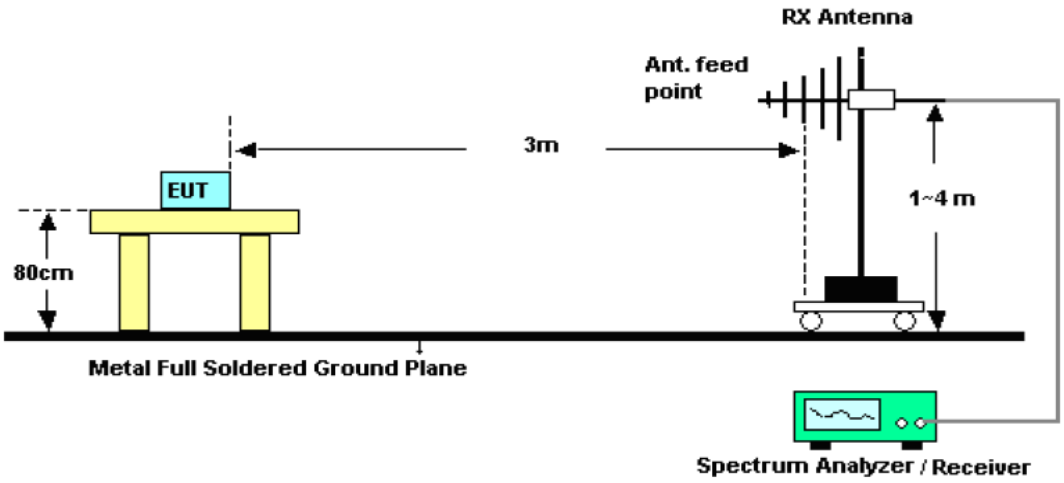
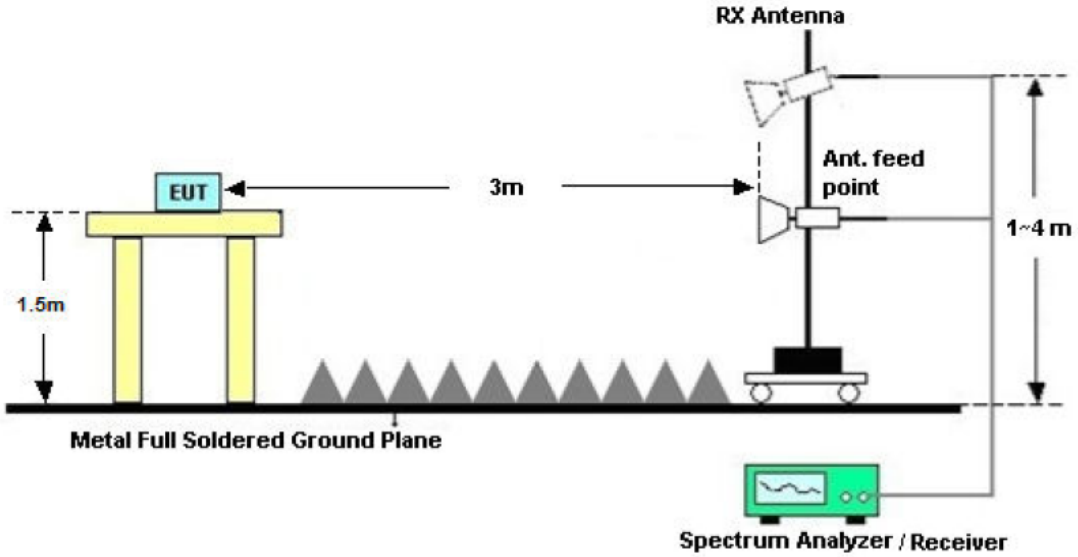
For radiated emission from 30MHz to1GHz



For radiated emission from above1GHz



10.3 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:
Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit. The equation for margin calculation is as follows:
Margin = Corr. Ampl. – FCC Part 15 Limit

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10.4 Environmental Conditions

Temperature (℃)	22~23
Humidity (%RH)	40~42
Barometric Pressure (mbar)	950~1000
Operating Mode	Continuous Transmitting
Testing Mode	Radiated

10.5 Summary of Test Results/Plots

According to the data below, the FCC Part 15.205, 15.209 and 15.247 standards, this EUT was tested in 3 orthogonal positions and the worst case position data was reported.
All test modes are performed, but only the worst case is recorded in this report.

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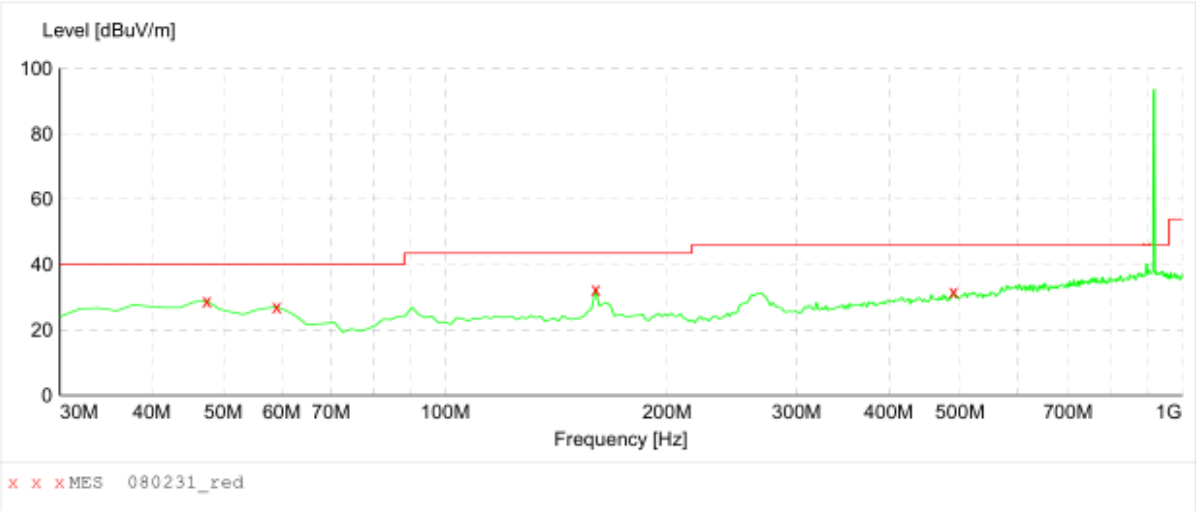
Plot of Radiated Emissions Test Data (30MHz to 1GHz)

EUT: *Hybrid Controller*
Tested Model: *GC9838-VE*
Operating Condition: *Transmitting Low Channel (914.5MHz)*
Comment: *AC120V/60Hz*

Test Specification: *Horizontal*



MEASUREMENT RESULT: "080231_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
47.460000	29.00	16.7	40.0	11.0	---	300.0	0.00	HORIZONTAL
59.100000	27.10	15.7	40.0	12.9	---	100.0	0.00	HORIZONTAL
159.980000	32.40	12.9	43.5	11.1	---	300.0	0.00	HORIZONTAL
489.780000	31.70	19.4	46.0	14.3	---	300.0	0.00	HORIZONTAL

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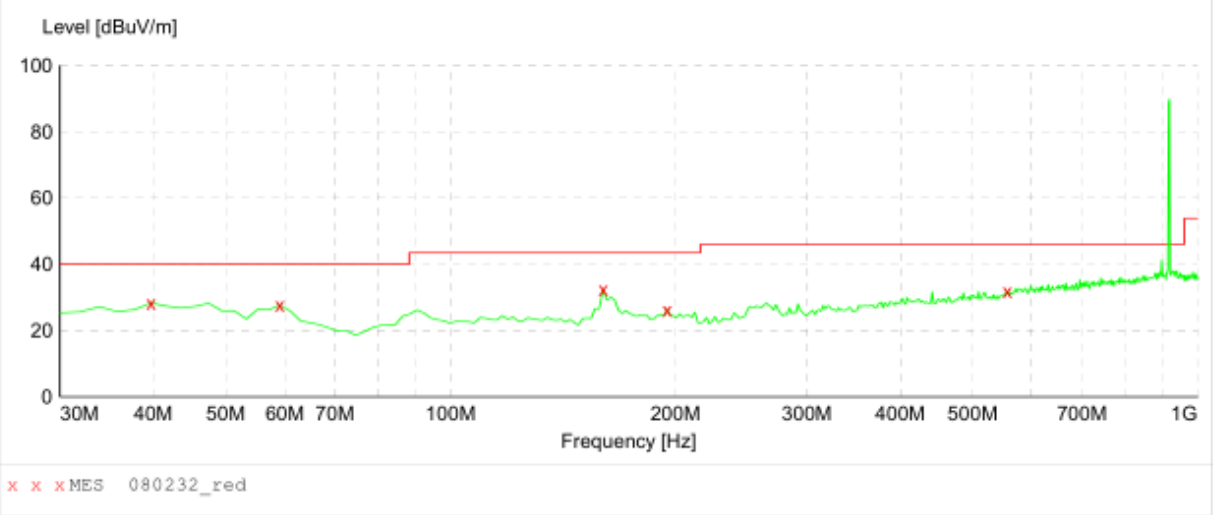
Test Specification: *Vertical*



MEASUREMENT RESULT: "080232_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
39.700000	28.30	15.7	40.0	11.7	---	100.0	0.00	VERTICAL
59.100000	27.70	15.7	40.0	12.3	---	100.0	0.00	VERTICAL
159.980000	32.40	12.9	43.5	11.1	---	100.0	0.00	VERTICAL
194.900000	26.30	13.7	43.5	17.2	---	100.0	0.00	VERTICAL
555.740000	31.90	20.4	46.0	14.1	---	100.0	0.00	VERTICAL

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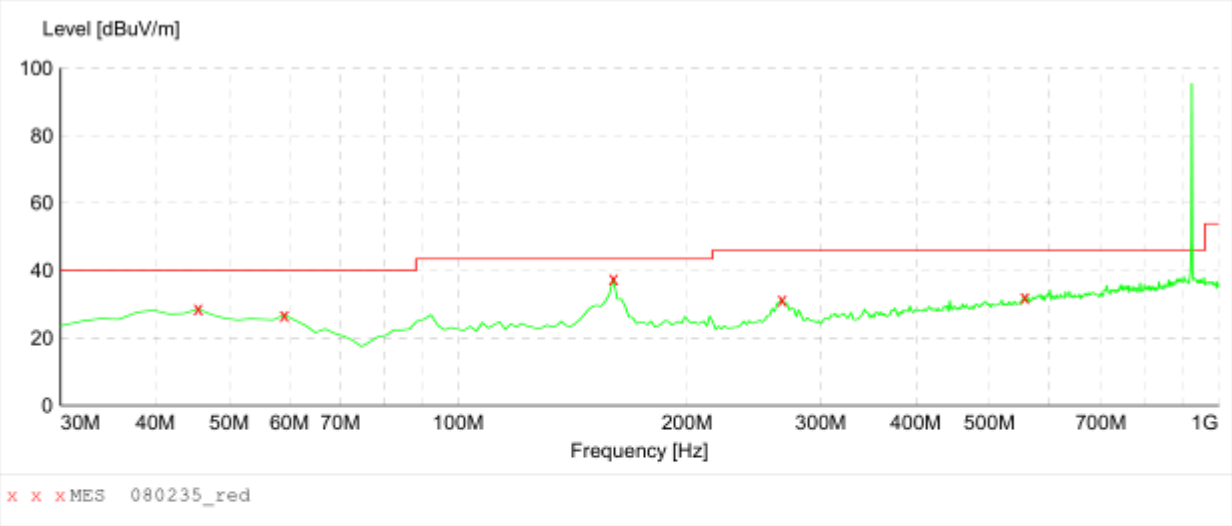
Operating Condition: *Transmitting Middle Channel (921MHz)*
Comment: *AC120V/60Hz*

Test Specification: *Horizontal*



MEASUREMENT RESULT: "080235_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	28.70	16.8	40.0	11.3	---	100.0	0.00	HORIZONTAL
59.100000	26.90	15.7	40.0	13.1	---	100.0	0.00	HORIZONTAL
159.980000	37.70	12.9	43.5	5.8	---	100.0	0.00	HORIZONTAL
266.680000	31.40	14.8	46.0	14.6	---	100.0	0.00	HORIZONTAL
555.740000	32.20	20.4	46.0	13.8	---	100.0	0.00	HORIZONTAL

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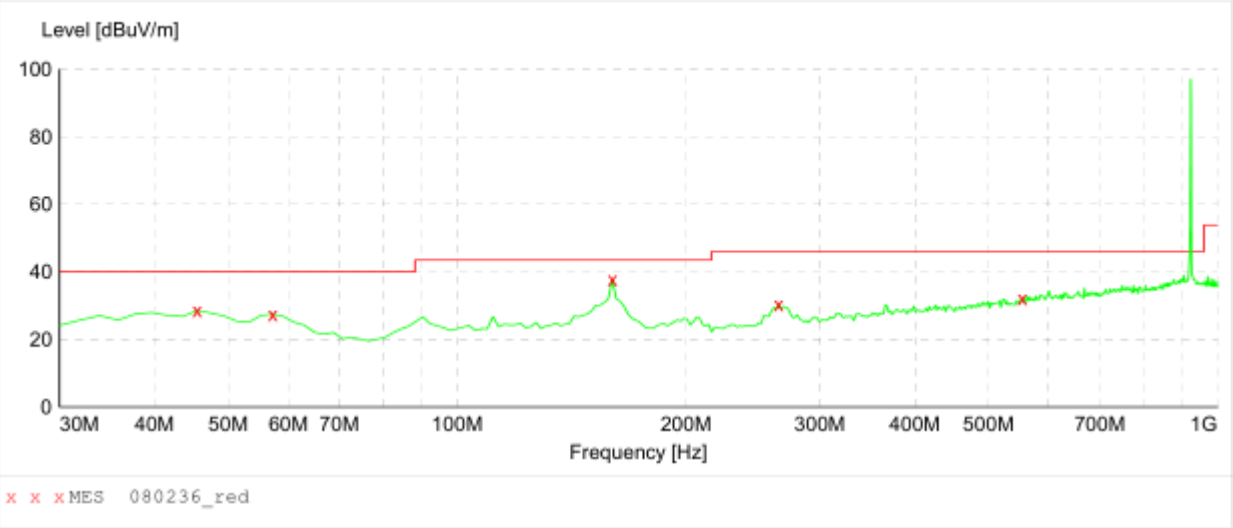
Test Specification: *Vertical*



MEASUREMENT RESULT: "080236_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarizatior
45.520000	28.60	16.8	40.0	11.4	---	100.0	0.00	VERTICAL
57.160000	27.40	15.7	40.0	12.6	---	300.0	0.00	VERTICAL
159.980000	37.80	12.9	43.5	5.7	---	100.0	0.00	VERTICAL
264.740000	30.40	14.7	46.0	15.6	---	100.0	0.00	VERTICAL
553.800000	32.10	20.4	46.0	13.9	---	300.0	0.00	VERTICAL

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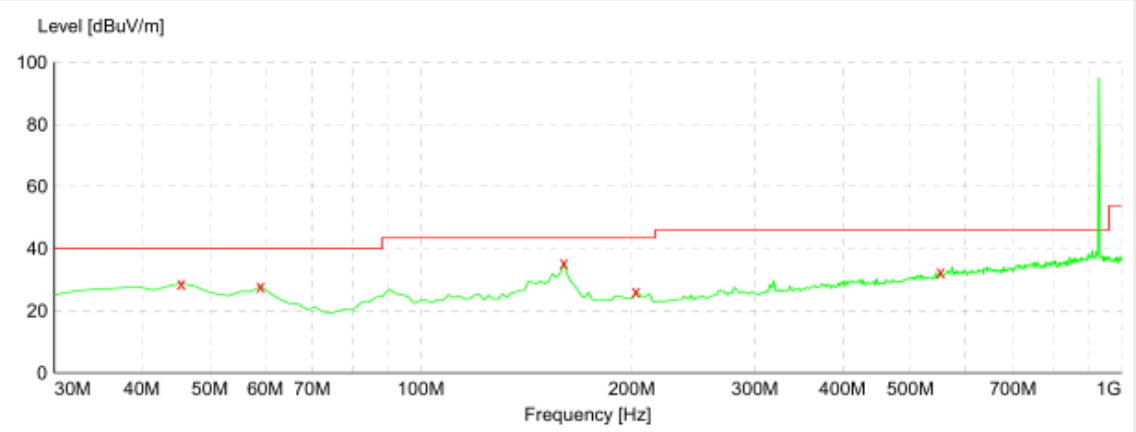
Operating Condition: Transmitting High Channel (927.5MHz)

Comment: AC120V/60Hz

Test Specification: Horizontal

SWEEP TABLE: "test (30M-1G)"

Short Description:			Field Strength		
Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	9163-2015



MEASUREMENT RESULT: "080233_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	28.80	16.8	40.0	11.2	---	100.0	0.00	HORIZONTAL
59.100000	27.90	15.7	40.0	12.1	---	300.0	0.00	HORIZONTAL
159.980000	35.50	12.9	43.5	8.0	---	300.0	0.00	HORIZONTAL
202.660000	26.20	14.0	43.5	17.3	---	100.0	0.00	HORIZONTAL
551.860000	32.50	20.5	46.0	13.5	---	100.0	0.00	HORIZONTAL

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Test Specification: Vertical

MEASUREMENT RESULT: "080234_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
37.760000	28.50	13.7	40.0	11.5	---	100.0	0.00	VERTICAL
57.160000	26.70	15.7	40.0	13.3	---	100.0	0.00	VERTICAL
159.980000	31.40	12.9	43.5	12.1	---	100.0	0.00	VERTICAL
210.420000	27.30	14.0	43.5	16.2	---	100.0	0.00	VERTICAL
553.800000	31.80	20.4	46.0	14.2	---	100.0	0.00	VERTICAL

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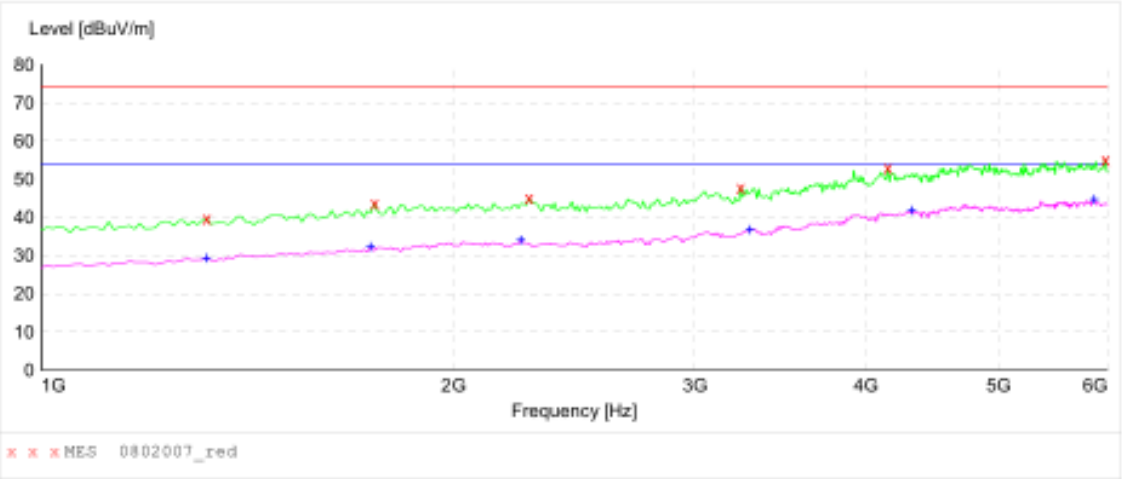
Spurious Emissions Above 1GHz

Low Channel-914.5MHz



MEASUREMENT RESULT: "0802007_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1320.000000	39.70	-2.5	74.0	34.3	---	100.0	0.00	VERTICAL
1750.000000	43.60	0.1	74.0	30.4	---	100.0	0.00	VERTICAL
2270.000000	45.00	1.4	74.0	29.0	---	100.0	0.00	VERTICAL
3240.000000	47.80	4.0	74.0	26.2	---	100.0	0.00	VERTICAL
4150.000000	53.00	10.1	74.0	21.0	---	100.0	0.00	VERTICAL
5980.000000	55.00	14.7	74.0	19.0	---	100.0	0.00	VERTICAL

MEASUREMENT RESULT: "0802007_red2"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1320.000000	29.30	-2.5	54.0	24.7	---	100.0	0.00	VERTICAL
1740.000000	32.20	0.0	54.0	21.8	---	100.0	0.00	VERTICAL
2240.000000	34.00	1.4	54.0	20.0	---	100.0	0.00	VERTICAL
3290.000000	36.70	4.2	54.0	17.3	---	100.0	0.00	VERTICAL
4320.000000	41.70	10.7	54.0	12.3	---	100.0	0.00	VERTICAL
5870.000000	44.60	14.7	54.0	9.4	---	100.0	0.00	VERTICAL

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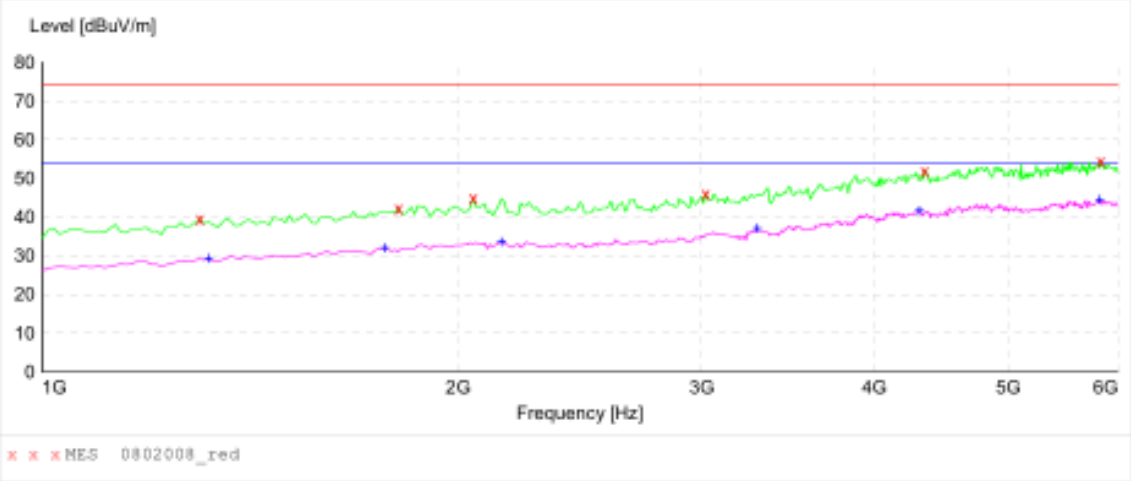

MEASUREMENT RESULT: "0802008_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1300.000000	39.50	-2.7	74.0	34.5	---	100.0	0.00	HORIZONTAL
1810.000000	42.20	0.4	74.0	31.8	---	100.0	0.00	HORIZONTAL
2050.000000	44.90	1.4	74.0	29.1	---	100.0	0.00	HORIZONTAL
3020.000000	46.00	3.0	74.0	28.0	---	100.0	0.00	HORIZONTAL
4350.000000	51.90	10.8	74.0	22.1	---	100.0	0.00	HORIZONTAL
5830.000000	54.40	14.6	74.0	19.6	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "0802008_red2"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1320.000000	29.20	-2.5	54.0	24.8	---	100.0	0.00	HORIZONTAL
1770.000000	32.00	0.2	54.0	22.0	---	100.0	0.00	HORIZONTAL
2150.000000	33.60	1.4	54.0	20.4	---	100.0	0.00	HORIZONTAL
3290.000000	37.00	4.2	54.0	17.0	---	100.0	0.00	HORIZONTAL
4310.000000	41.60	10.7	54.0	12.4	---	100.0	0.00	HORIZONTAL
5820.000000	44.40	14.6	54.0	9.6	---	100.0	0.00	HORIZONTAL

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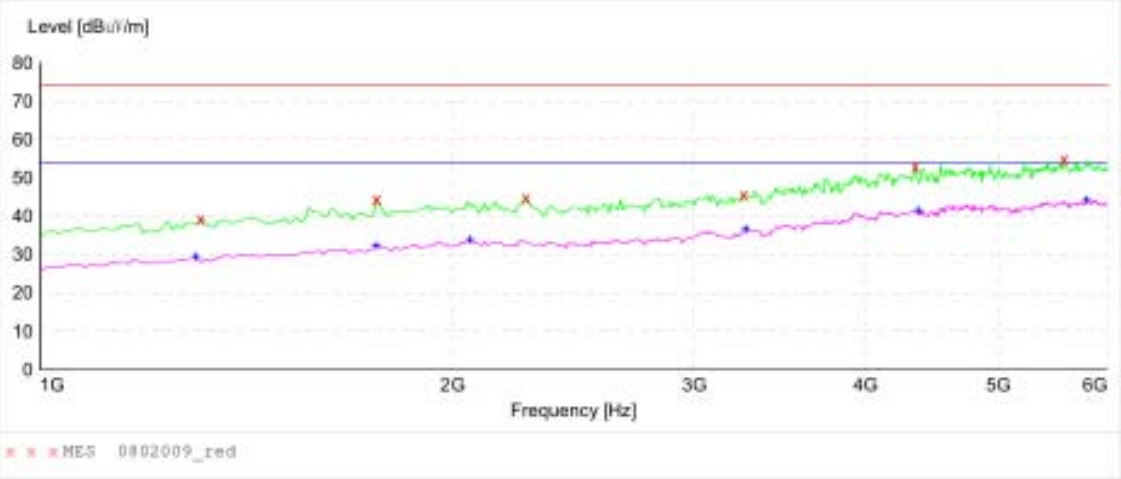
Middle Channel-921.0MHz



MEASUREMENT RESULT: "0802009_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1310.000000	39.20	-2.6	74.0	34.8	---	100.0	0.00	HORIZONTAL
1760.000000	44.40	0.1	74.0	29.6	---	100.0	0.00	HORIZONTAL
2260.000000	44.70	1.4	74.0	29.3	---	100.0	0.00	HORIZONTAL
3260.000000	45.50	4.0	74.0	28.5	---	100.0	0.00	HORIZONTAL
4350.000000	53.00	10.8	74.0	21.0	---	100.0	0.00	HORIZONTAL
5580.000000	54.90	14.5	74.0	19.1	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "0802009_red2"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1300.000000	29.40	-2.7	54.0	24.6	---	100.0	0.00	HORIZONTAL
1760.000000	32.30	0.1	54.0	21.7	---	100.0	0.00	HORIZONTAL
2060.000000	33.90	1.4	54.0	20.1	---	100.0	0.00	HORIZONTAL
3270.000000	36.60	4.1	54.0	17.4	---	100.0	0.00	HORIZONTAL
4370.000000	41.50	10.9	54.0	12.5	---	100.0	0.00	HORIZONTAL
5800.000000	44.20	14.6	54.0	9.8	---	100.0	0.00	HORIZONTAL

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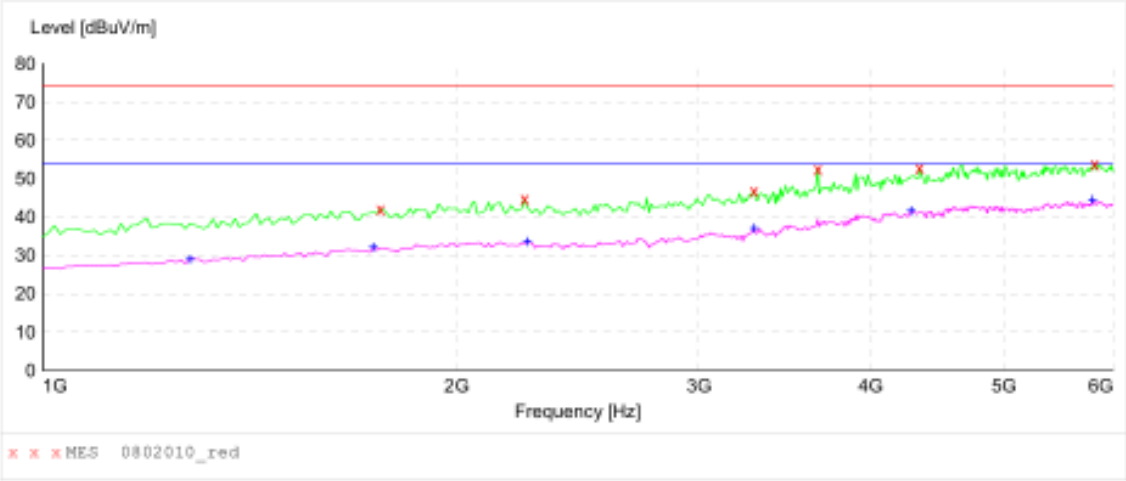

MEASUREMENT RESULT: "0802010_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1760.000000	42.10	0.1	74.0	31.9	---	100.0	0.00	VERTICAL
2240.000000	44.80	1.4	74.0	29.2	---	100.0	0.00	VERTICAL
3290.000000	46.80	4.2	74.0	27.2	---	100.0	0.00	VERTICAL
3660.000000	52.50	6.5	74.0	21.5	---	100.0	0.00	VERTICAL
4340.000000	52.80	10.8	74.0	21.2	---	100.0	0.00	VERTICAL
5820.000000	53.80	14.6	74.0	20.2	---	100.0	0.00	VERTICAL

MEASUREMENT RESULT: "0802010_red2"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1280.000000	29.00	-2.8	54.0	25.0	---	100.0	0.00	VERTICAL
1740.000000	32.10	0.0	54.0	21.9	---	100.0	0.00	VERTICAL
2250.000000	33.60	1.4	54.0	20.4	---	100.0	0.00	VERTICAL
3290.000000	37.00	4.2	54.0	17.0	---	100.0	0.00	VERTICAL
4280.000000	41.60	10.6	54.0	12.4	---	100.0	0.00	VERTICAL
5800.000000	44.50	14.6	54.0	9.5	---	100.0	0.00	VERTICAL

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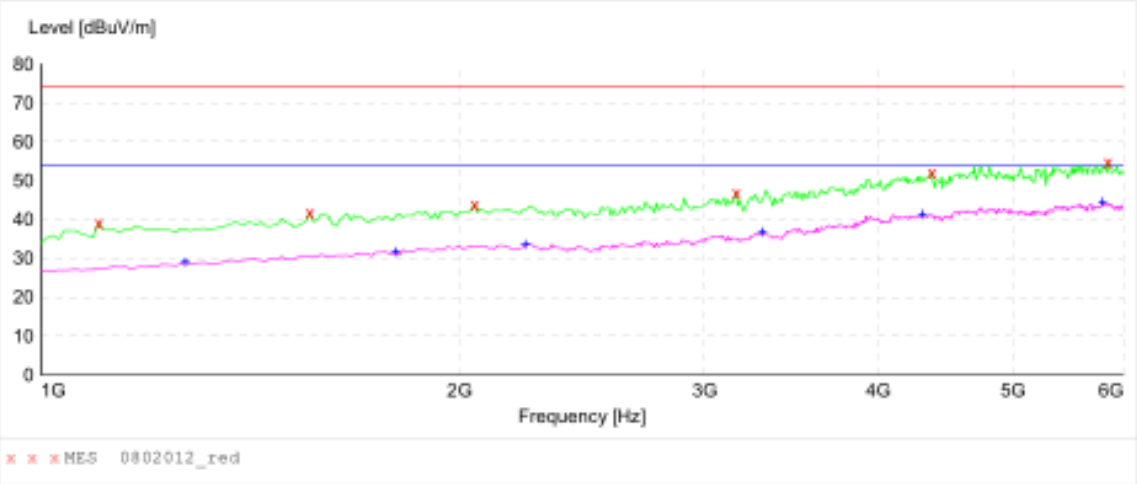
High Channel-927.5MHz



MEASUREMENT RESULT: "0802012_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1100.000000	39.00	-4.0	74.0	35.0	---	100.0	0.00	HORIZONTAL
1560.000000	41.70	-1.1	74.0	32.3	---	100.0	0.00	HORIZONTAL
2050.000000	43.80	1.4	74.0	30.2	---	100.0	0.00	HORIZONTAL
3160.000000	46.80	3.6	74.0	27.2	---	100.0	0.00	HORIZONTAL
4370.000000	52.10	10.9	74.0	21.9	---	100.0	0.00	HORIZONTAL
5850.000000	54.70	14.7	74.0	19.3	---	100.0	0.00	HORIZONTAL

MEASUREMENT RESULT: "0802012_red2"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1270.000000	29.00	-2.9	54.0	25.0	---	100.0	0.00	HORIZONTAL
1800.000000	31.70	0.4	54.0	22.3	---	100.0	0.00	HORIZONTAL
2230.000000	33.60	1.4	54.0	20.4	---	100.0	0.00	HORIZONTAL
3300.000000	36.70	4.2	54.0	17.3	---	100.0	0.00	HORIZONTAL
4300.000000	41.20	10.6	54.0	12.8	---	100.0	0.00	HORIZONTAL
5800.000000	44.50	14.6	54.0	9.5	---	100.0	0.00	HORIZONTAL

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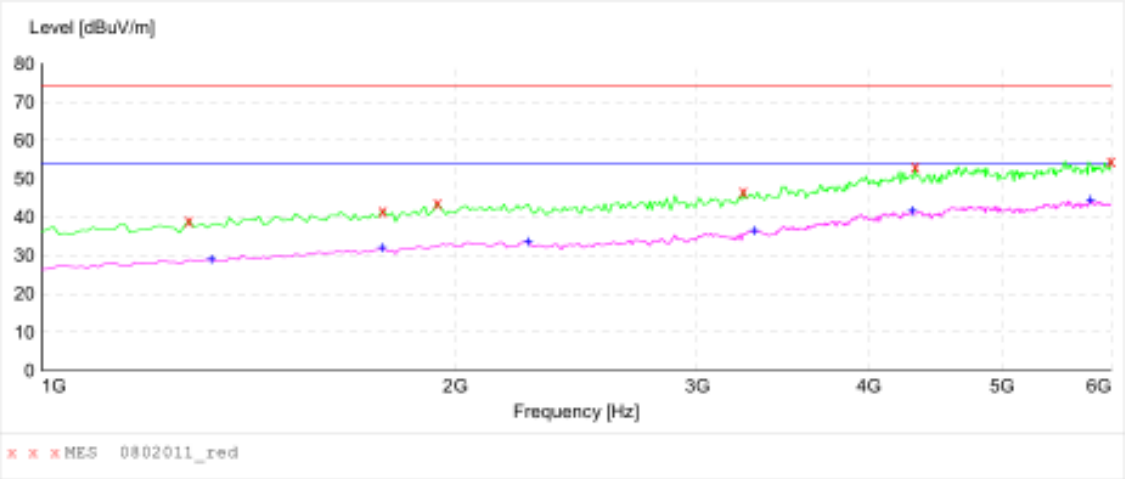

MEASUREMENT RESULT: "0802011_red"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1280.000000	39.10	-2.8	74.0	34.9	---	100.0	0.00	VERTICAL
1770.000000	41.60	0.2	74.0	32.4	---	100.0	0.00	VERTICAL
1940.000000	43.60	1.1	74.0	30.4	---	100.0	0.00	VERTICAL
3240.000000	46.60	4.0	74.0	27.4	---	100.0	0.00	VERTICAL
4320.000000	53.20	10.7	74.0	20.8	---	100.0	0.00	VERTICAL
6000.000000	54.50	14.7	74.0	19.5	---	100.0	0.00	VERTICAL

MEASUREMENT RESULT: "0802011_red2"

Frequency MHz	Level dBuV/m	Transd dB	Limit dBuV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
1330.000000	28.90	-2.5	54.0	25.1	---	100.0	0.00	VERTICAL
1770.000000	31.90	0.2	54.0	22.1	---	100.0	0.00	VERTICAL
2260.000000	33.50	1.4	54.0	20.5	---	100.0	0.00	VERTICAL
3300.000000	36.40	4.2	54.0	17.6	---	100.0	0.00	VERTICAL
4300.000000	41.60	10.6	54.0	12.4	---	100.0	0.00	VERTICAL
5800.000000	44.50	14.6	54.0	9.5	---	100.0	0.00	VERTICAL

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11. Test of Band Edges Emission

11.1 Standard Applicable

According to §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

11.2 Test Procedure

According to ANSI C63.10-2013 section 7.8.6, the Band-edge measurements for RF conducted emissions test method as follows.

a) Connect the EMI receiver or spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described in step e) (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).
b) Set the EUT to the lowest frequency channel (for the hopping on test, the hopping sequence shall include the lowest frequency channel).
c) Set the EUT to operate at maximum output power and 100% duty cycle, or equivalent “normal mode of operation” as specified in 6.10.3.
d) If using the radiated method, then use the applicable procedure(s) of 6.4, 6.5, or 6.6, and orient the EUT and measurement antenna positions to produce the highest emission level.
e) Perform the test as follows:
    1) Span: Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products that fall outside of the authorized band of operation.
    2) Reference level: As required to keep the signal from exceeding the maximum instrument input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
    3) Attenuation: Auto (at least 10 dB preferred).
    4) Sweep time: Coupled.
    5) Resolution bandwidth: 100 kHz.
    6) Video bandwidth: 300 kHz.
    7) Detector: Peak.

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8) Trace: Max hold.

f) Allow the trace to stabilize. For the test with the hopping function turned ON, this can take several minutes to achieve a reasonable probability of intercepting any emissions due to oscillator overshoot.

g) Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, and then use the marker-to-peak function to move the marker to the peak of the in-band emission.

h) Repeat step c) through step e) for every applicable modulation.

i) Set the EUT to the highest frequency channel (for the hopping on test, the hopping sequence shall include the highest frequency channel) and repeat step c) through step d).

j) The band-edge measurement shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

Restricted-band band-edge test method please refers to ANSI C63.10-2013 section 6.10.5. The emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated band-edge measurements.

According to ANSI C63.10-2013 section 7.8.8, Conducted spurious emissions shall be measured for the transmit frequency, per 5.5 and 5.6, and at the maximum transmit powers.
Connect the primary antenna port through an attenuator to the spectrum analyzer input; in the results, account for all losses between the unlicensed wireless device output and the spectrum analyzer. The instrument shall span 30 MHz to 10 times the operating frequency in GHz, with a resolution bandwidth of 100 kHz, video bandwidth of 300 kHz, and a coupled sweep time with a peak detector. The band 30 MHz to the highest frequency may be split into smaller spans, as long as the entire spectrum is covered.

11.3 Environmental Conditions

Temperature (℃)	22~23
Humidity (%RH)	40~42
Barometric Pressure (mbar)	950~1000
Operating Mode	Continuous Transmitting
Testing Mode	Radiated

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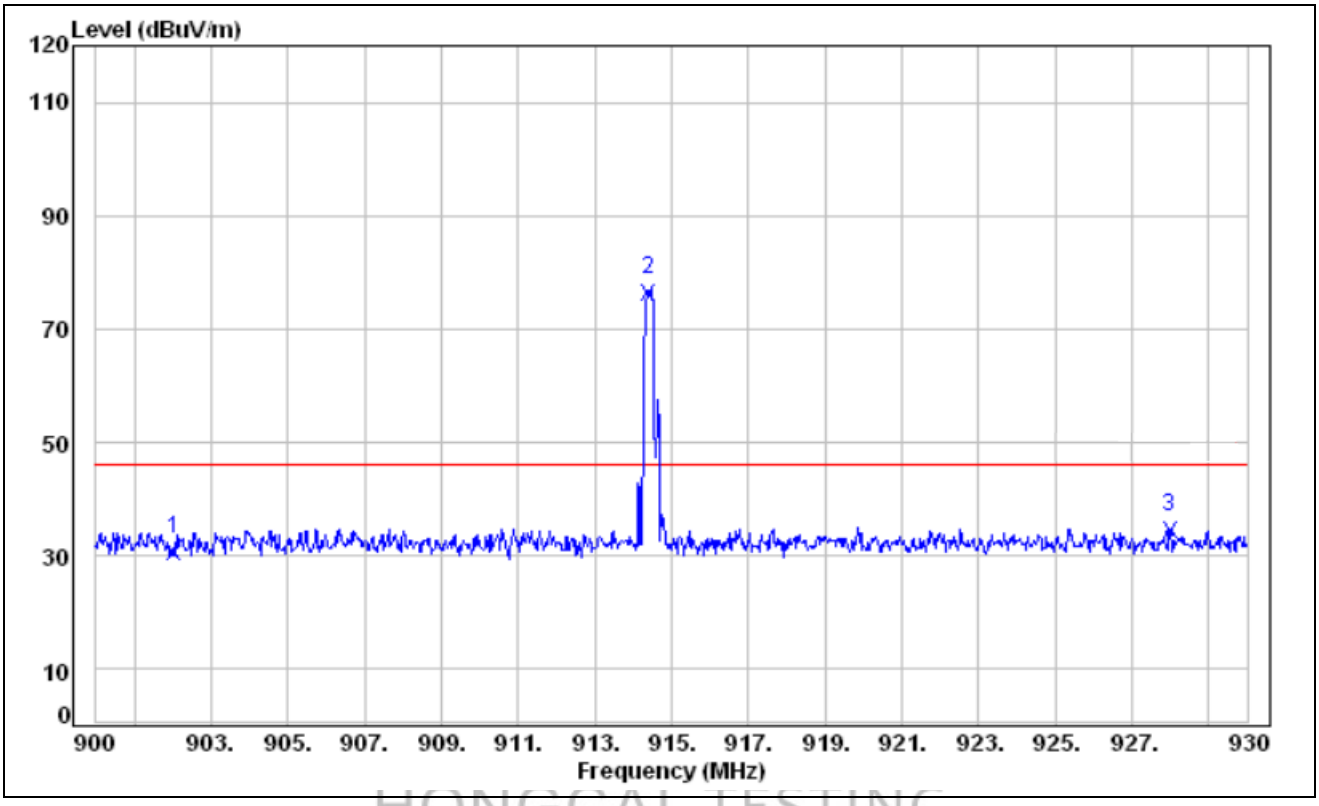
11.4 Summary of Test Results/Plots

Radiated Band edge

Low channel

Vertical (Worst case)



No.	Frequency	Reading	Factor	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	902.00	47.26	15.10	30.64	46.00	-15.36	Peak
2	914.5885	93.04	15.05	76.43	/	/	Peak
3	928.00	50.98	15.11	34.37	46.00	-11.63	Peak

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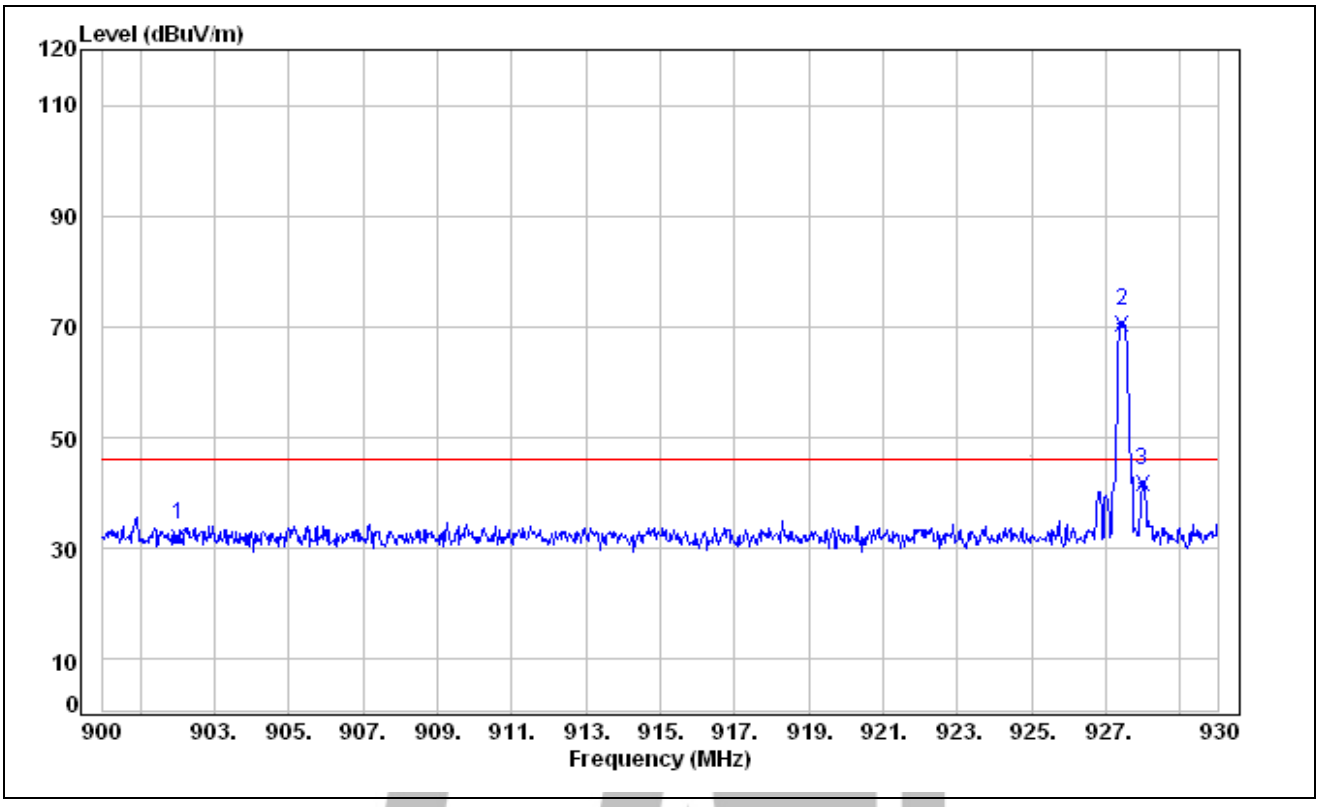
High channel

Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	902.00	48.49	14.88	31.87	46.00	-14.13	Peak
2	927.48	87.20	14.91	70.59	/	/	Peak
3	928.12	58.40	15.01	41.79	46.00	-4.21	Peak

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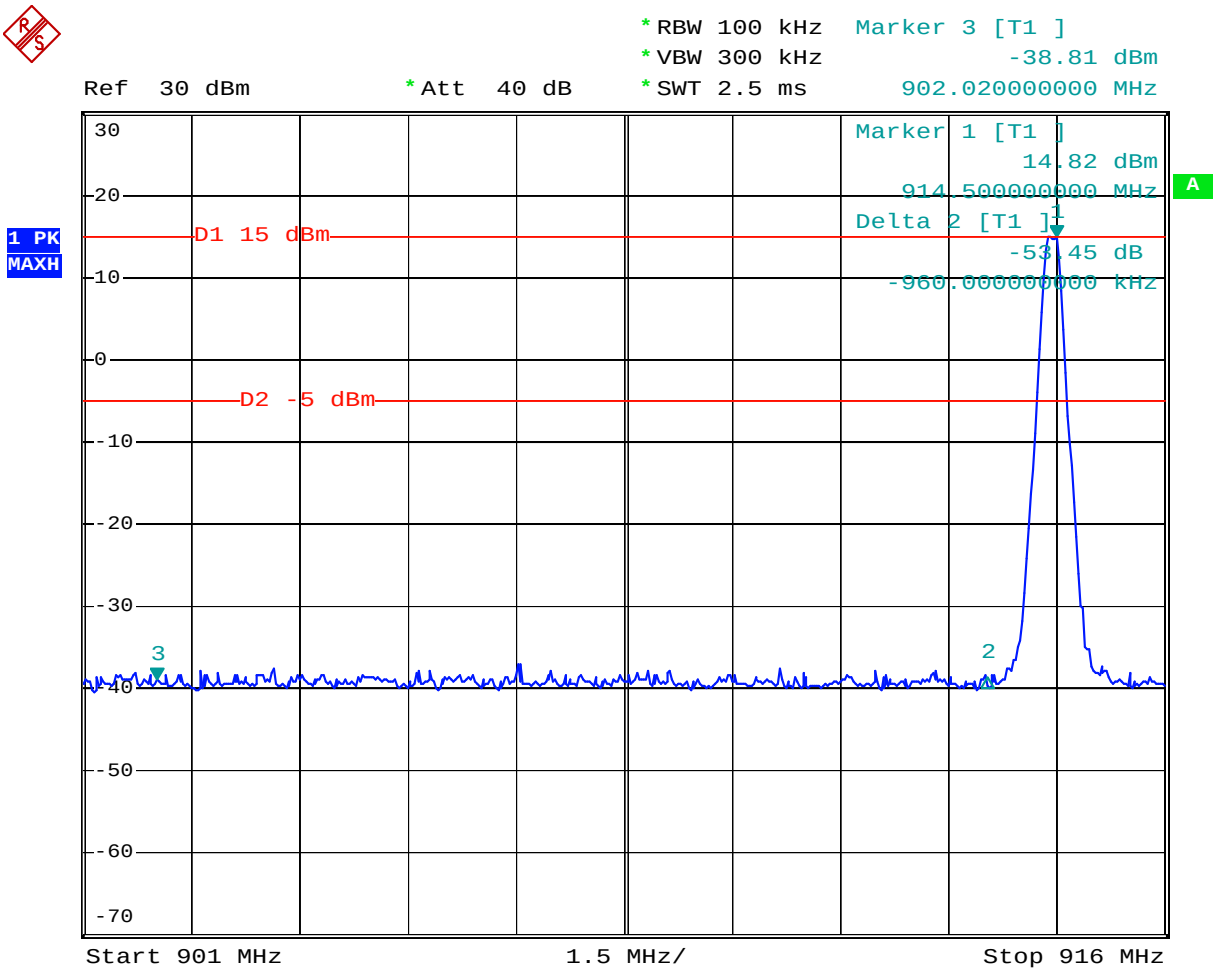
Conducted Band edge

Low channel



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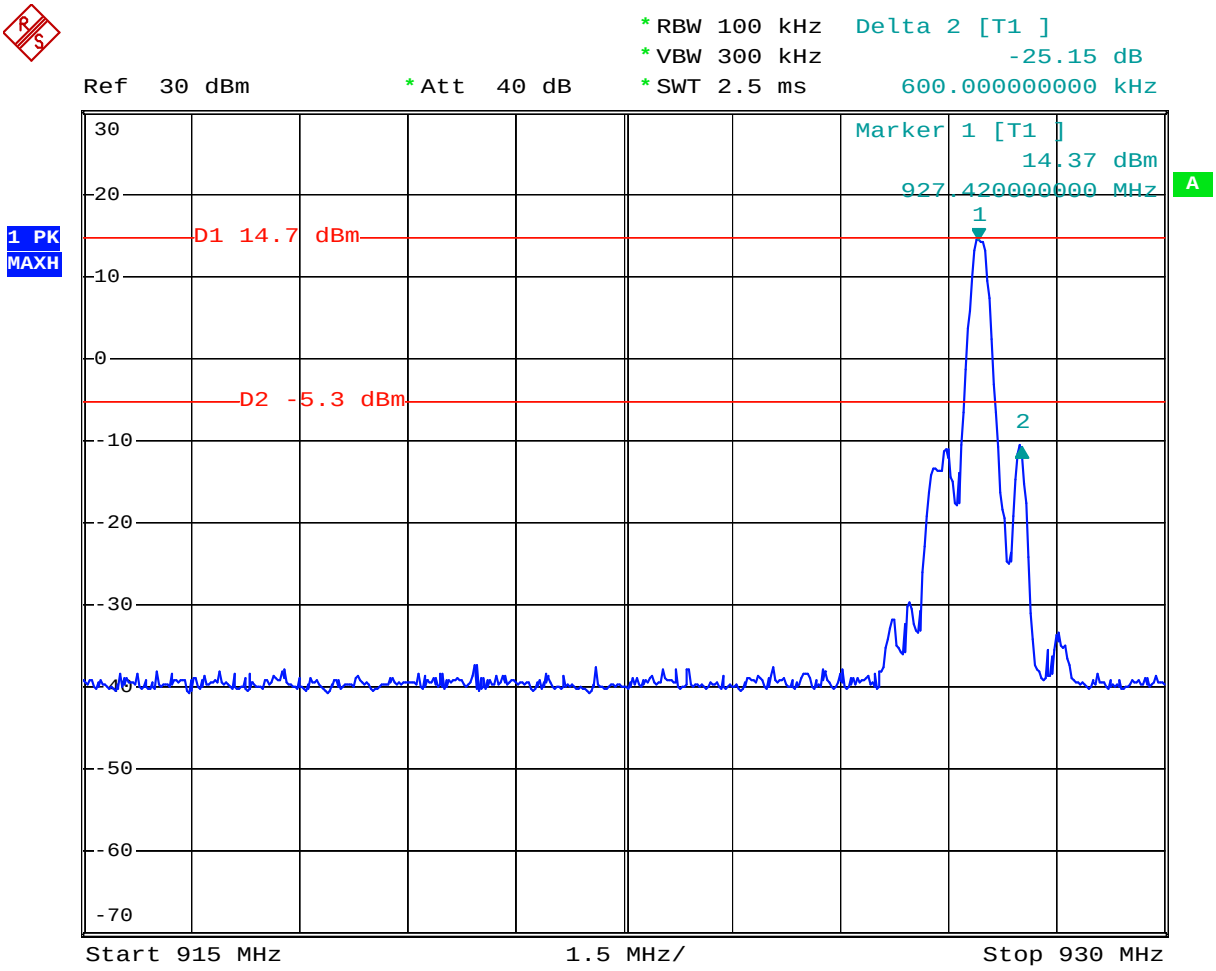
High channel



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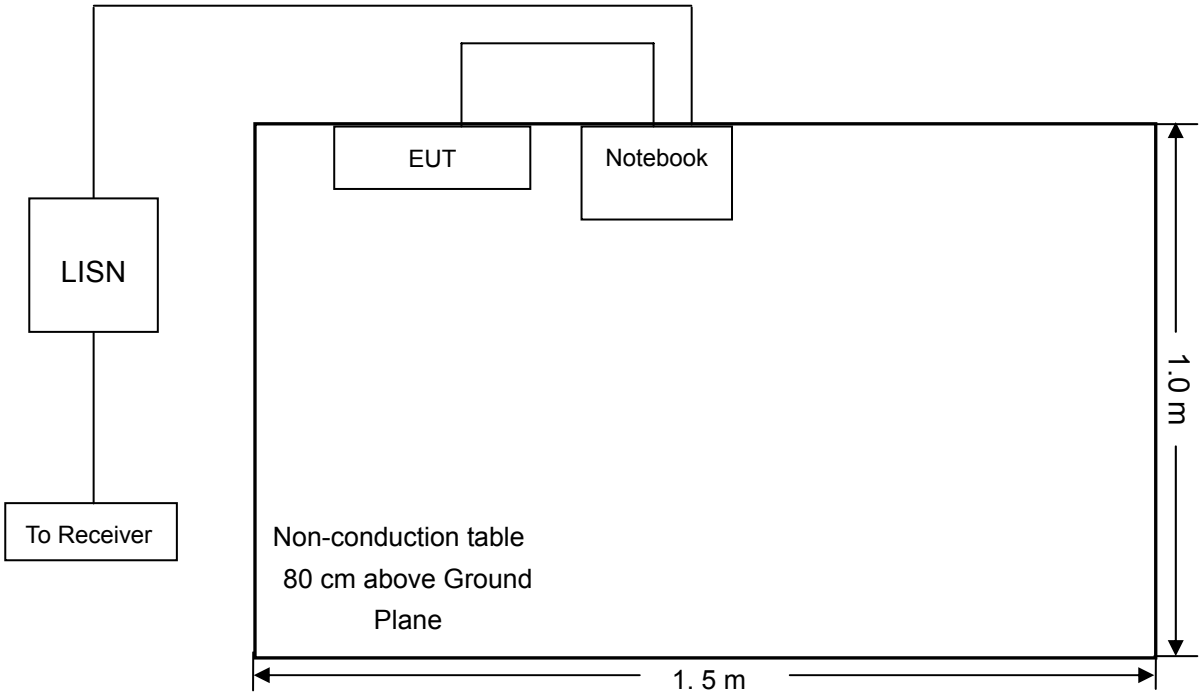
12. Conducted Emissions

12.1 Test Procedure

Test is conducting under the description of ANSI C63.4-2014, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

12.2 Basic Test Setup Block Diagram



12.3 Environmental Conditions

Temperature (℃)	22~23
Humidity (%RH)	40~42
Barometric Pressure (mbar)	950~1000
Operating Mode	Continuous Transmitting
Testing Mode	/

12.4 Summary of Test Results/Plots

According to the data in section 12.5, the EUT complied with the FCC Part 15.207(a) Conducted Emission Requirement.

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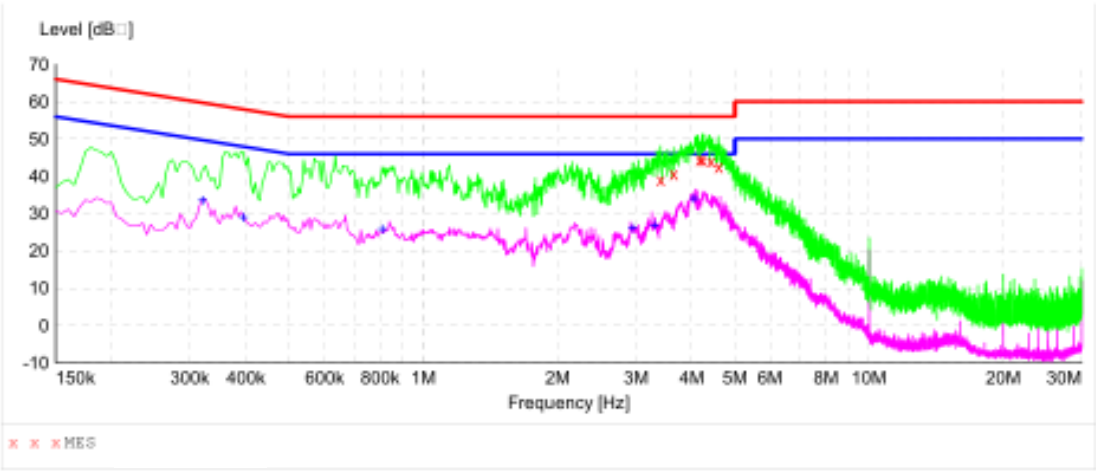
12.5 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

EUT: *Hybrid Controller*
Tested Model: *GC9838-VE*
Operating Condition: *Transmitting(RFID)*
Comment: *AC 120V/60Hz;*

Test Specification: *Neutral*

SCAN TABLE: "Voltage(150K-30M)FIN"
Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dB□	Transd dB	Limit dB□	Margin dB	Detector	Line	PE
3.410000	39.00	12.7	56	17.0	QP	N	GND
3.640000	40.60	12.9	56	15.4	QP	N	GND
4.170000	44.50	13.3	56	11.5	QP	N	GND
4.230000	44.50	13.3	56	11.5	QP	N	GND
4.415000	44.00	13.4	56	12.0	QP	N	GND
4.590000	42.60	13.4	56	13.4	QP	N	GND

MEASUREMENT RESULT:

Frequency MHz	Level dB□	Transd dB	Limit dB□	Margin dB	Detector	Line	PE
0.320000	33.50	11.0	50	16.2	AV	N	GND
0.395000	28.90	11.0	48	19.1	AV	N	GND
0.810000	25.80	10.3	46	20.2	AV	N	GND
2.945000	26.00	12.3	46	20.0	AV	N	GND
3.295000	26.80	12.6	46	19.2	AV	N	GND
4.050000	34.00	13.3	46	12.0	AV	N	GND

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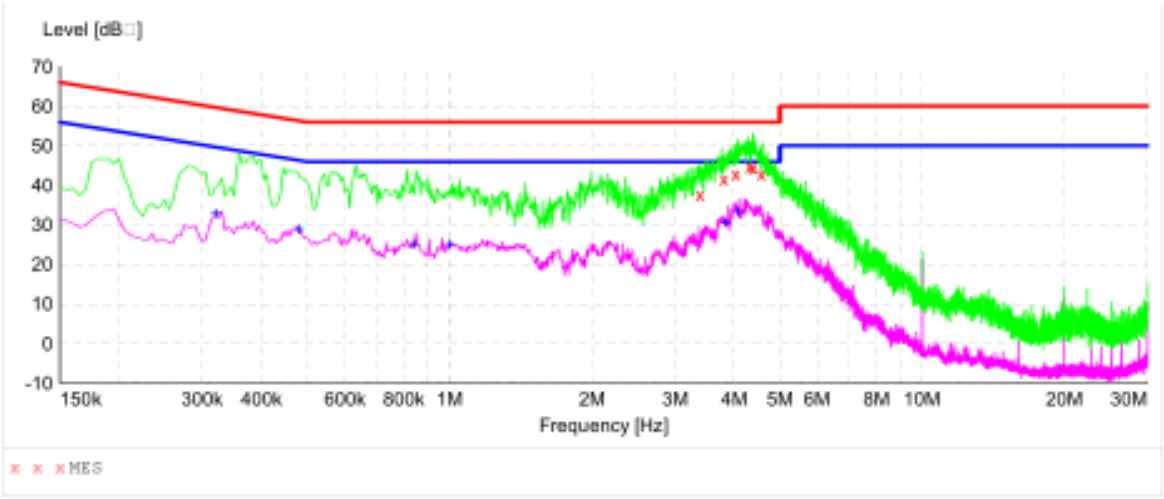
Test Specification: *L LINE*

SCAN TABLE: "Voltage(150K-30M)FIN"

Short Description: 150K-30M Voltage



MEASUREMENT RESULT:

Frequency MHz	Level dB□	Transd dB	Limit dB□	Margin dB	Detector	Line	PE
3.385000	37.60	12.7	56	18.4	QP	L1	GND
3.805000	41.60	13.1	56	14.4	QP	L1	GND
4.035000	42.90	13.3	56	13.1	QP	L1	GND
4.315000	44.70	13.3	56	11.3	QP	L1	GND
4.395000	44.40	13.4	56	11.6	QP	L1	GND
4.570000	42.80	13.4	56	13.2	QP	L1	GND

MEASUREMENT RESULT:

Frequency MHz	Level dB□	Transd dB	Limit dB□	Margin dB	Detector	Line	PE
0.320000	32.90	11.0	50	16.8	AV	L1	GND
0.480000	28.90	10.6	46	17.4	AV	L1	GND
0.840000	25.10	10.3	46	20.9	AV	L1	GND
1.000000	25.10	10.4	46	20.9	AV	L1	GND
3.845000	30.70	13.1	46	15.3	AV	L1	GND
4.080000	33.40	13.3	46	12.6	AV	L1	GND

***** END OF REPORT *****

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