

TEST REPORT

Report Reference No.:	91800100101001	
Sample ID	BLC-01-0969750-008	
Date of issue	17/03/2026	
Total number of pages	89	
Testing Laboratory	TUV SUD South Asia Pvt Ltd	
Address	Plot No. 3-P1-B, Hitech Defence & Aerospace Park, KIADB Industrial Area, BK Palya, Bengaluru, Bengaluru North Taluk Pin code – 562149 India	
Applicant's name	Special Forces Consulting Distribution, Inc DBA, Byram Metering Solutions	
Address	650 Seco Rd, Monroeville, PA 15146, USA	
Test specification Standard	FCC Part 15 Subpart C 15.247, 15.205, 15.209,15.203, RSS 247 and RSS GEN	
Test Method	ANSI C63.10-2020	
Non-standard test method	NA	
Test Report Form Number	LAB_F(EE)_138-51	
Product Name	ZEUS Energy Meter	
Test Item Description	ANSI-compliant revenue-grade Energy meter which is used for measuring electricity consumption by customers in residential, commercial, industrial applications and it has LORA based communication for automatic meter reading and controlling.	
Manufacturer	RISHABH INSTRUMENTS LIMITED, F-31,SATPUR,MIDC, NASHIK,422007, India, 0253 2202202	
Model Number	ZEUS R2 / ZEUSR12	
Serial Number	2510010007	
Ratings	120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output.	
FCC ID	2BSUR-ZEUSRX	
IC ID	34878-ZEUSRX	
Tested by (Name + Signature)	Nikhil G	
Reviewed & Approved by (Name + Signature)	Raghunath M N	

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Possible test case verdicts:

- test case does not apply to the test object: N/A
- test object does meet the requirement: Pass
- test object does not meet the requirement: Fail

Testing:

Condition of the EUT on Receipt.....: Good
Date of receipt of test item: 23/10/2025
Date (s) of performance of tests.....: 19/11/2025 to 21/11/2025

General remarks:

1. The submitted sample(s) were not drawn by laboratory.
2. The test results presented in this report relate only to the object tested.
3. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.
4. The correctness of the information related to sample(s) in the Test Request Form/Customer letterhead/E-mail is the customer's responsibility. The laboratory reports the said information in the test report and is not liable for the same.
5. The laboratory will retain the sample(s) for 45 days except for the mandatory retention period specified by the Regulatory Bodies and unless otherwise specified by the client.
6. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
“(see Enclosure #)” refers to additional information appended to the report.
“(see appended table)” refers to a table appended to the report.
7. Throughout this report a point is used as the decimal separator.

Use of uncertainty of measurement for decisions on conformity (decision rule): Yes/No

☒ No decision rule is specified by the IEC/EN standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty (“simple acceptance” decision rule, previously known as “accuracy method”).

☐ Other: (to be specified)

Decisions on conformity: Decision on conformity of results is based on as per standard limits or criteria.

Summary of compliance: The Product comply with the requirements of FCC Part 15 Subpart C 15.247, 15.205, 15.209, 15.203, RSS 247 and RSS GEN

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Revision History of Records

Test Report Number	Version	Reason for Change	Date Issued
91800100101001	00	Initial Report	14/01/2026
91800100101001	01	TCB Review Comments	17/03/2026

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1 TEST LABORATORY

1.1 Test Facility

TUV SUD South Asia Pvt Ltd

Plot No. 3-P1-B, Hitech Defence & Aerospace Park, KIADB Industrial Area, BK Palya, Bengaluru,
Bengaluru North Taluk | Pin code – 562149 India

FCC Registration Number: 553113

ISED Wireless Testing Laboratory: 33098

2 GENERAL INFORMATION

2.1 Appendices

The following documents are appended to this report as separate attachments:

Test Setup Photographs, External and Internal Photographs of the EUT, Label and its Location, Block Diagram, EUT Specifications, Schematic Diagrams, Bill of Materials, User Manual, and Maximum Permissible Exposure (MPE) information.

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3 TEST SUMMARY

Table 1: Test Summary

Sl.no	Requirement – Test	Basic Standard		Result
		FCC	ISED	
1.	Maximum conducted (Peak) output power	FCC 15.247 (b)(2)&(3)	RSS 247 Issue 4, Section 6.3.2	Pass
2.	Maximum Power Spectral Density	FCC 15.247(e)	RSS 247 Issue 4, Section 6.3.1	Pass*
3.	DTS Bandwidth & 99% Bandwidth	FCC 15.247(a)(2)	RSS 247 Issue 4, Section 6.3.1	Pass*
4.	Emissions in non-restricted frequency bands	FCC 15.247(d)	RSS 247 Issue 4, Section 6.6	Pass*
5.	Radiated Spurious Emissions	FCC 15.247 (d)/209(a) / 15.205	RSS-Gen Issue 5, Section 8.9 /8.10	Pass
6.	Conducted Emissions on AC Power Lines	FCC 15.207(a)	RSS-Gen Issue 5, Section 8.8	Pass
7.	Antenna Requirement	FCC 15.203	RSS-Gen Issue 5, Section 6.8	Pass
8.	Carrier Frequency Separation	FCC 15.247 (a) (1)	RSS-247 Issue 4, Section 6.2.1	Pass*
9.	Number of Hopping Frequency	FCC 15.247 (a) (1) (i)	RSS-247 Issue 4, Section 6.2.1	Pass*
10.	Time of Occupancy	FCC 15.247 (a) (1) (iii)	RSS-247 Issue 4, Section 6.2.1	Pass*

Antenna Requirement:

The antenna used in the host device is identical to the antenna configuration approved with the original module certification. The antenna type, gain, and RF path remain unchanged, ensuring compliance with the requirements of FCC §15.203 and RSS-Gen Issue 5.

Note:

The customer has declared that the ZEUS Energy Meter is available in two models, ZEUS R2 and ZEUS R12 meters, which are functionally identical in all performance, accuracy, communication, and standards-related aspects. The only differences are the wiring configuration and supported voltage range, which do not impact the characteristics assessed in this report. Refer to Section 6.2 Product Similarities and Differentiation.

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Pass*:

Certain transmitter parameters were not evaluated as they are not affected by host integration. The LoRa transmitter RF design remains unchanged from the previously certified platform under FCC ID: 2AF6B-RAK3172 / IC ID: 25908-RAK3172, and integration into the ZEUS Energy Meter does not modify the RF circuitry, operating characteristics, or antenna interface affecting compliance.

The host device uses the same antenna type and maximum antenna gain as approved with the original module certification, and no modifications have been made to the antenna design or RF path.

Therefore, conducted test data from the original module certification has been reproduced in this report and reused in accordance with FCC KDB 996369 D02 Module Q&A v02r02, Section Q1(b)(4). The previously tested data under the original module certification continues to comply with RSS-247 Issue 4, as there have been no changes in test limits, measurement methods, or transmitter RF parameters.

Therefore, Pass* items are justified based on the unchanged transmitter RF design and evaluation of the final integrated host configuration.

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4 MEASUREMENT UNCERTAINTY

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$

Table 2: Measurement Uncertainty

No.	Item	Uncertainty
1	Conducted Emission Test	2.25dB
2	Radiated Emission Test	4.71 dB

5 TEST EQUIPMENT USED

Table 3: Test Equipment Used

S. No	Test Equipment	Manufacturer	Model No	Serial No	Calibration Due Date
1.	Active Loop Antenna	Schwarzbeck Mess-Elektronik	FMZB 1519C	43	07/04/2026
2.	Biconical Antenna	Schwarzbeck Mess-Elektronik	VHBB 9124	1940	17/02/2026
3.	Log-Periodic Antenna	Schwarzbeck Mess-Elektronik	VUSLP 9111 B	735	18/02/2026
4.	Double Ridge Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA 9120D	2733	31/03/2026
5.	Double Ridge Broadband Horn Antenna	Schwarzbeck Mess-Elektronik	BBHA 9120L	18	15/05/2026
6.	EMI Test Receiver	ROHDE & SCHWARZ	ESR3	103112	25/02/2026
7.	Open Switch and Control Platform	ROHDE & SCHWARZ	OSP150	101158	27/02/2026
8.	EMI Test Receiver	ROHDE & SCHWARZ	ESW44	103295	10/03/2026
9.	Signal controlling unit	ROHDE & SCHWARZ	SCU01F	100507	--
10.	Signal Conditioning Unit	ROHDE & SCHWARZ	SCU18F	101037	--
11.	Signal controlling unit	ROHDE & SCHWARZ	SCU40F1	100653	--

Table 4: Instrument application Software versions

Sl. No	Test Type	Application software and version
1	Antenna Port conducted measurement: TS8997 system	WMS 32 V11.60.00
2	Radiated spurious emission measurement- 10-meter Semi Anechoic Chamber	Elektra V5.03.0

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6 EQUIPMENT INFORMATION

6.1 Product Function

ANSI Energy meter is used for measuring electricity consumption by customer it has LORA based communication for remote monitoring and controlling

6.2 Product Similarities and differentiation

Block Features	Differences	Similarity
Voltage and current connection	R2S : Neutral not connected R12S : Neutral connected	Same except differences
Signal conditioning For voltage and current input and power supply	R2S: Phase A Resistor dividers are connected with respect to internal ground and Internal ground is connected to Phase C. R12S : Resistor dividers Phase A , C are connected with respect to internal ground which is connected to external Neutral.	All hardware is same except Differences
Measurement Microcontroller	No differences	Common firmware and hardware
Peripheral like Memory , LCD, Keys , Optical Port etc	No differences	Common hardware and firmware
LoRa Module communication Microcontroller	No differences	Common hardware and firmware

Note:

Although ZEUS R2 and ZEUS R12 differ in input signal conditioning and neutral connection, the RF section including LoRa module, antenna, and communication circuitry is identical. These differences do not affect RF emissions or compliance results.

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6.3 General Information of EUT

Table 5: EUT details as declared by client*

EUT Name	ZEUS Energy Meter	
Model Name	ZEUS R2 / ZEUS R12	
Protocol	LoRa	
Environmental conditions	Storage	Temperature: -40°C to +85°C Humidity: 0 to 100% RH
	Operating	Temperature: -40°C to +85°C Humidity: 0 to 100% RH
Supply Voltage	120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output	
Modulation	Lora DTS	Lora FHSS
Operating Frequency Range	903 – 914.2MHz	902.3 – 914.9MHz
Data Rate LoRa: SF8 / DR4	Data Rate LoRa: SF8 / DR4	LoRa: SF7 to SF10 / DR0 to DR3
Channel Number 8 channels (Upstream)	Channel Number 8 channels (Upstream)	64 channels (Upstream)
Channel Separation	1.6 MHz	200 KHz
Occupied Bandwidth	500 KHz	125 KHz
Antenna Type	LoRa Flexible PCB Antenna	
Antenna Gain	-0.06 dBi	
EUT Dimension (LxWxH)	L= 177mm, W= 177mm (Ø177mm), H= 153.7mm.	

***Disclaimer:** The TÜV SÜD is not responsible for the accuracy of the customer declared specification.

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7 TEST DESCRIPTION

7.1 Test Operation and software mode

Hardware Version Identification Number: ZEUS-R2, ZEUS-R12

Software Version: RUI_4.2.1_ZEUS-Rx

7.2 Principle of Configuration Selection

Transmission was enabled with highest possible duty cycle on low, mid and high channels

7.3 Accessories and Auxiliary Equipment

Table 6: Auxiliary Equipment Used during Test

Description	Manufacturer	Model	S/N	Rating
Laptop	DELL	P144G201	5510FX3	230V AC

7.4 List of frequencies

Table 7: RF Channel and Frequency of Lora FHSS

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
0	902.3	16	905.5	32	908.7	48	911.9
1	902.5	17	905.7	33	908.9	49	912.1
2	902.7	18	905.9	34	909.1	50	912.3
3	902.9	19	906.1	35	909.3	51	912.5
4	903.1	20	906.3	36	909.5	52	912.7
5	903.3	21	906.5	37	909.7	53	912.9
6	903.5	22	906.7	38	909.9	54	913.1
7	903.7	23	906.9	39	910.1	55	913.3
8	903.9	24	907.1	40	910.3	56	913.5
9	904.1	25	907.3	41	910.5	57	913.7
10	904.3	26	907.5	42	910.7	58	913.9
11	904.5	27	907.7	43	910.9	59	914.1
12	904.7	28	907.9	44	911.1	60	914.3
13	904.9	29	908.1	45	911.3	61	914.5
14	905.1	30	908.3	46	911.5	62	914.7
15	905.3	31	908.5	47	911.7	63	914.9

Table 8: RF Channel and Frequency of Lora DTS

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
64	903	66	906.2	68	909.4	70	912.6
65	904.6	67	907.8	69	911		914.2

8 OPERATIONAL DESCRIPTION

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LoRa-Based Energy Metering System Description

1. Voltage and Current Signal Acquisition

Voltage Input and Current Input signals are acquired from the electrical system under measurement. These are analog signals representing instantaneous electrical parameters.

2. Signal Conditioning Circuit

The voltage and current signals are connected to the Signal Conditioning Circuit, where they are scaled and filtered. This circuit reduces the amplitude of the voltage and current wave forms to levels suitable for analog-to-digital conversion and removes any high-frequency noise. The output consists of low-voltage analog signals that accurately represent the original input wave forms.

3. Measurement Micro controller (Meteorology MCU)

The conditioned voltage and current signals are fed into the Measurement Micro controller (Meteorology MCU). This micro controller samples the analog signals using its internal or external ADCs (Analog-to-Digital Converters) and performs real-time digital signal processing to calculate meteorological parameters such as:

- Instantaneous voltage and current
- Active, reactive, and apparent power
- Energy consumption (kWh)
- Power factor

4. Peripheral Components of the Meteorology MCU

The Measurement Micro controller is connected to the following components:

- Memory – For storing energy consumption data and device configurations.
- LCD Display – For local display of metering values.
- Keys/Buttons – For user interaction and device configuration.
- Optical Port – For local data reading or programming using an optical probe.

5. Data Communication Between MCUs

After computation, the measured data is transmitted via the UART (Universal Asynchronous Receiver/Transmitter) interface to the LoRa Communication Micro controller. This serial communication link transfers digital data packets from the Meteorology MCU to the Communication MCU.

6. LoRa Communication Micro controller

The LoRa Communication Micro controller receives the UART data from the Meteorology MCU, parses and formats it into packets compatible with the LoRa protocol. It handles data framing, error checking, and command interpretation. Once the data is ready, it communicates with the LoRa Module using either a UART or SPI interface, depending on the module Specification.

7. LoRa Module

The LoRa Module receives the formatted data from the Communication Micro controller and transmits it wireless using the LoRa modulation scheme. The module operates in the license free sub-GHz ISM bands (e.g., 915 MHz in North America).

The LoRa Module is responsible for RF modulation, transmission, and reception.

8. Serial Communication Interface

In addition to RF transmission, the LoRa Module provides a serial communication interface (Tx, Rx, GND) that can be connected to a computer for monitoring, testing, debugging, or configuring the module. Through this interface, transmitted data can be viewed in real time, and commands can be issued to the module or the entire device.

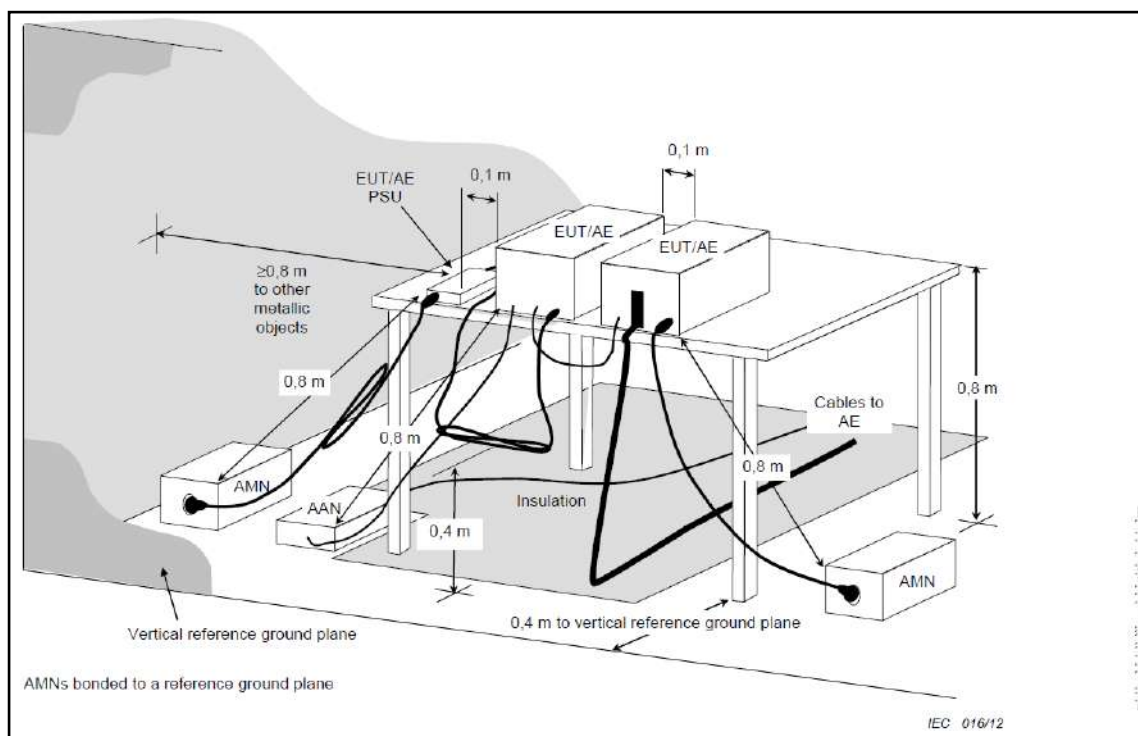
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9 TEST METHODOLOGY

9.1 Conducted Spurious Emission Test on AC Power Lines

AC powerline conducted emissions were measured across the 50Ω LISN port connected to the Equipment Under Test (EUT). Emission voltage and current measurements were performed on each current-carrying conductor at the EUT power cord plug using mating plugs and receptacles on the LISN. The EUT was tested using manufacturer-supplied or recommended power cords, ensuring equivalent electrical and shielding characteristics. The device will be positioned on a test table 80cm above the reference ground plane, with a vertical conducting plane located 40cm to its rear. AC conducted emission measurements were conducted over a frequency range of 150kHz to 30MHz, utilizing an AC adapter with a 110V AC 60Hz supply.

9.1.1 Test Setup Configuration



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9.2 Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2020. The equipment under test (EUT) was placed at the middle of the 1mtr high turntable for below 1 GHz and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360 ° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1GHz was performed by Horn Antenna, the measurement below 30 MHz was performed by loop antenna, Measurement from 30 MHz to 1000 MHz was performed by Broadband Trilog Antenna.

The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded

9.2.1 Test Setup Configuration

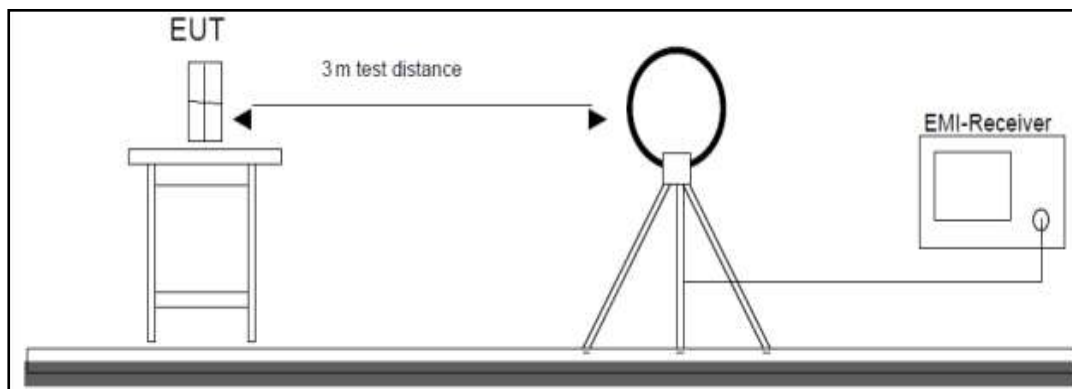


Figure 1: Frequency Range 9 kHz- 30 MHz

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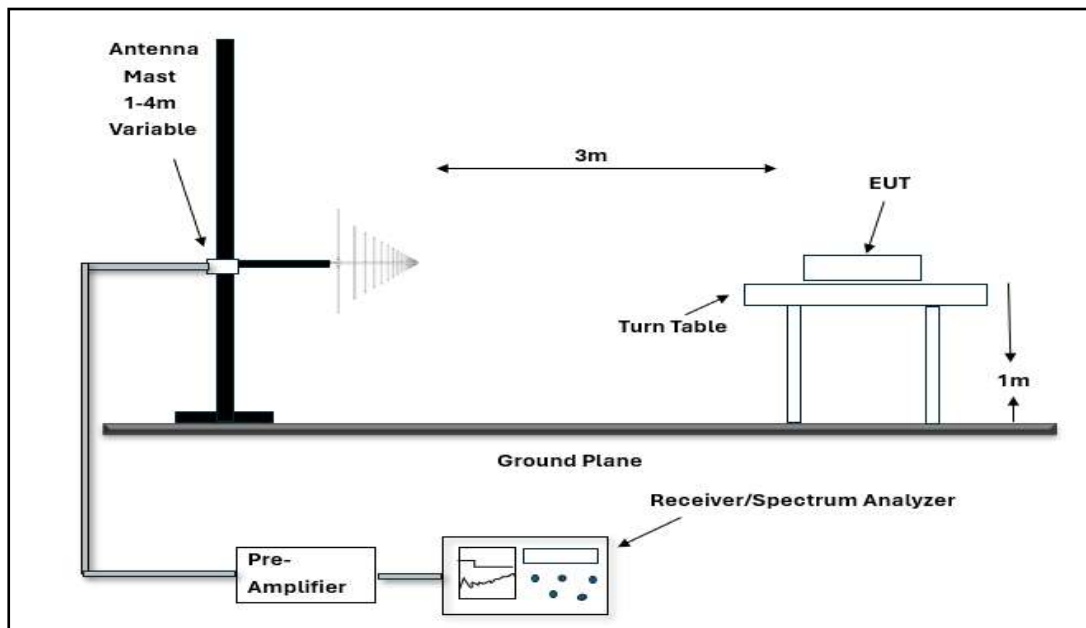


Figure 2: Frequency Range 30 MHz - 1GHz

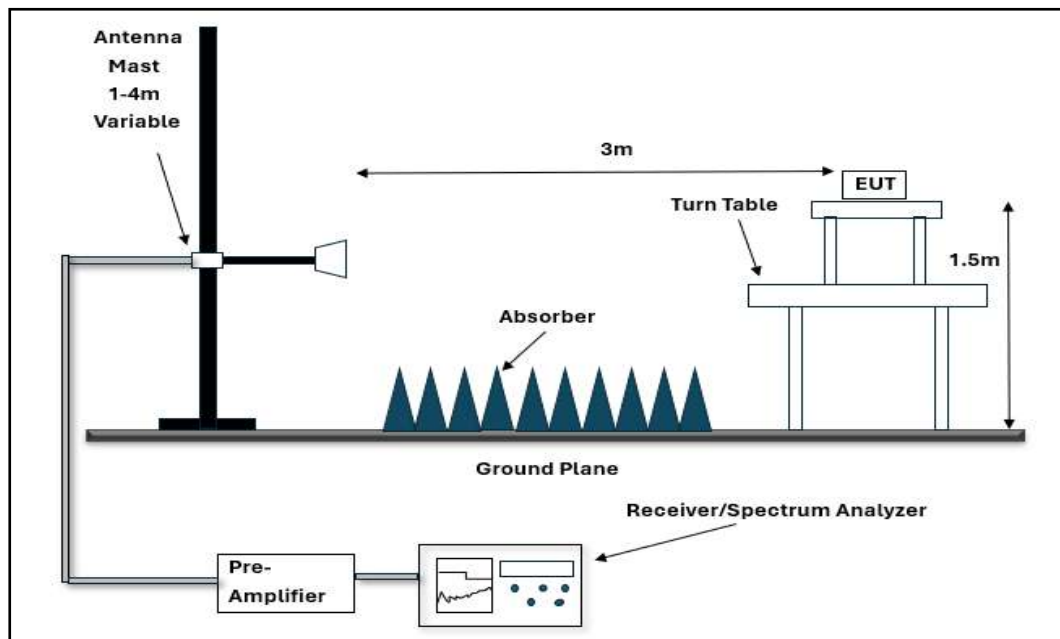


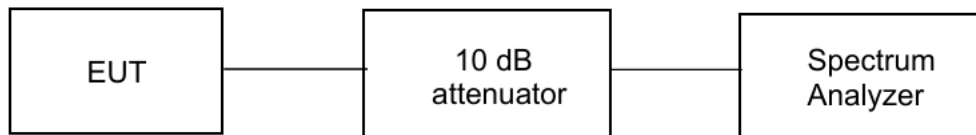
Figure 3: Frequency Range above 1 GHz

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10 TEST CONDITIONS AND RESULTS – Maximum Peak Conducted Output Power

Test Specification	FCC part 15 Subpart C 15.247 (b)(2)&(3)/ RSS 247 Issue 4, Section 6.3.2
Test Method	Subclause 11.9.2.3.2 of ANSI C63.10-2020
Measurement Bandwidth	1MHz
Detector	Peak
Requirement	Not more than 1Watt(30dBm) for DTS in the band 902 928MHz and 2400-2483.5MHz Not more than 1Watt(30dBm) for FHSS with at least 50 hopping channels in the band 902-928MHz

Test Setup:



10.1 Environmental Conditions

Temperature	: 24°C
Relative humidity	: 52%
Power supply	: 120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output

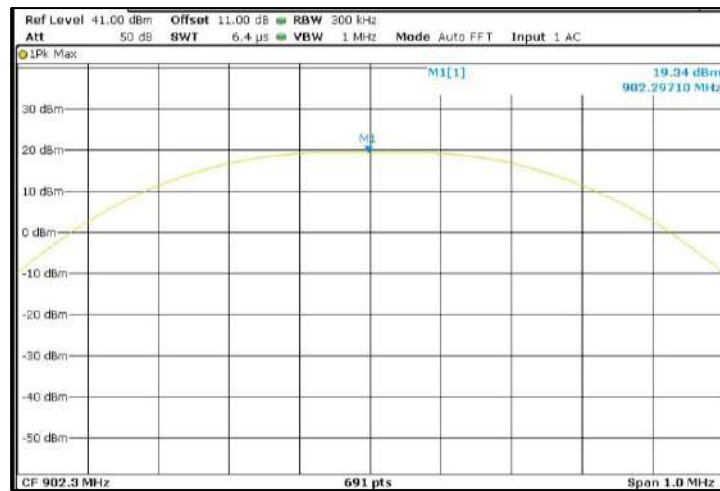
10.2 Test results

Product: ZEUSR12

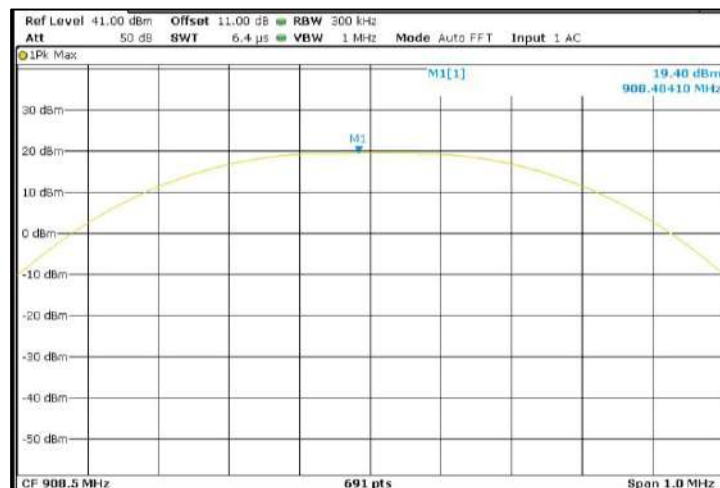
Test Mode	Channel Frequency (MHz)	RF Output Power (dBm)	Maximum e.i.r.p (dBm)	Limit (dBm)	e.i.r.p limit (dBm)
FHSS	902.3	19.34	19.28	30	36
	908.5	19.40	19.34	30	36
	914.9	19.45	19.39	30	36
DTS	903.0	19.56	19.50	30	36
	907.8	19.52	19.46	30	36
	914.2	19.61	19.55	30	36

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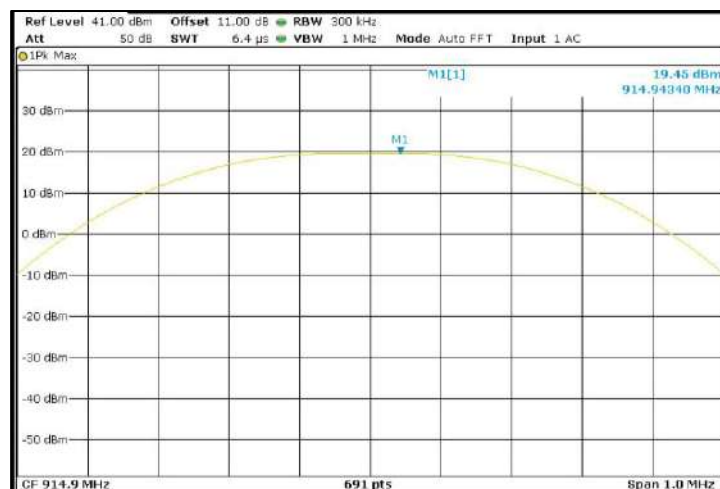
Modulation: FHSS



Channel Frequency: 902.3MHz



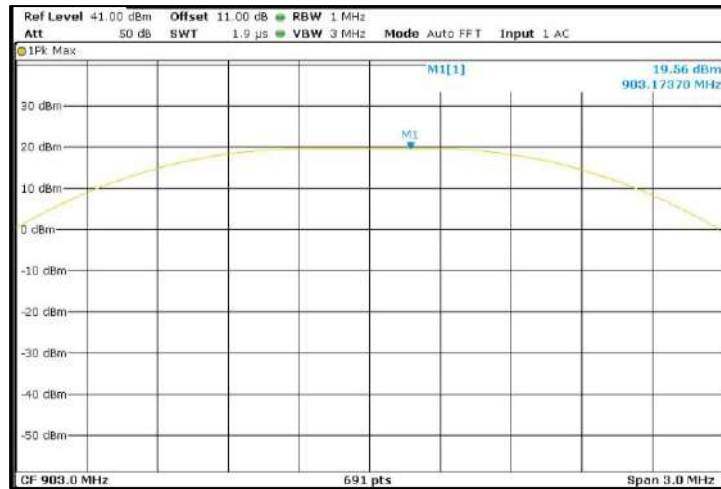
Channel Frequency: 908.5MHz



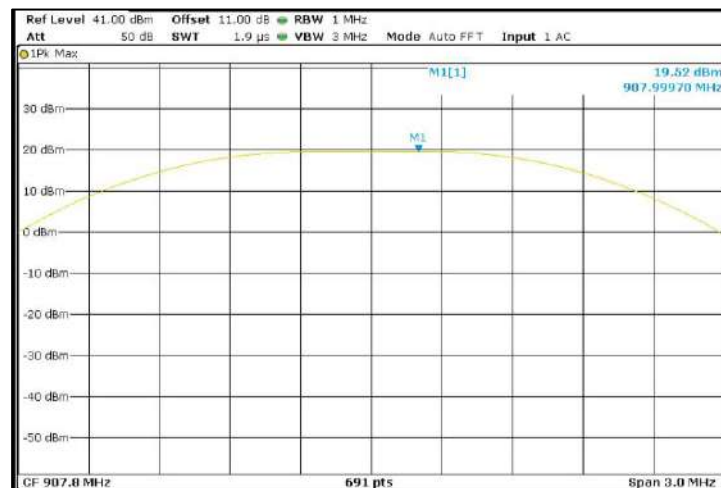
Channel Frequency: 914.2MHz

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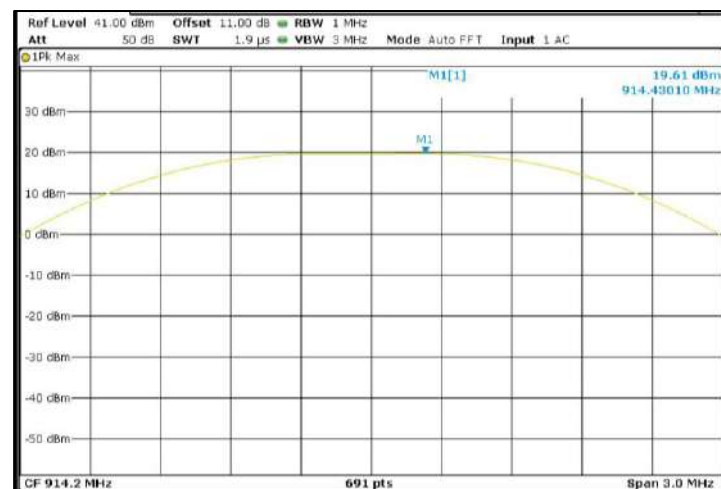
Modulation: DTS



Channel Frequency: 903MHz



Channel Frequency: 907.8MHz



Channel Frequency: 914.2MHz

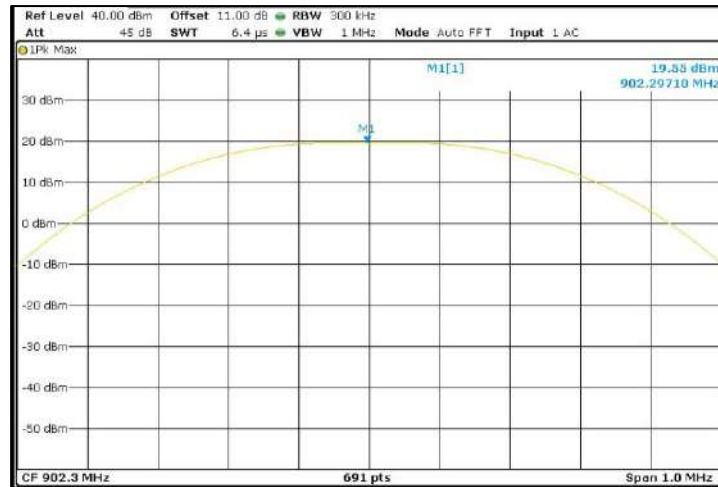
Report Reference. No.: 91800100101001

Product: ZEUSR2

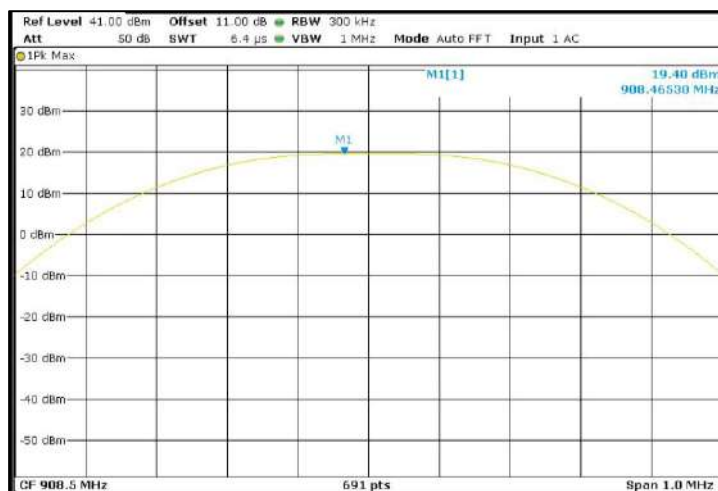
Test Mode	Channel Frequency (MHz)	RF Output Power (dBm)	Maximum e.i.r.p (dBm)	Limit (dBm)	e.i.r.p limit (dBm)
FHSS	902.3	19.55	19.49	30	36
	908.5	19.40	19.34	30	36
	914.9	19.72	19.66	30	36
DTS	903.0	19.29	19.23	30	36
	907.8	19.28	19.22	30	36
	914.2	19.34	19.28	30	36

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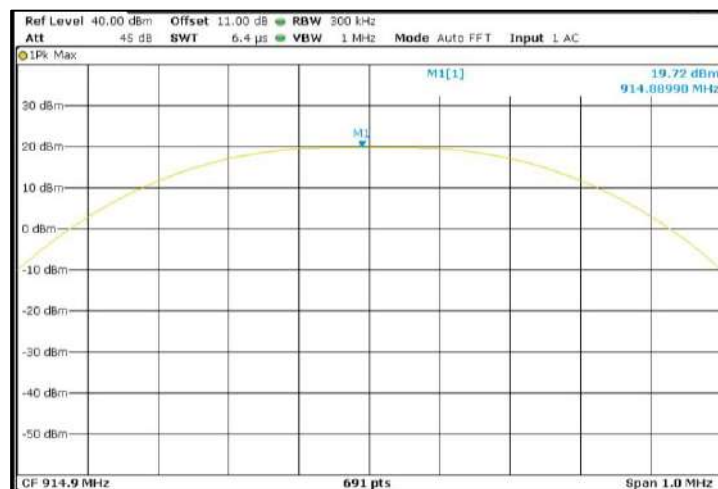
Modulation: FHSS



Channel Frequency: 902.3MHz



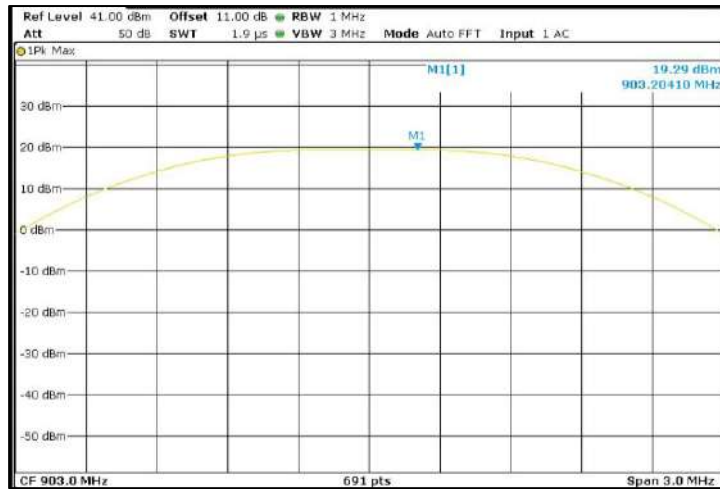
Channel Frequency: 908.5MHz



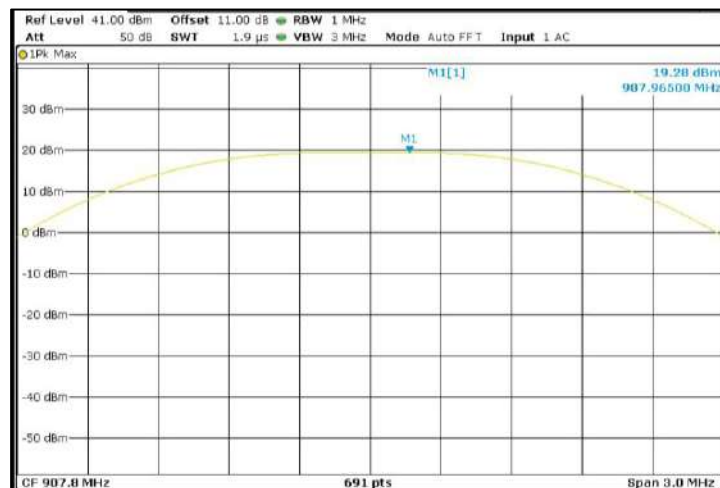
Channel Frequency: 914.2MHz

Report Reference. No.: 91800100101001

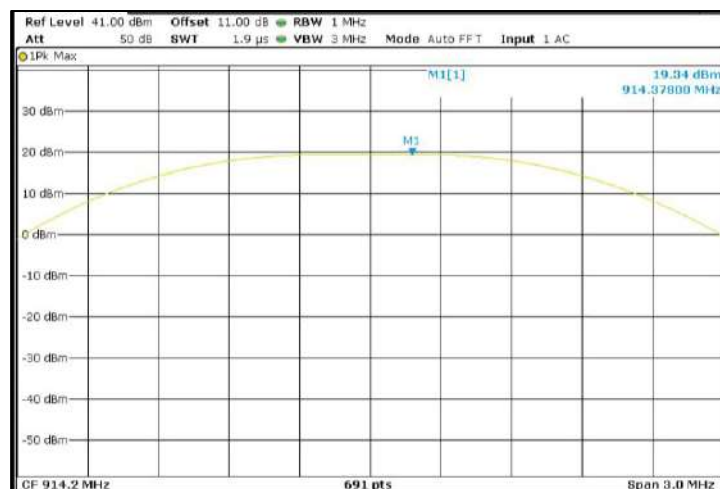
Modulation: DTS



Channel Frequency: 903MHz



Channel Frequency: 907.8MHz



Channel Frequency: 914.2MHz

Report Reference. No.: 91800100101001

11 TEST CONDITIONS AND RESULTS – Conducted Power Spectral Density

Test Specification	FCC part 15 Subpart C 15.247 (e)/ RSS 247 Issue 4, Section 6.3.1
Test Method	Subclause 11.10 of ANSI C63.10-2020
Measurement Bandwidth	3kHz
Detector	Peak
Requirement	< 8 dBm / 3kHz

11.1 Environmental Conditions

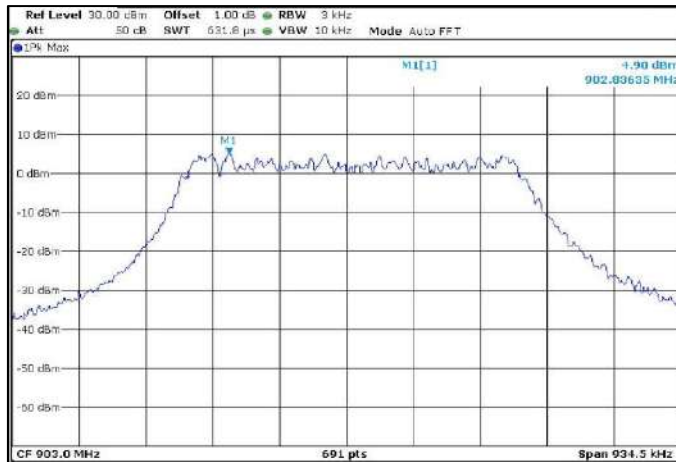
Temperature	: 24°C
Relative humidity	: 52%
Power supply	: 120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output

11.2 Test results

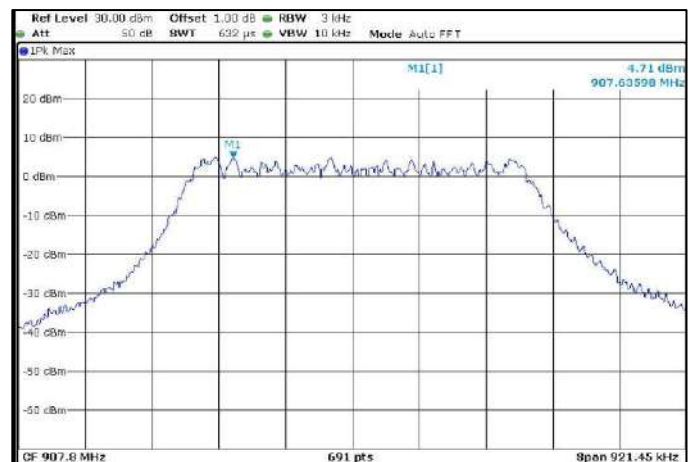
Test Mode	Channel Frequency (MHz)	Measured Peak PSD (dBm/3kHz)	Limit (dBm)
DTS	903.0	4.90	30
	907.8	4.71	30
	914.2	4.79	30

Report Reference. No.: 91800100101001

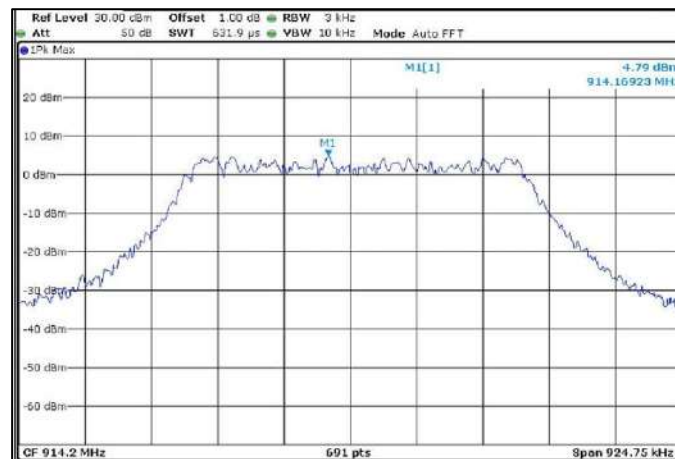
Test Plots:



Channel Frequency: 903MHz



Channel Frequency: 907.8MHz



Channel Frequency: 914.2MHz

Report Reference. No.: 91800100101001

12 TEST CONDITIONS AND RESULTS – 6dB Bandwidth

Test Specification	FCC part 15 Subpart C 15.247 (a)(2)/ RSS 247 Issue 4, Section 6.3.1
Test Method	Subclause 11.8 of ANSI C63.10-2020
Measurement Bandwidth	100kHz
Detector	Peak
Requirement	At least 500kHz for bandwidth (DTS)

12.1 Environmental Conditions

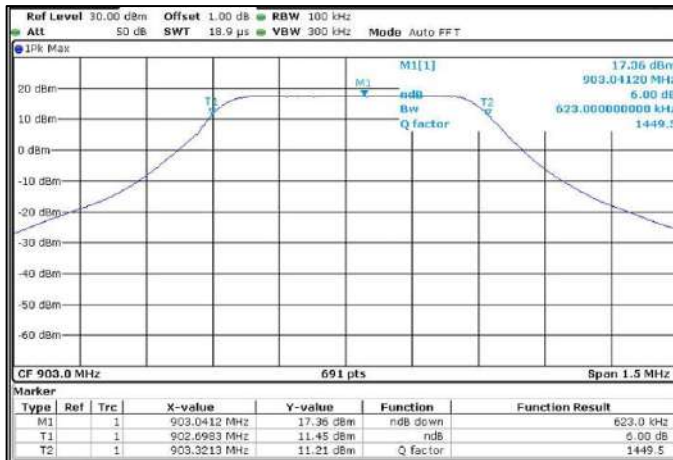
Temperature	: 24°C
Relative humidity	: 52%
Power supply	: 120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output

12.2 Test results

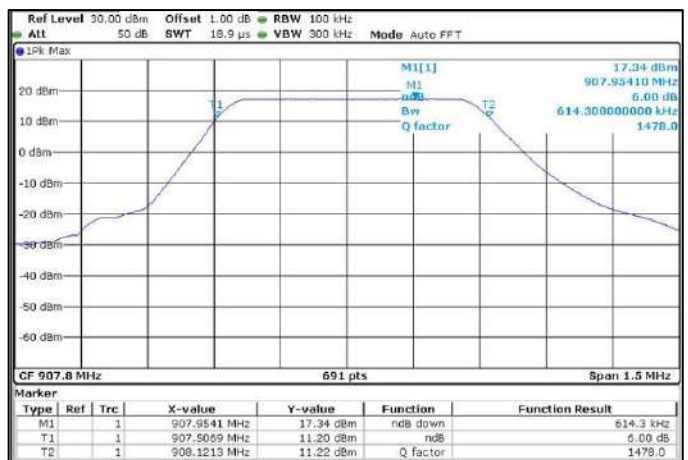
Test Mode	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
DTS	903.0	623.0	>500kHz
	907.8	614.3	
	914.2	616.5	

Report Reference. No.: 91800100101001

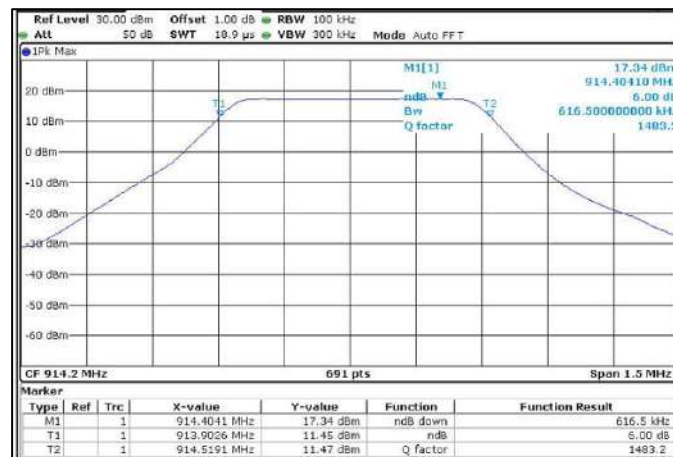
Test Plots:



Channel Frequency: 903MHz



Channel Frequency: 907.8MHz



Channel Frequency: 914.2MHz

Report Reference. No.: 91800100101001

13 TEST CONDITIONS AND RESULTS – 20dB Bandwidth

Test Specification	FCC part 15 Subpart C 15.247 (a)(2)/ RSS 247 Issue 4, Section 6.3.1
Test Method	Subclause 11.8 of ANSI C63.10-2020
Measurement Bandwidth	3kHz
Detector	Peak
Requirement	Not more than 500kHz and < 250KHz for at least 50 hopping frequencies >=250KHz for at least 25 hopping frequencies

13.1 Environmental Conditions

Temperature	:	24°C
Relative humidity	:	52%
Power supply	:	120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output

13.2 Test results

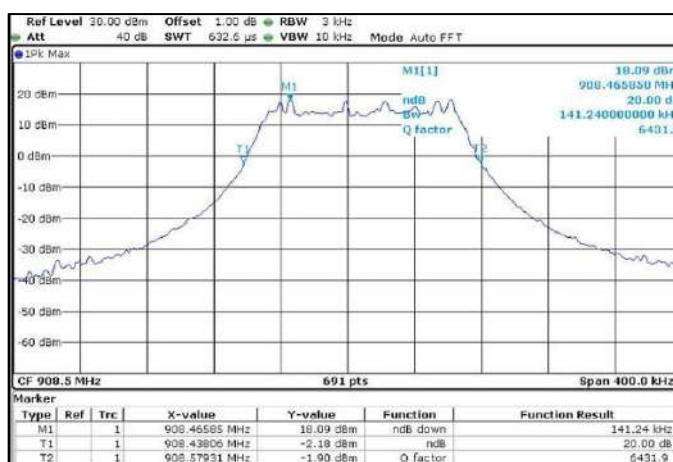
Test Mode	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)
FHSS	902.3	141.24	<500kHz
	908.5	141.24	
	914.9	141.09	

Report Reference. No.: 91800100101001

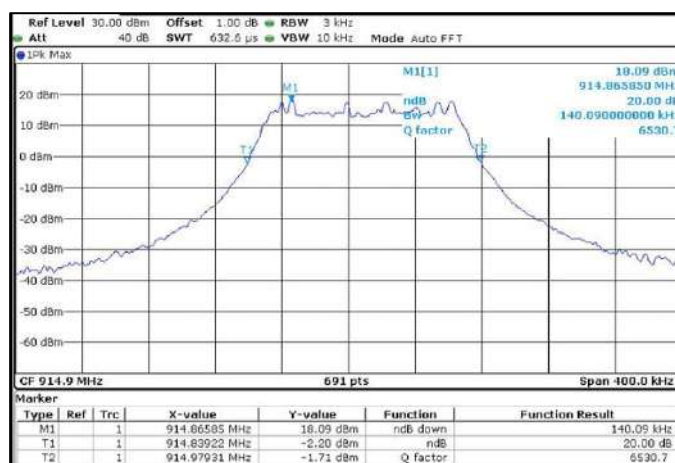
Test Plots:



Channel Frequency: 902.3MHz



Channel Frequency: 908.5MHz



Channel Frequency: 914.9MHz

Report Reference. No.: 91800100101001

14 TEST CONDITIONS AND RESULTS – 99% Bandwidth

Test Specification	FCC part 15 Subpart C 15.247 (a)(2)/ RSS 247 Issue 4, Section 6.3.1
Test Method	Subclause 11.8 of ANSI C63.10-2020
Measurement Bandwidth	3kHz
Detector	Peak

14.1 Environmental Conditions

Temperature	: 24°C
Relative humidity	: 52%
Power supply	: 120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output

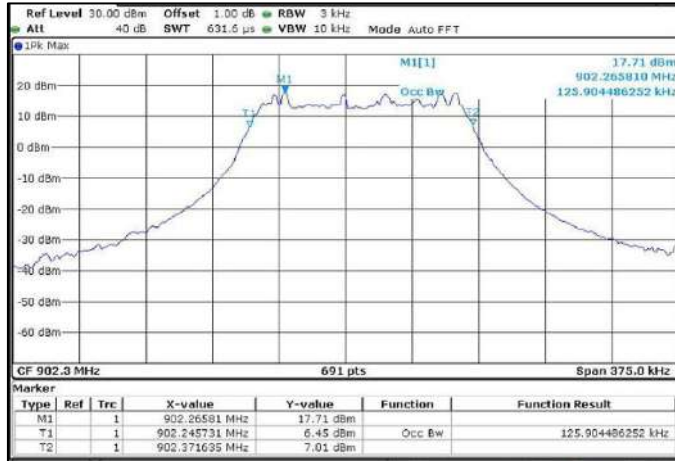
14.2 Test results

Test Mode	Channel Frequency (MHz)	99% Bandwidth (kHz)
FHSS	902.3	125.90
	908.5	126.45
	914.9	125.36
DTS	903.0	501.45
	907.8	503.62
	914.2	505.79

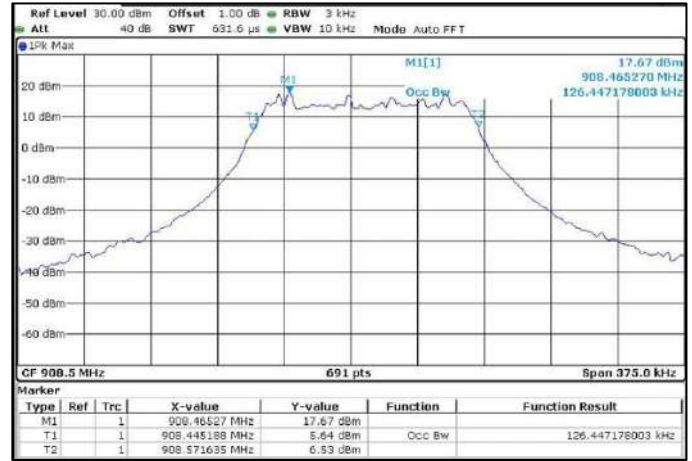
Report Reference. No.: 91800100101001

Test Plots:

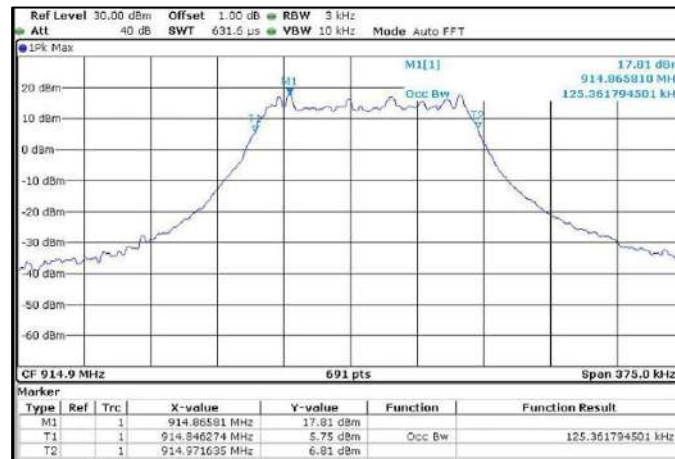
FHSS plots:



Channel Frequency: 902.3MHz



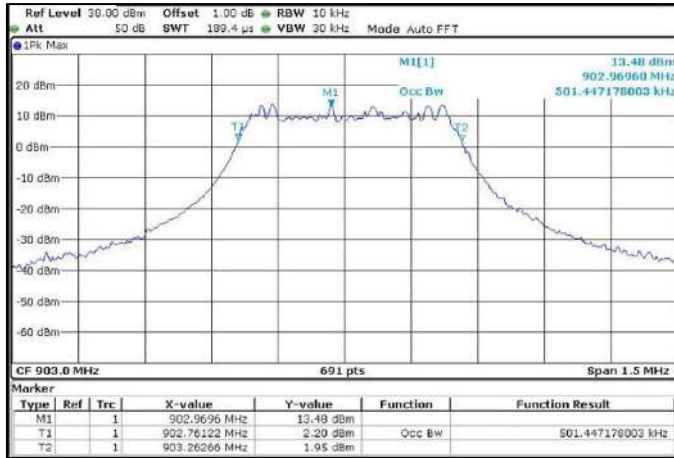
Channel Frequency: 908.5MHz



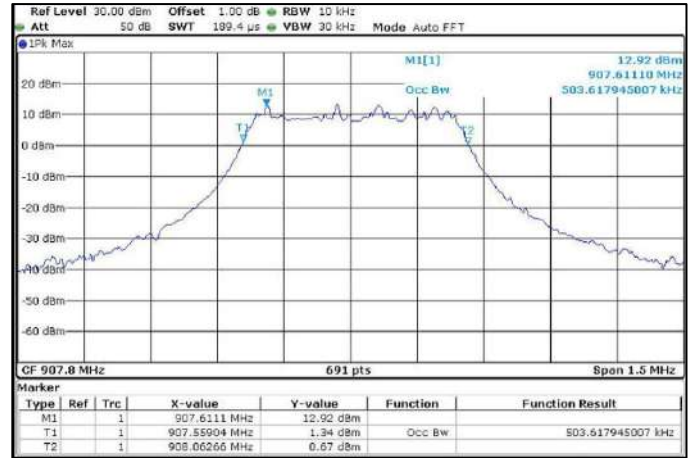
Channel Frequency: 914.9MHz

Report Reference. No.: 91800100101001

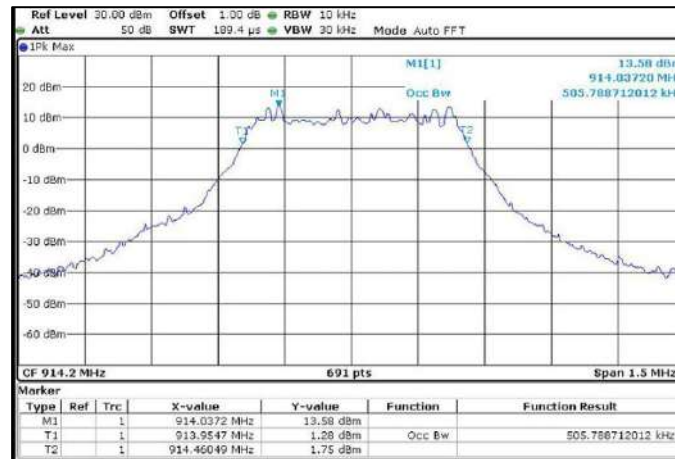
DTS plots:



Channel Frequency: 903MHz



Channel Frequency: 907.8MHz



Channel Frequency: 914.2MHz

Report Reference. No.: 91800100101001

15 TEST CONDITIONS AND RESULTS – Conducted Spurious Emissions

Test Specification	FCC part 15 Subpart C 15.247 (d)/ RSS 247 Issue 4, Section 6.6
Test Method	Subclause 11.11 of ANSI C63.10-2020
Measurement Bandwidth	100kHz
Detector	Peak
Requirement	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)

15.1 Environmental Conditions

Temperature	: 24°C
Relative humidity	: 52%
Power supply	: 120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output

15.2 Test results

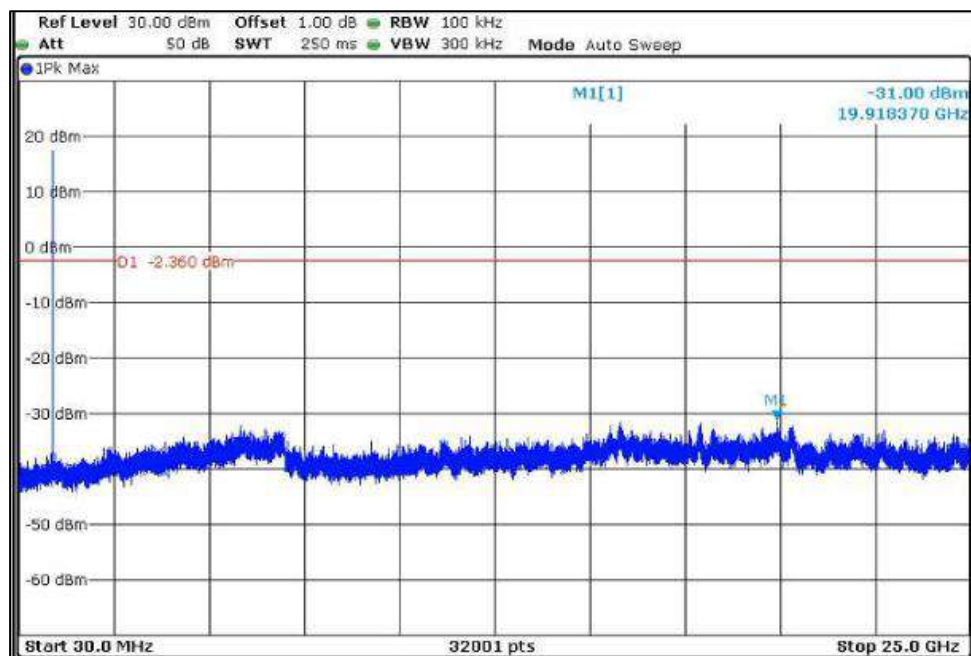
Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

Report Reference. No.: 91800100101001

Test Plots:

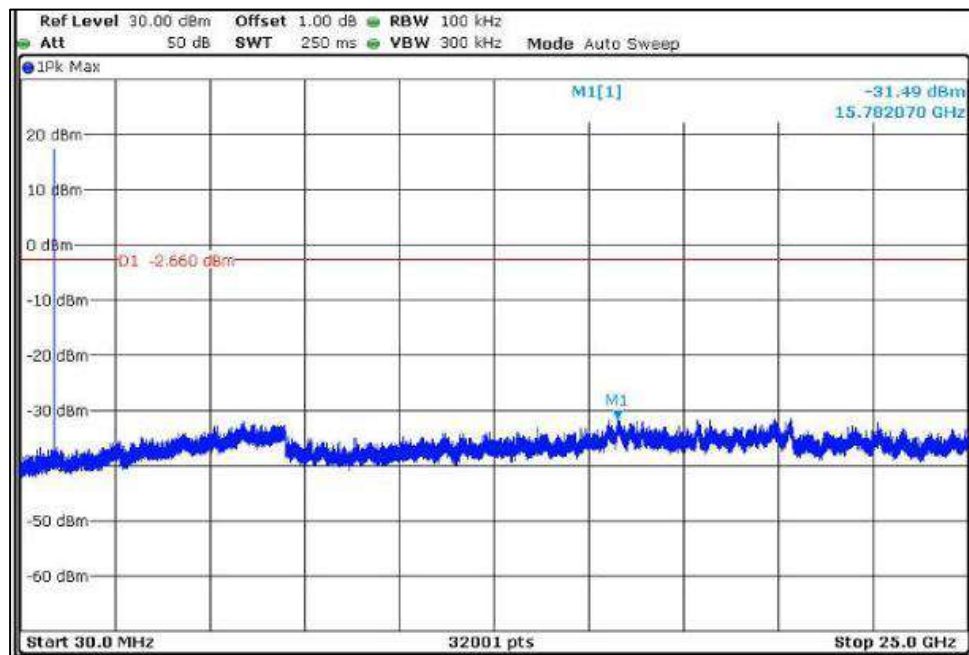
DTS plots:

Channel Frequency: 903MHz



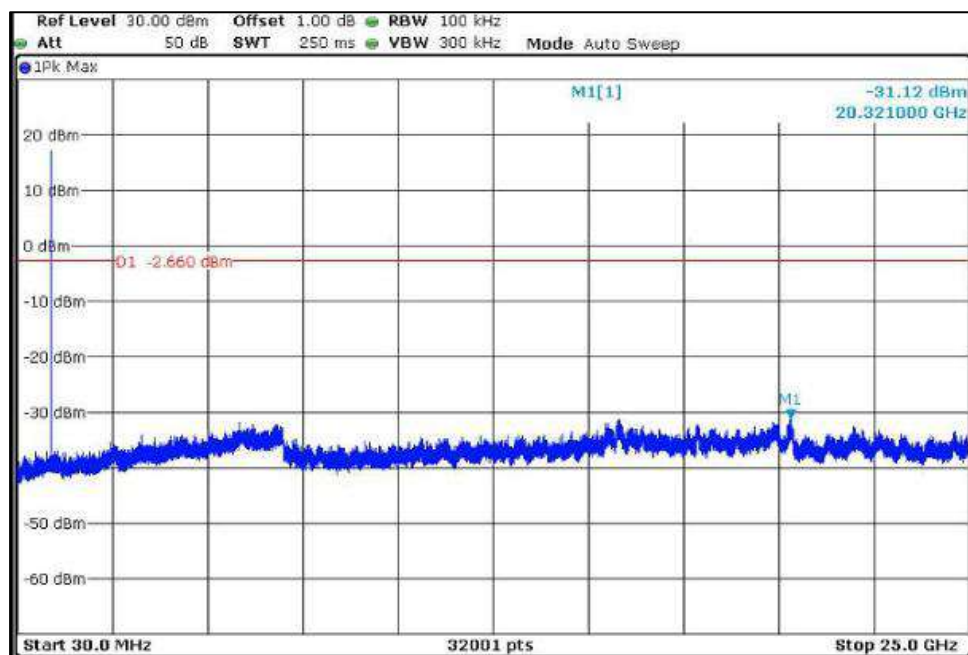
Report Reference. No.: 91800100101001

Channel Frequency: 907.8MHz



Report Reference. No.: 91800100101001

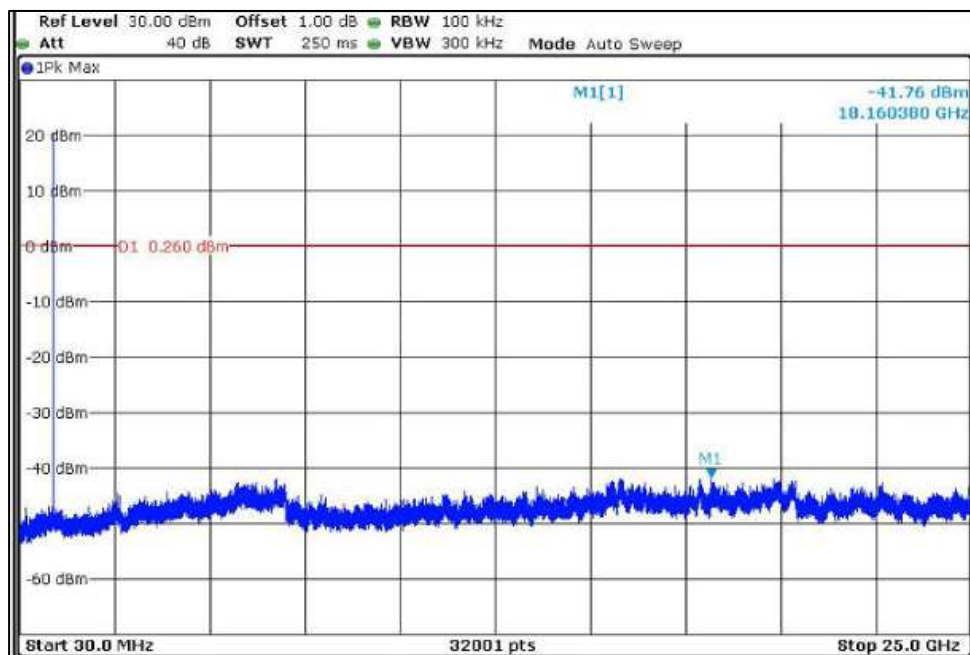
Channel Frequency: 914.2MHz



Report Reference. No.: 91800100101001

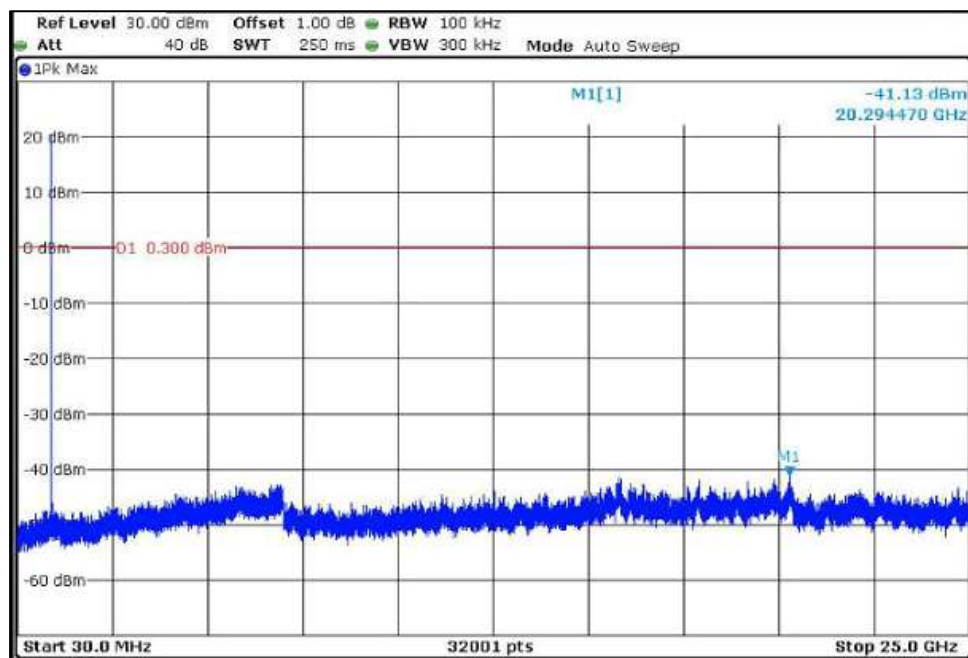
FHSS plots (No Hopping):

Channel Frequency: 902.3MHz



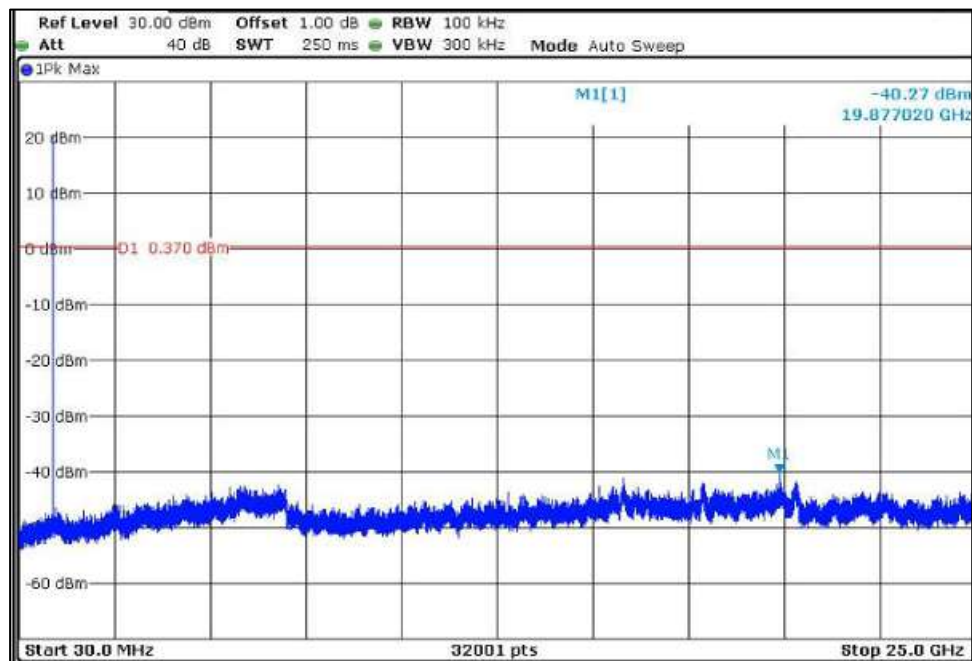
Report Reference. No.: 91800100101001

Channel Frequency: 908.5MHz



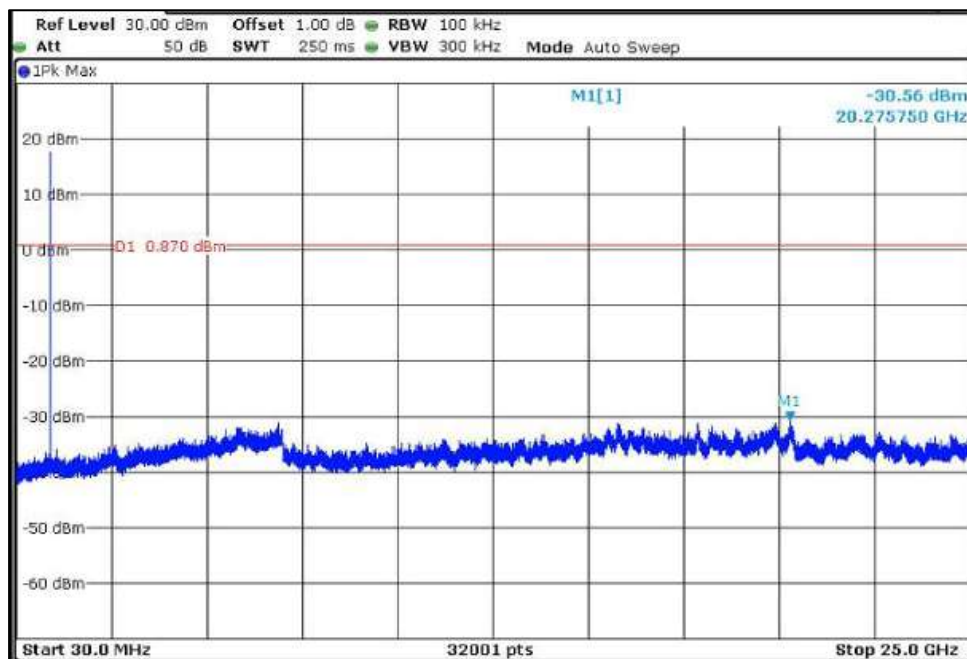
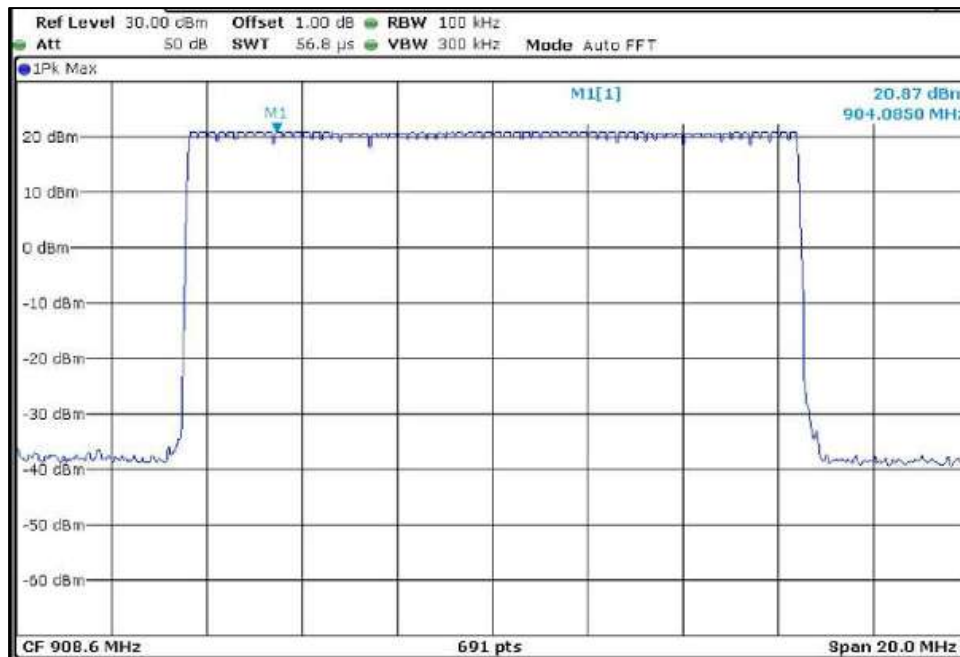
Report Reference. No.: 91800100101001

Channel Frequency: 914.9MHz



Report Reference. No.: 91800100101001

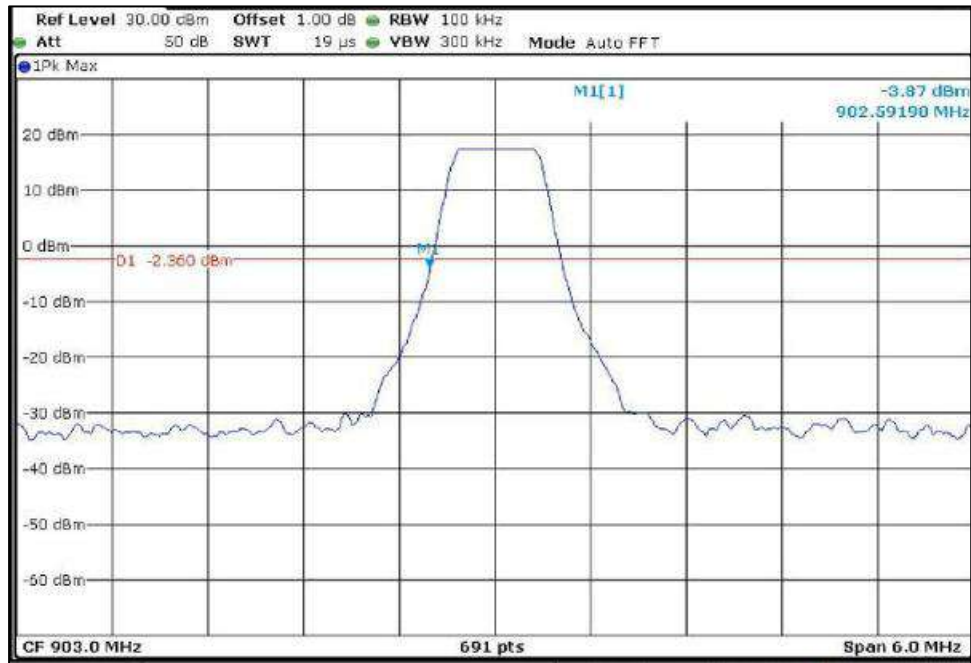
FHSS (Hopping) plots:



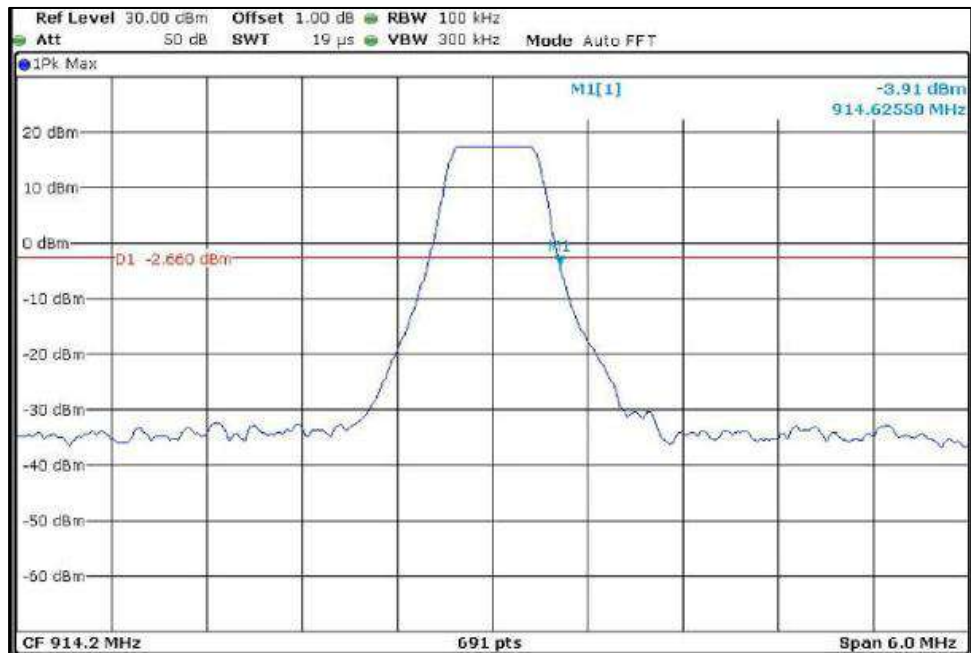
Report Reference. No.: 91800100101001

DTS (Band edge) plots:

Channel Frequency: 903MHz



Channel Frequency: 914.2MHz



Report Reference. No.: 91800100101001

FHSS (No Hopping, Band Edge) plots:

Channel Frequency: 902.3MHz

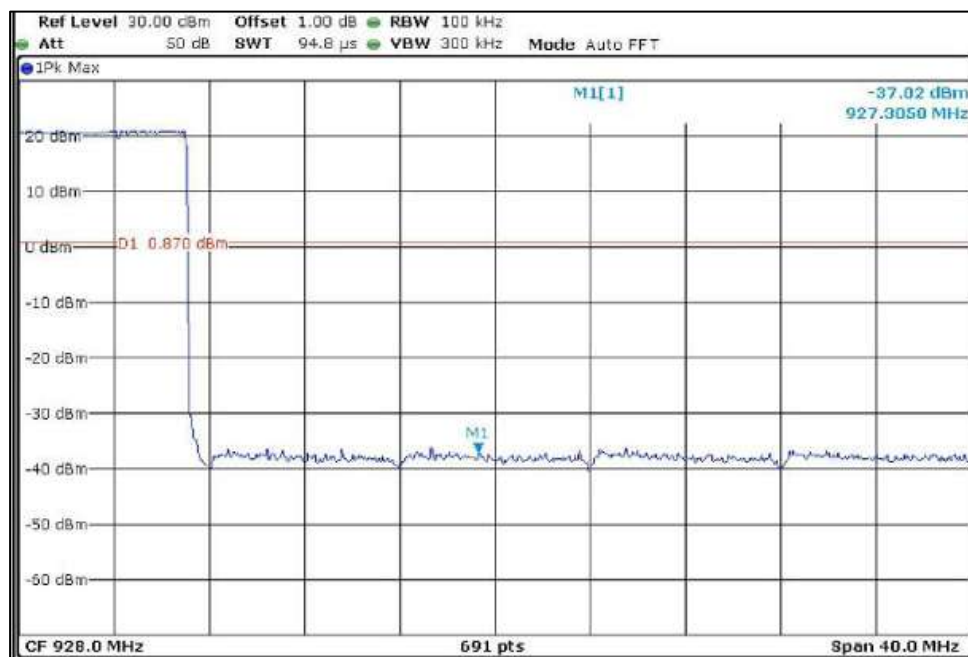
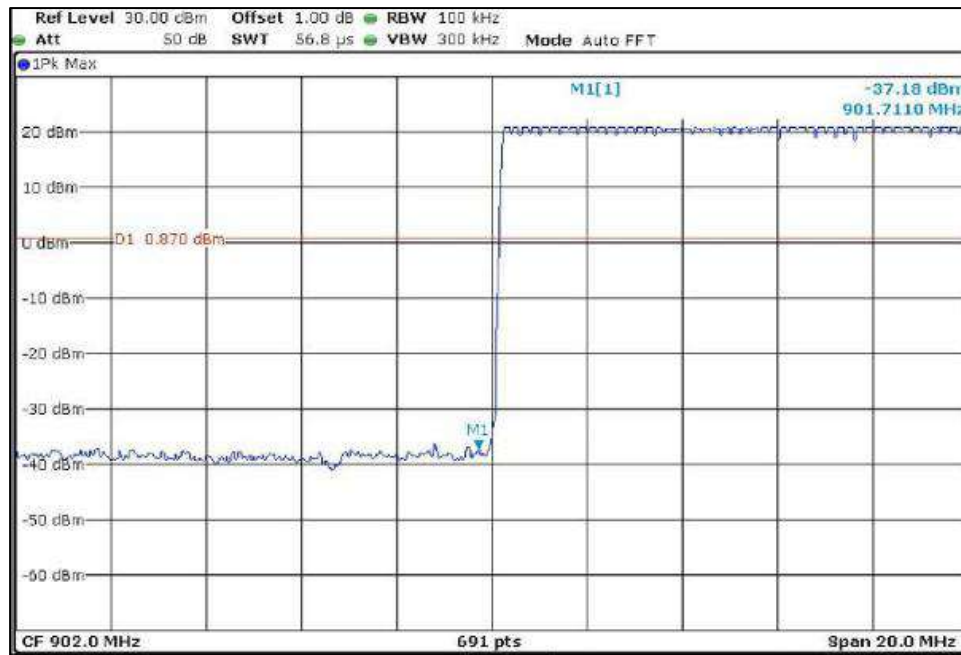


Channel Frequency: 914.9MHz



Report Reference. No.: 91800100101001

FHSS (hopping, Band Edge) plots:



Report Reference. No.: 91800100101001

16 TEST CONDITIONS AND RESULTS – Carrier Frequency Separation

Test Specification	FCC part 15 Subpart C 15.247 (a)(1)/ RSS 247 Issue 4, Section 6.2.1
Test Method	Subclause 11.12 of ANSI C63.10-2020
Measurement Bandwidth	100kHz
Detector	Peak
Requirement	≥ 20dB bandwidth, whichever is greater

16.1 Environmental Conditions

Temperature	: 24°C
Relative humidity	: 52%
Power supply	: 120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output

16.2 Test results

Test Mode	Channel Frequency (MHz)	Measured Channel Separation (kHz)	Limit (kHz)
FHSS	902.30015	201.20	≥20dB Bandwidth
	902.50135		
	908.50010	201.20	
	908.90250		
	914.70010	201.20	
	914.90130		

Report Reference. No.: 91800100101001

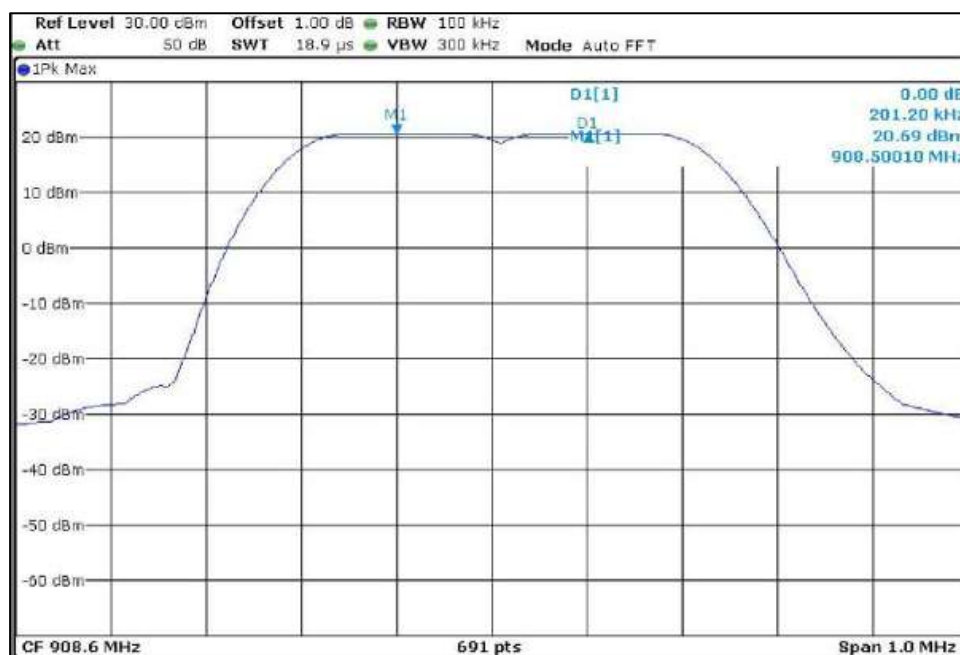
Test Plots:

FHSS plots:

Channel Frequency: 902.4MHz



Channel Frequency: 908.6MHz



Report Reference. No.: 91800100101001

Channel Frequency: 914.8MHz



Report Reference. No.: 91800100101001

17 TEST CONDITIONS AND RESULTS – Number of Hopping Frequency

Test Specification	FCC part 15 Subpart C 15.247 (a)(1)(i)/ RSS 247 Issue 4, Section 6.2.1
Test Method	Subclause 11.12 of ANSI C63.10-2020
Measurement Bandwidth	100kHz
Detector	Peak
Requirement	≥ 15 non-overlapping channels

17.1 Environmental Conditions

Temperature	: 24°C
Relative humidity	: 52%
Power supply	: 120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output

17.2 Test results

Test Mode	20dB Bandwidth (kHz)	Hopping Frequencies	Limit (kHz)
FHSS	20dB Bandwidth < 250	201.20	≥50

Report Reference. No.: 91800100101001

18 TEST CONDITIONS AND RESULTS – Time of Occupancy

Test Specification	FCC part 15 Subpart C 15.247 (a)(1)(iii)/ RSS 247 Issue 4, Section 6.2.1
Test Method	Subclause 11.12 of ANSI C63.10-2020
Measurement Bandwidth	100kHz
Detector	Peak
Requirement	< 0.4s

18.1 Environmental Conditions

Temperature	: 24°C
Relative humidity	: 52%
Power supply	: 120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output

18.2 Test results

Test Mode	20dB Bandwidth (kHz)	Period (s)	Channel Occupancy Time (ms)	Limit (ms)
FHSS	20dB Bandwidth < 250	20	304.35	400

Report Reference. No.: 91800100101001

19 TEST CONDITIONS AND RESULTS – Spurious Radiated Emissions & Restricted Bands Of Operation

Test Specification	FCC part 15 Subpart C 15.247 (d) / (15.209 & 15.205) / RSS-Gen Issue 5, Section 8.9 / 8.10
Test Method	ANSI C63.10
Testing Location	Semi Anechoic Chamber 9kHz - 1 GHz Fully Anechoic Chamber 1 GHz - 26GHz
Measurement Bandwidth	100 kHz for frequency range < 1GHz 1 MHz for Frequency range >1GHz
Measuring Distance	3 m
Requirement	As per the limits mentioned in the below table
Test Setup	Refer <u>TEST METHODOLOGY</u>

Table 9: Transmitter limits for Radiated emission

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Field strength ($\text{dB}\mu\text{V/m}$)	Distance of Measurement (m)
0.009 – 0.490	2400/F(kHz)	48.50 – 13.80	300*
0.490 – 1.705	24000/F(kHz)	33.80 – 23.00	30*
1.705 -30	30	29.54	30*
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Remark: * The limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300-meter, 30-meter and 30-meter range respectively, which corresponds to 128.51 – 93.80, 73.80 – 62.96 and 69.54 $\text{dB}\mu\text{V/m}$ at 3m range by extrapolation calculation and the measurement of loop antenna.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

19.1 Environmental Conditions

Temperature	:	24°C
Relative humidity	:	52%
Power supply	:	120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output

Report Reference. No.: 91800100101001

19.2 Test result:

Test results for frequency range 9kHz – 30MHz

No emissions found in frequency range 9 kHz to 30 MHz, and measured levels are below 20dB from the limit line, hence not reported.

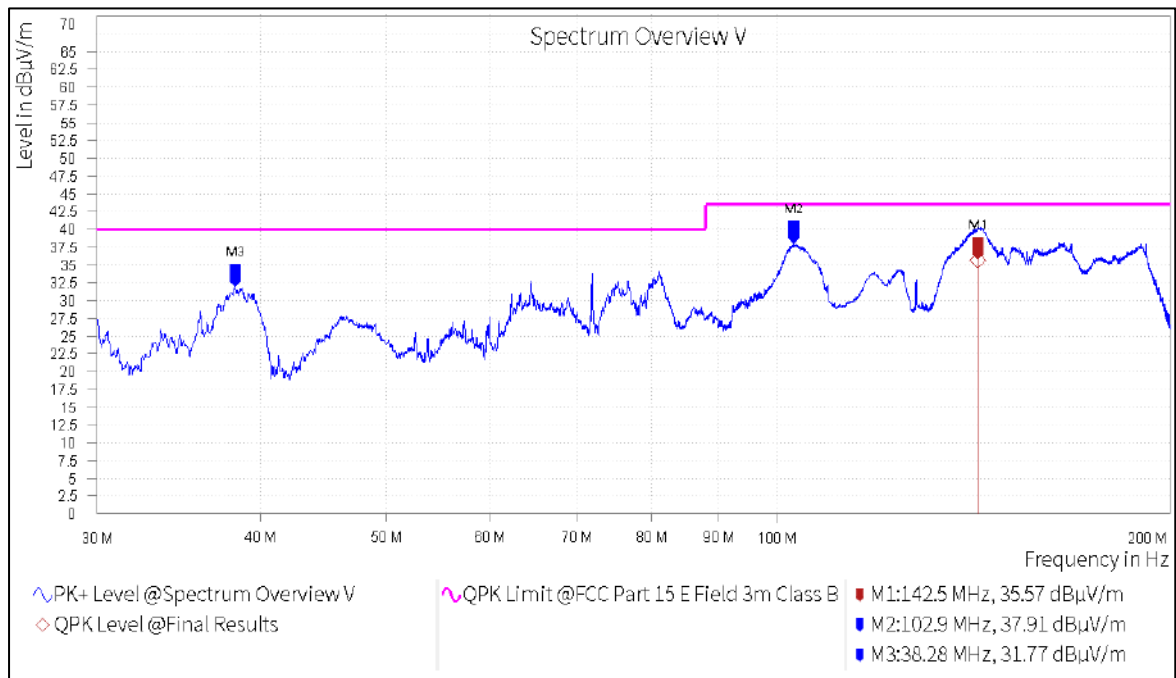
Table 10: Test results for frequency range 30MHz – 200MHz

Product: ZEUSR12

Antenna Polarization	Measured Frequency (MHz)	Measured peak value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Vertical	38.28	31.77	40	-8.23
	102.90	37.91	43.5	-5.59
	142.50	35.57	43.5	-7.93
Horizontal	80.97	28.22	40	-11.78
	142.08	37.32	43.5	-6.18
	168.21	31.13	43.5	-12.37

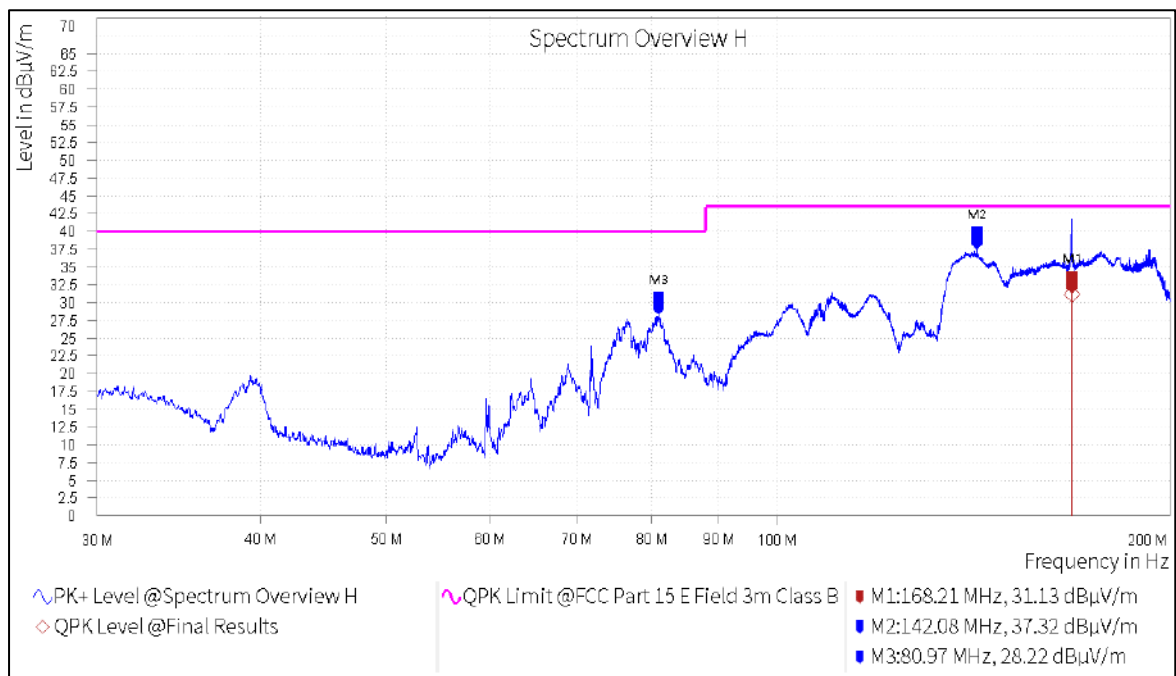
Report Reference. No.: 91800100101001

Test Plots:



Frequency range: 30MHz -200MHz

Polarization: Vertical



Frequency range: 30MHz -200MHz

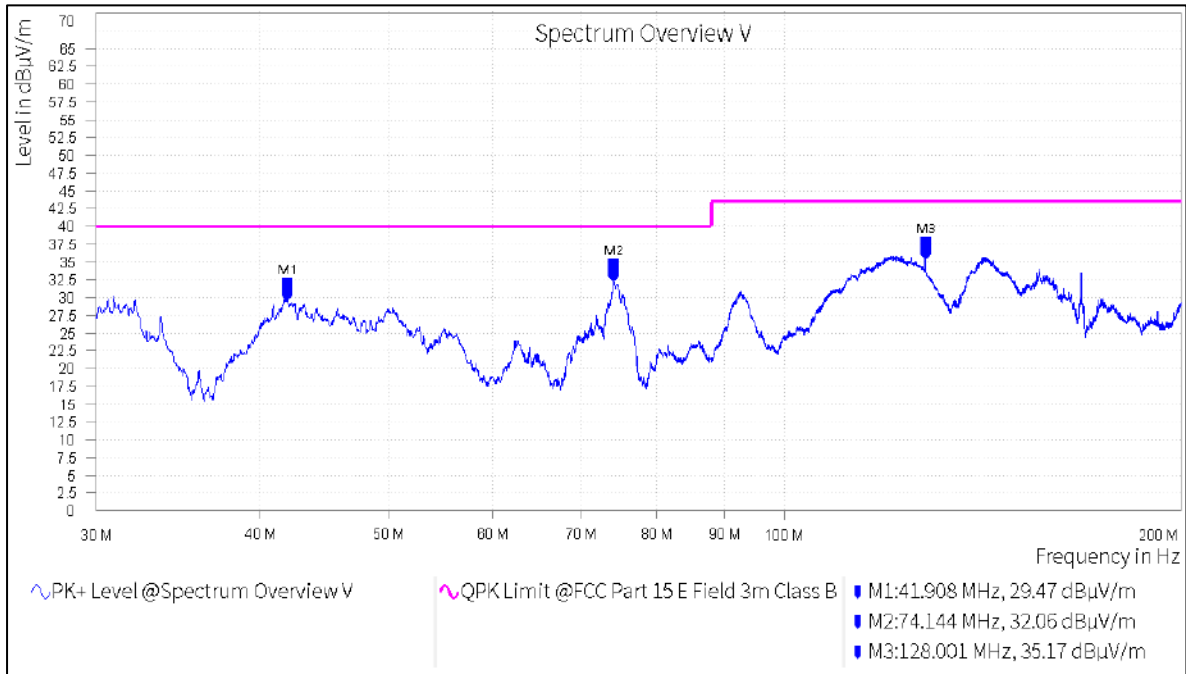
Polarization: Horizontal

Report Reference. No.: 91800100101001

Product: ZEUSR2

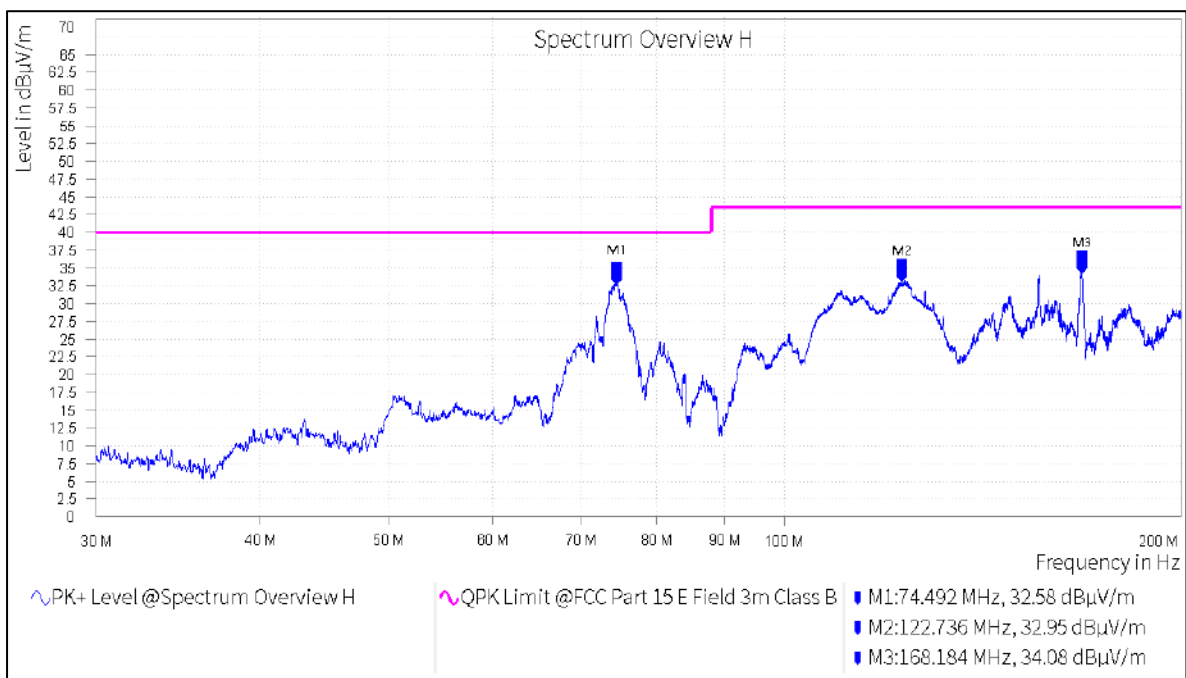
Antenna Polarization	Measured Frequency (MHz)	Measured peak value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Vertical	41.91	29.47	40	-10.53
	74.14	32.06	40	-7.94
	128.00	35.17	43.5	-8.33
Horizontal	74.49	32.58	40	-7.42
	122.74	32.95	43.5	-10.55
	168.18	34.08	43.5	-9.42

Report Reference. No.: 91800100101001



Frequency range: 30MHz -200MHz

Polarization: Vertical



Frequency range: 30MHz -200MHz

Polarization: Horizontal

Report Reference. No.: 91800100101001

Table 11: Test results for frequency range 200MHz – 1GHz

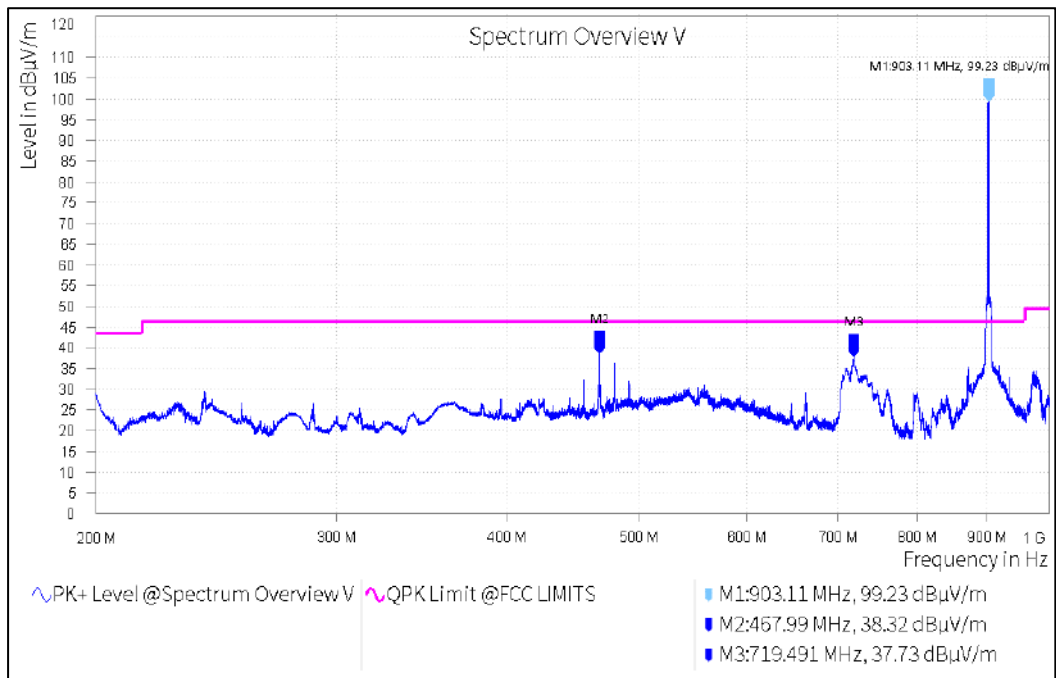
Product: ZEUSR12

Modulation: DTS

Channel Frequency (MHz)	Antenna Polarization	Measured Frequency (MHz)	Measured peak value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
903	Vertical	903.110	99.23	--	--
		467.990	38.32	46	-7.68
		719.491	37.73	46	-8.27
	Horizontal	902.780	90.64	--	--
		255.650	34.64	46	-11.36
		468.560	39.66	46	-6.34
907.8	Vertical	907.918	9.49	--	--
		258.228	38.06	46	-7.94
		468.620	38.76	46	-7.24
	Horizontal	908.027	95.81	--	--
		239.989	36.49	46	-9.51
		467.990	36.97	46	-9.03
914.2	Vertical	914.200	99.71	--	--
		468.023	37.67	46	-8.33
		722.400	35.76	46	-10.24
	Horizontal	914.200	95.99	--	--
		468.303	38.18	46	-7.82
		979.347	37.49	46	-8.51

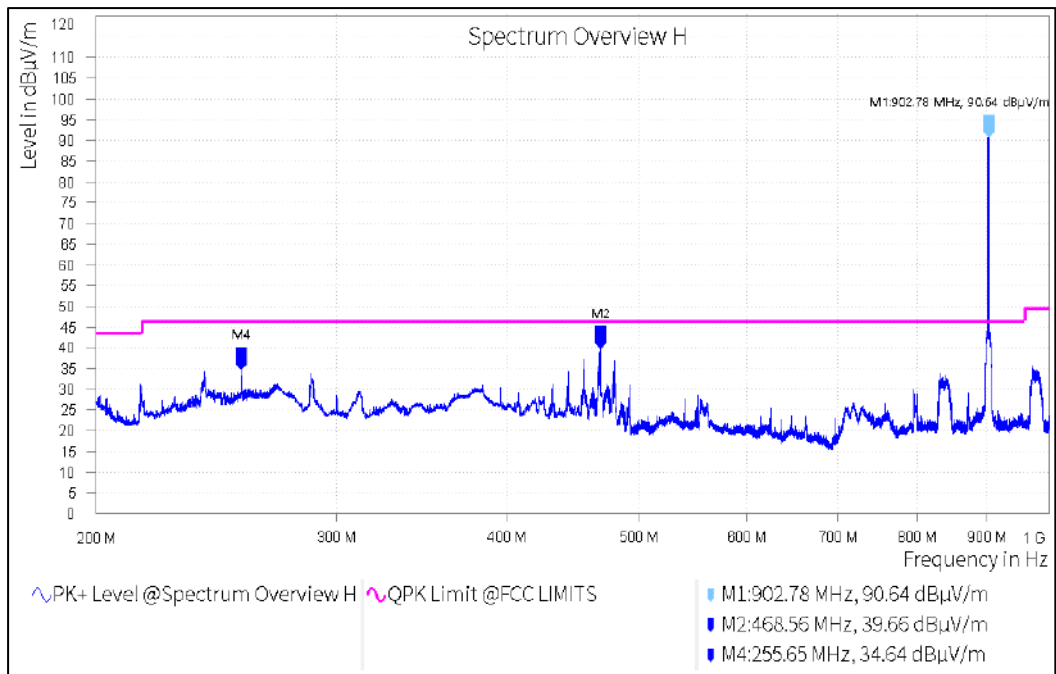
Report Reference. No.: 91800100101001

Test Plots:



Channel Frequency: 903MHz

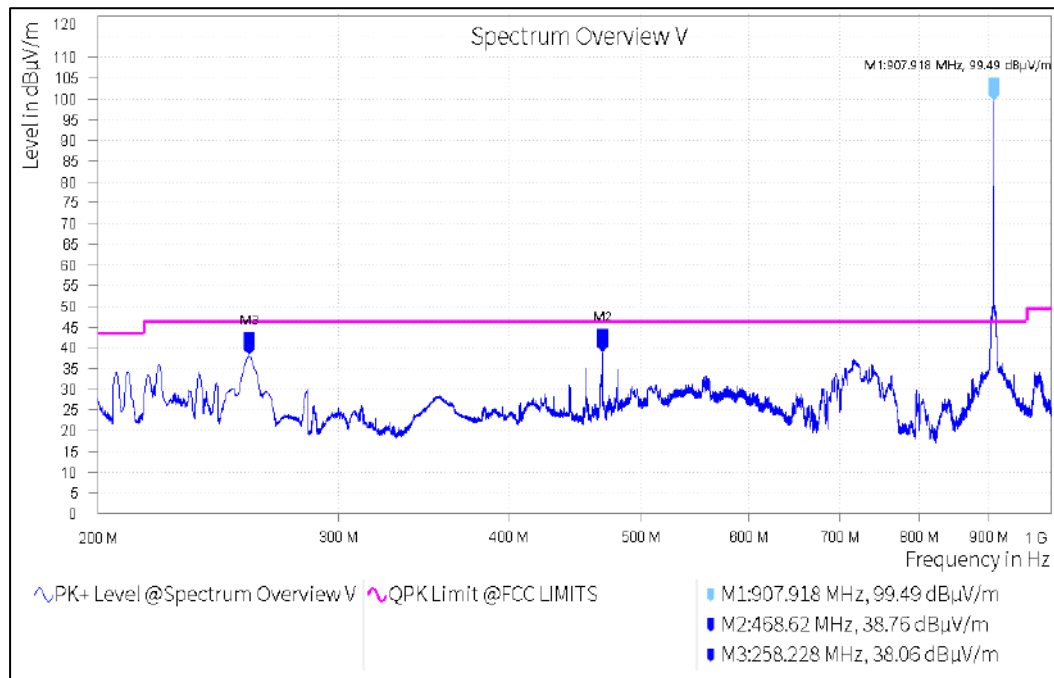
Polarization: Vertical



Channel Frequency: 903MHz

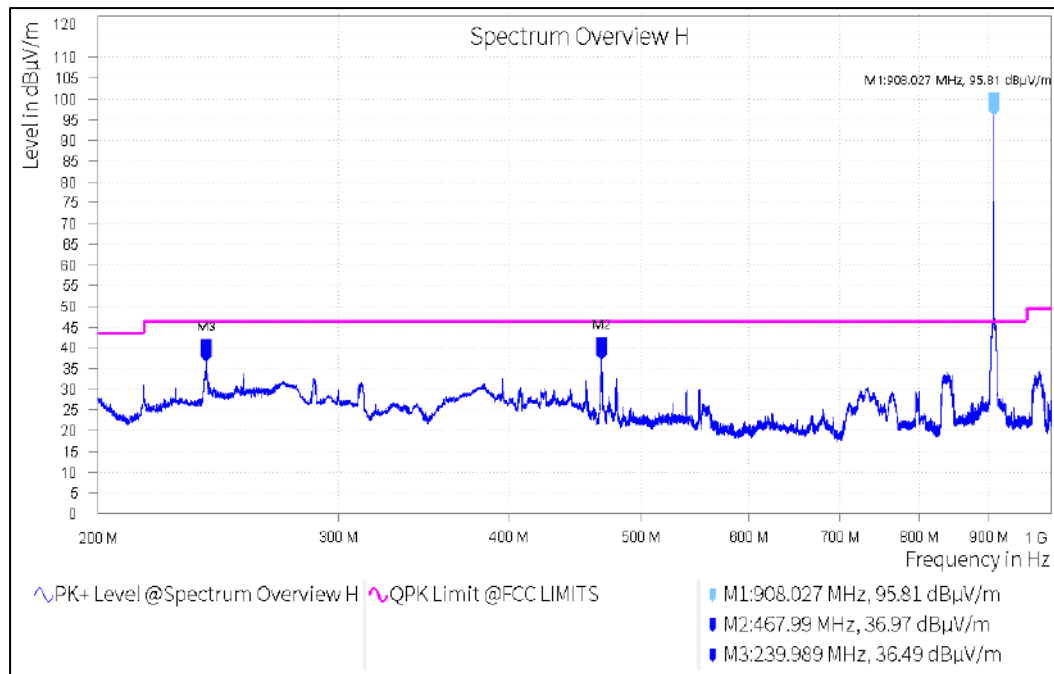
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 907.8MHz

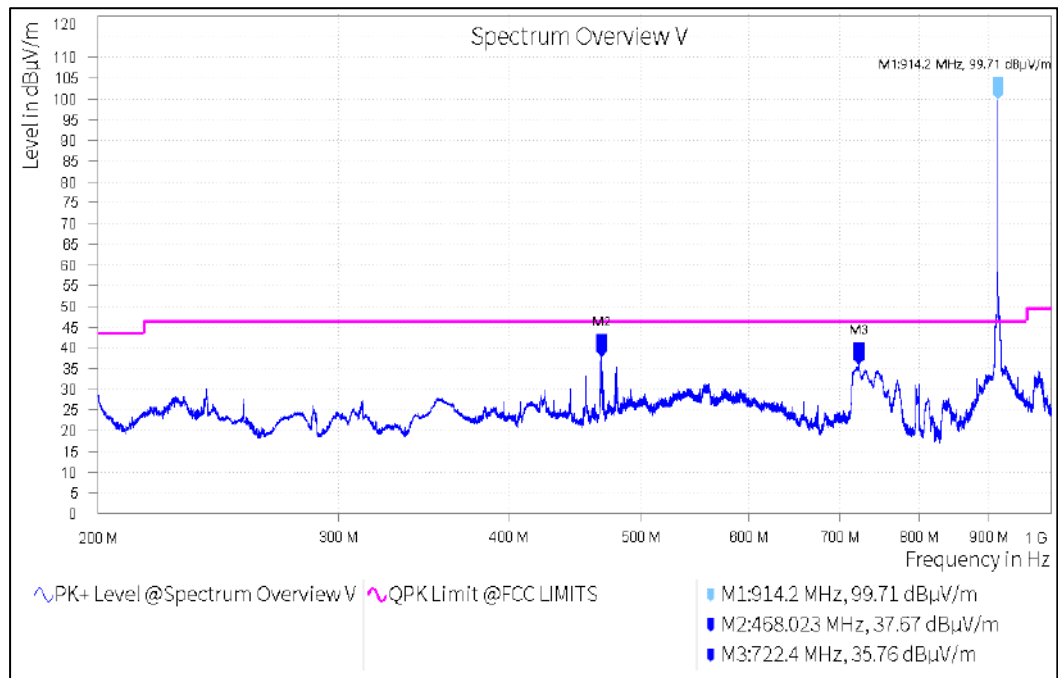
Polarization: Vertical



Channel Frequency: 907.8MHz

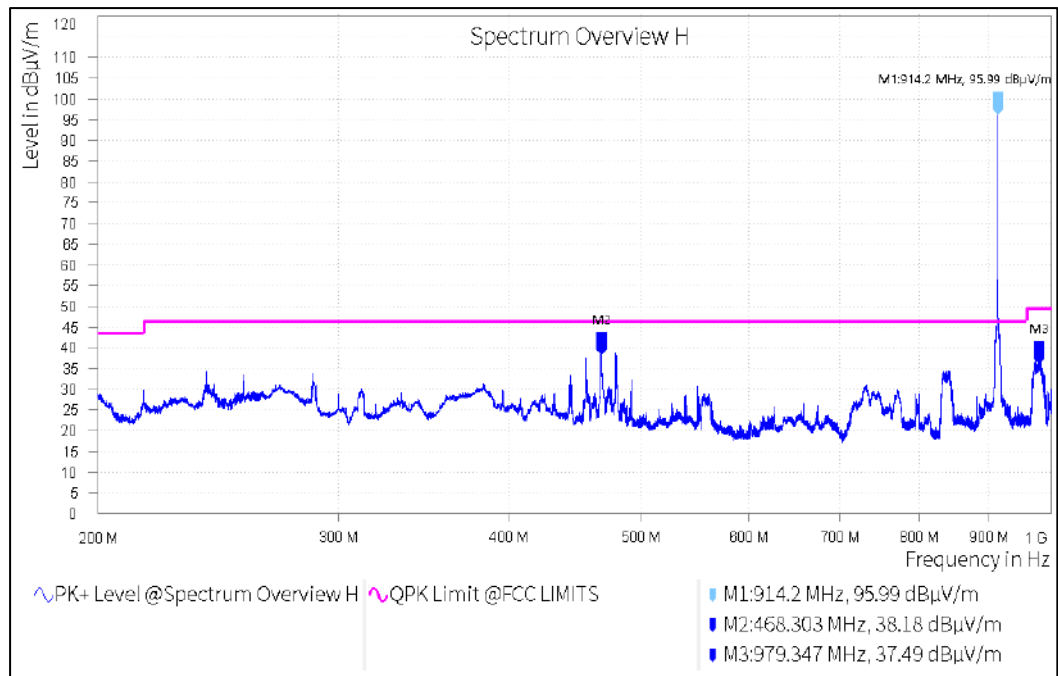
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 914.2MHz

Polarization: Vertical



Channel Frequency: 914.2MHz

Polarization: Horizontal

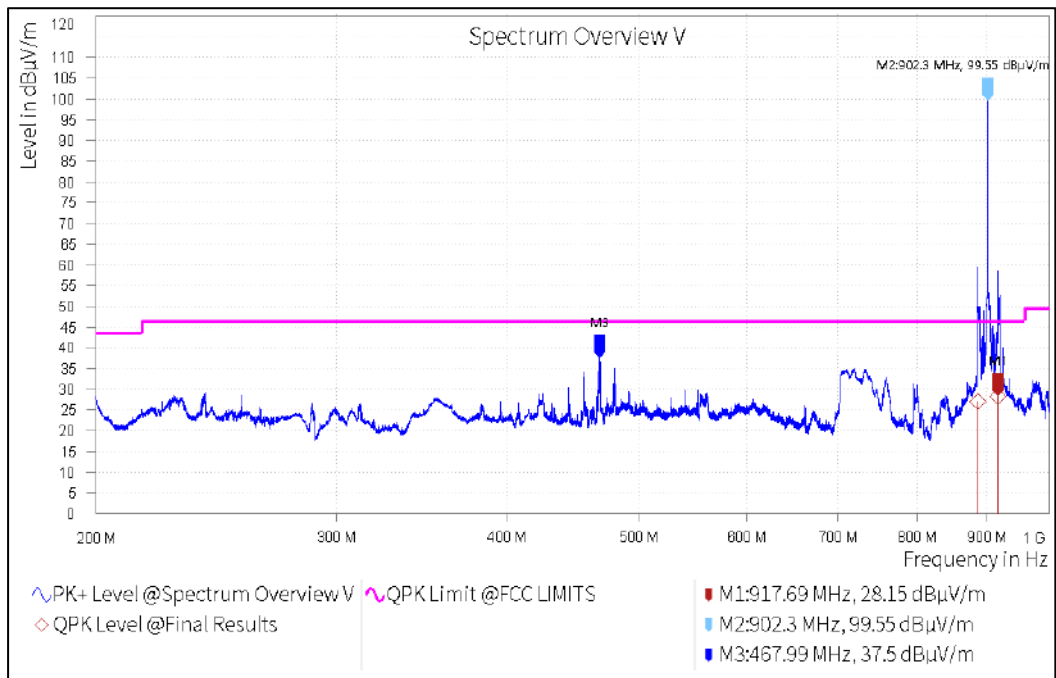
Report Reference. No.: 91800100101001

Modulation: FHSS

Channel Frequency (MHz)	Antenna Polarization	Measured Frequency (MHz)	Measured peak value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
902.3	Vertical	902.300	99.55	--	--
		467.990	37.50	46	-8.5
		886.820	27.00	46	-19
		917.690	28.15	46	-17.85
	Horizontal	902.300	95.22	--	--
		468.140	25.84	46	-20.16
		887.750	14.66	46	-31.34
		916.850	15.14	46	-30.86
908.5	Vertical	908.500	99.58	--	--
		258.449	39.51	46	-6.49
		468.141	36.03	46	-9.97
	Horizontal	908.500	94.27	--	--
		239.794	36.69	46	-9.31
		467.990	41.47	46	-4.53
914.9	Vertical	914.900	99.80	--	--
		408.294	35.46	46	-10.54
		630.244	38.01	46	-7.99
	Horizontal	914.900	96.02	--	--
		240.030	37.13	46	-8.87
		491.962	37.25	46	-8.75

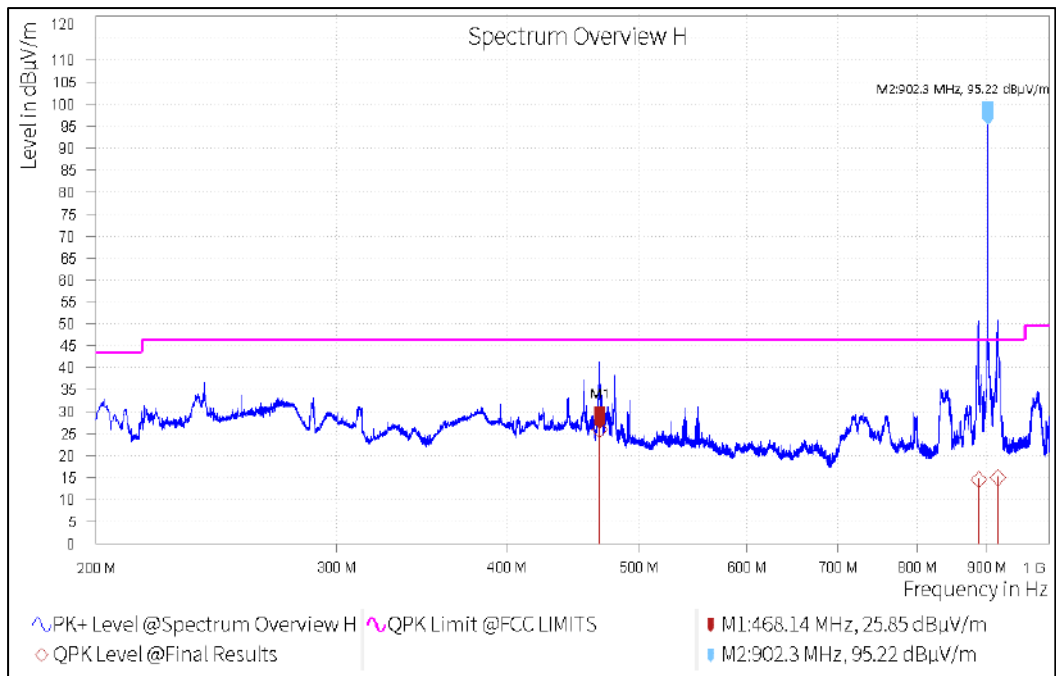
Report Reference. No.: 91800100101001

Test Plots:



Channel Frequency: 902.3MHz

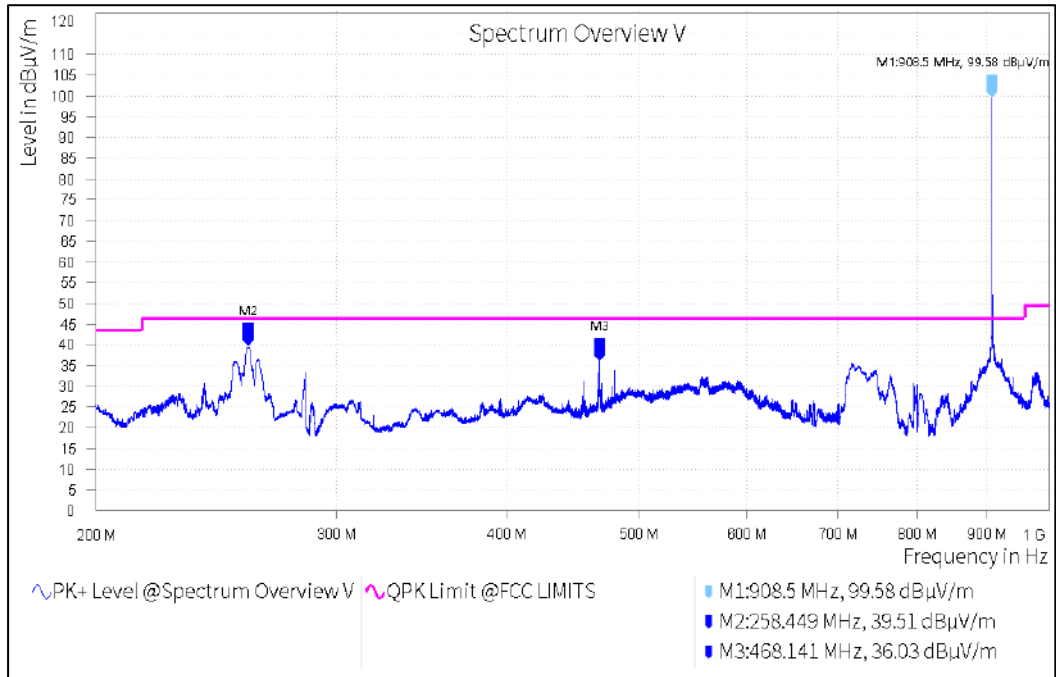
Polarization: Vertical



Channel Frequency: 902.3MHz

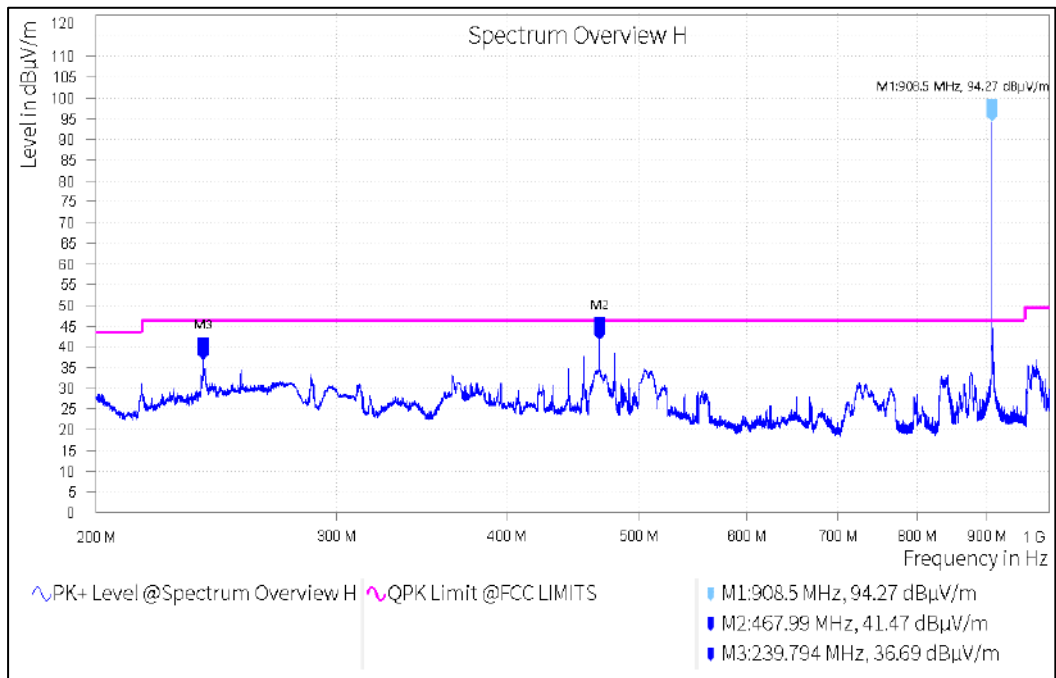
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 908.5MHz

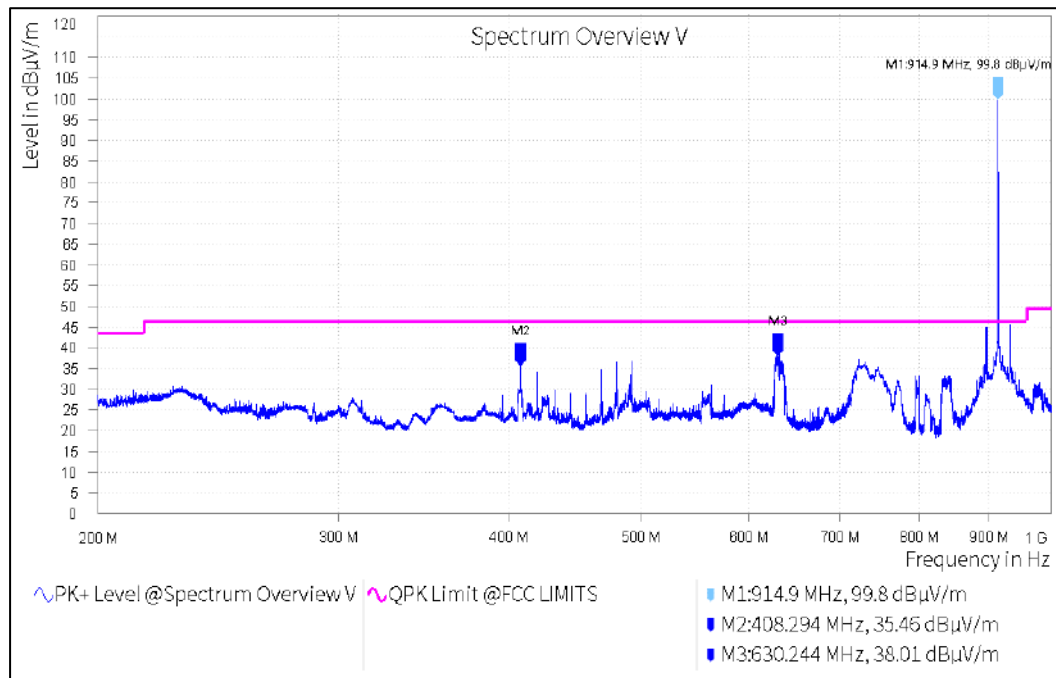
Polarization: Vertical



Channel Frequency: 908.5MHz

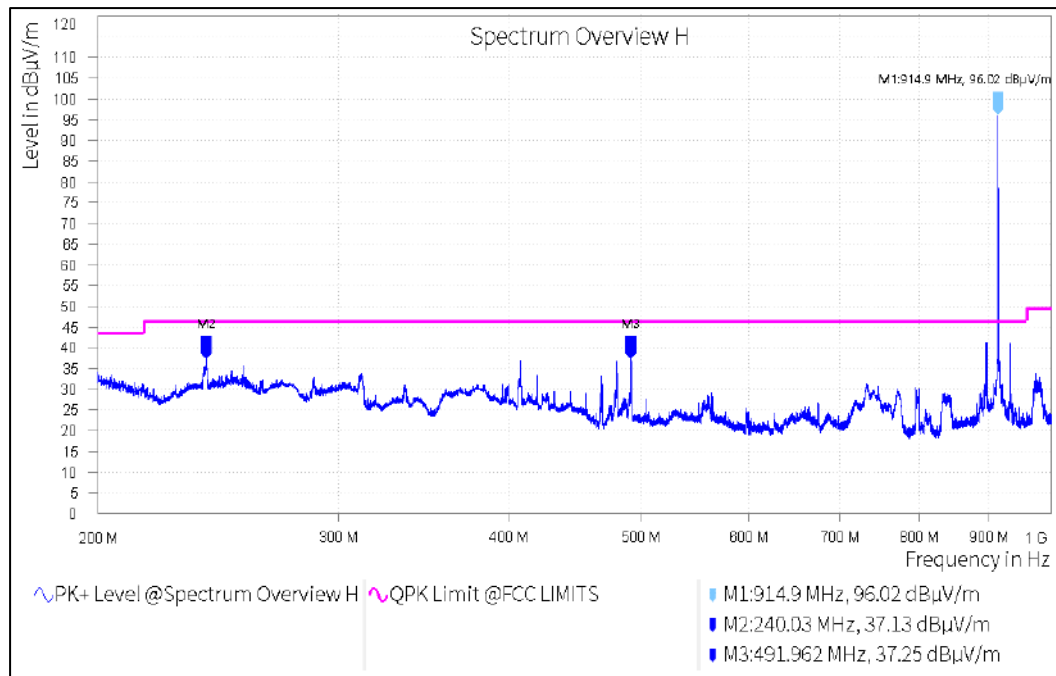
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 914.9MHz

Polarization: Vertical



Channel Frequency: 914.9MHz

Polarization: Horizontal

Report Reference. No.: 91800100101001

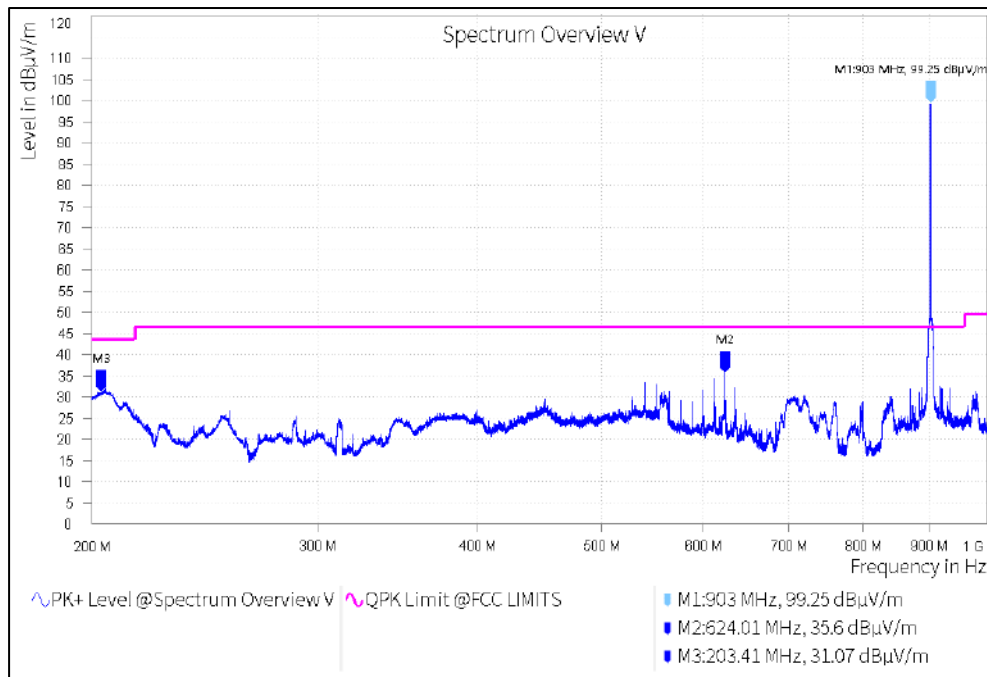
Product: ZEUSR2

Modulation: DTS

Channel Frequency (MHz)	Antenna Polarization	Measured Frequency (MHz)	Measured peak value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
903	Vertical	903.000	99.25	--	--
		203.410	31.07	46	-14.93
		624.010	35.60	46	-10.4
	Horizontal	903.000	99.24	--	--
		384.171	33.78	46	-12.22
		626.701	39.82	46	-6.18
907.8	Vertical	907.800	99.31	--	--
		205.953	32.61	46	-13.39
		624.030	34.68	46	-11.32
	Horizontal	907.800	99.17	--	--
		239.684	31.73	46	-14.27
		639.384	38.6	46	-7.4
914.2	Vertical	914.200	99.59	--	--
		205.199	32.66	46	-13.34
		623.600	34.46	46	-11.54
	Horizontal	914.200	99.28	--	--
		205.953	35.75	46	-10.25
		552.562	35.27	46	-10.73

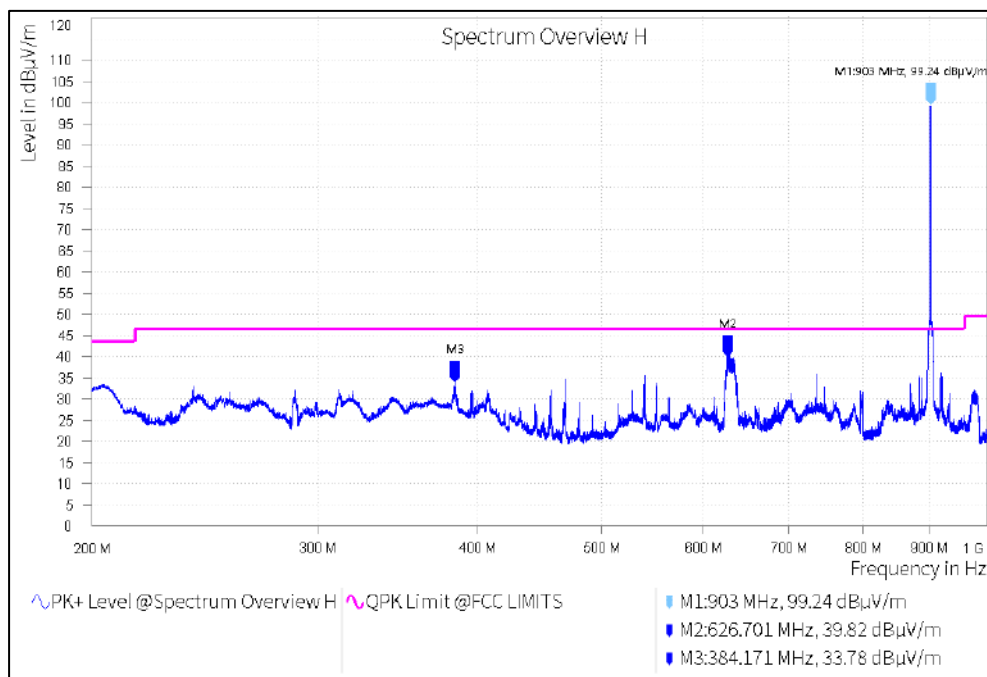
Report Reference. No.: 91800100101001

Test Plots:



Channel Frequency: 903MHz

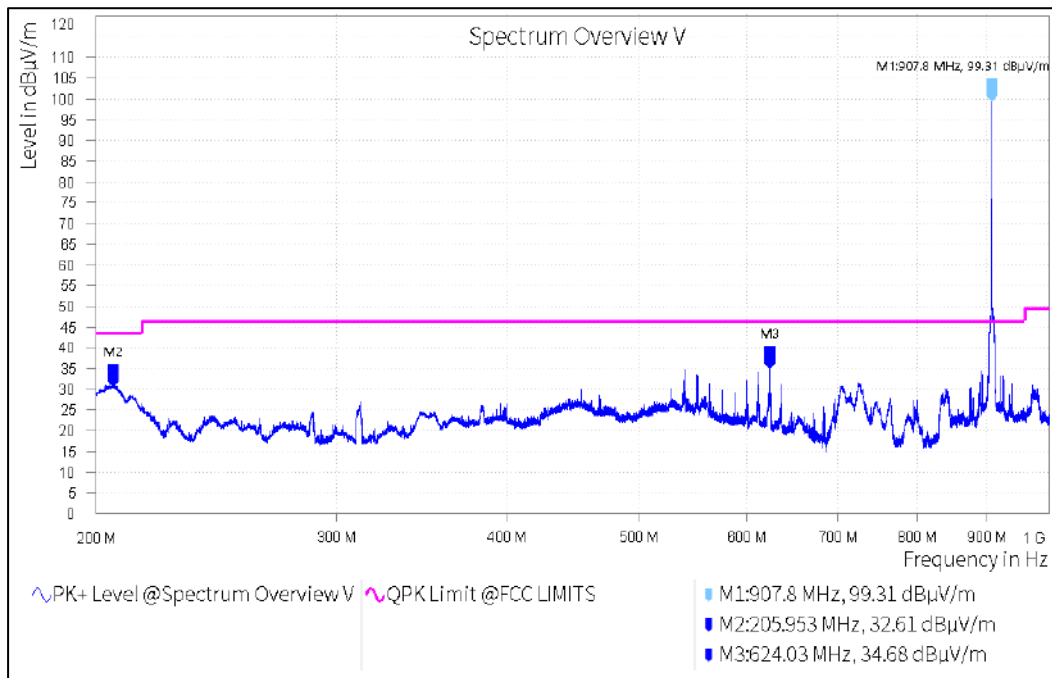
Polarization: Vertical



Channel Frequency: 903MHz

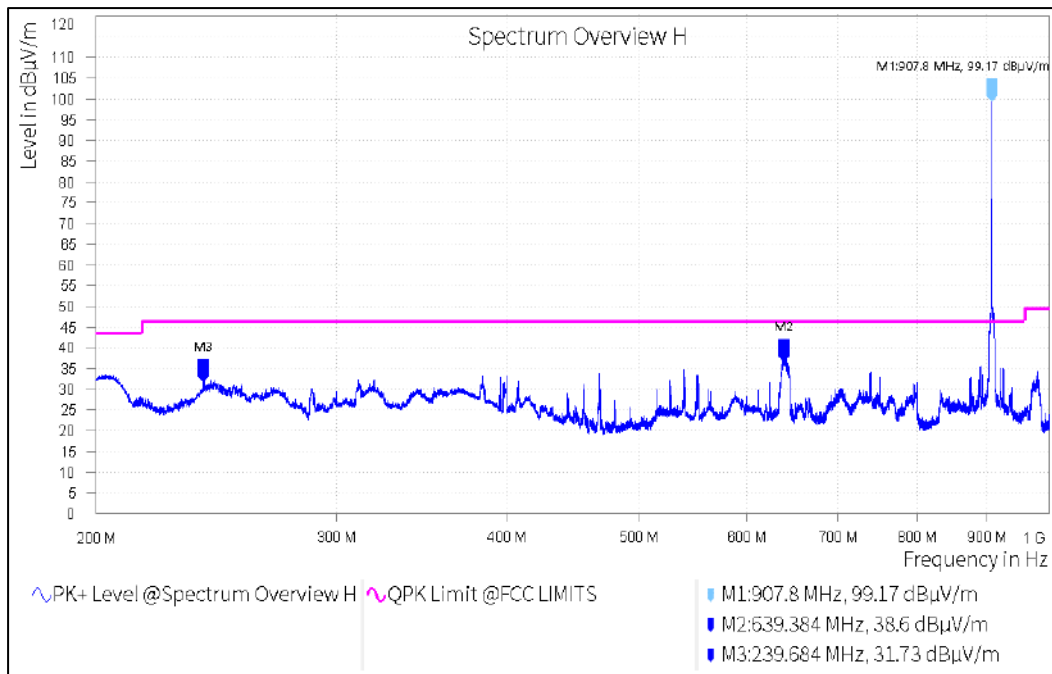
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 907.8MHz

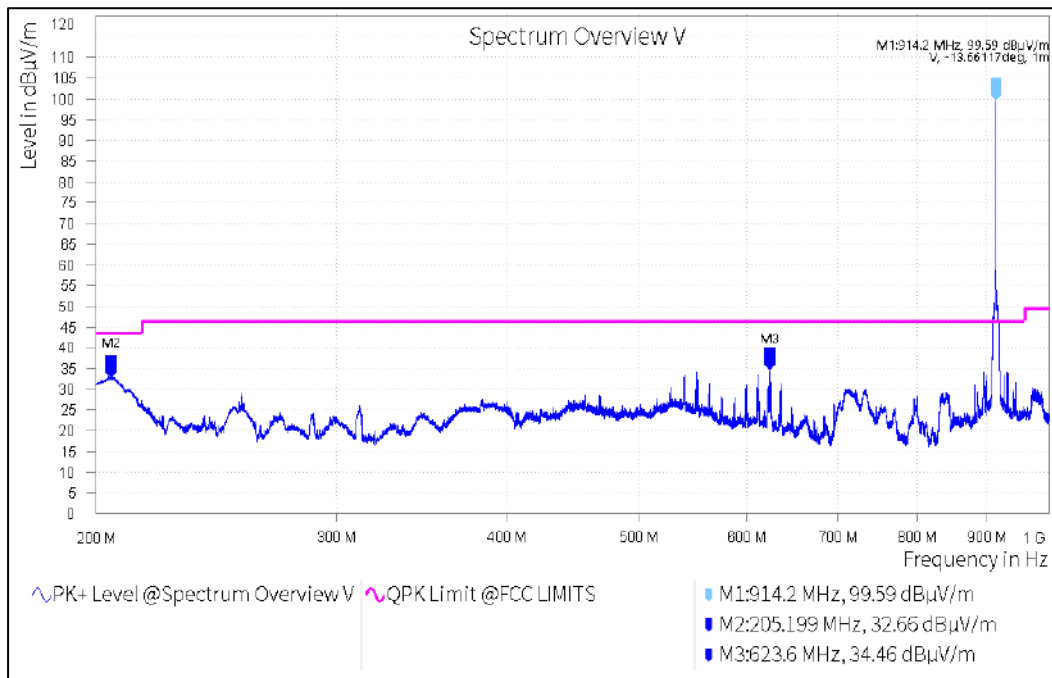
Polarization: Vertical



Channel Frequency: 907.8MHz

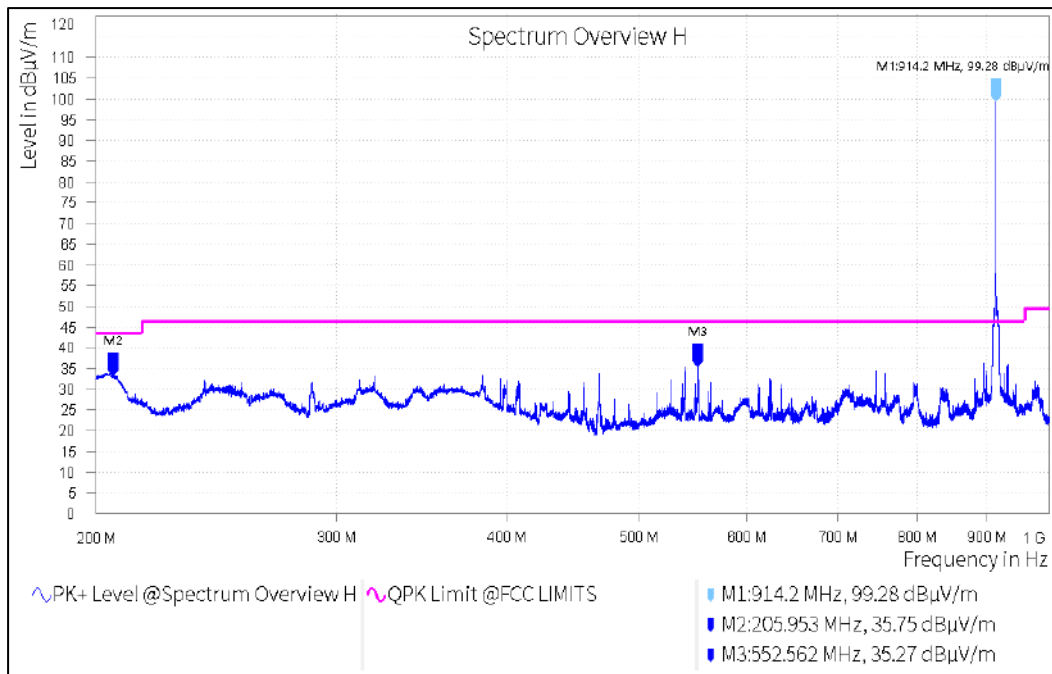
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 914.2MHz

Polarization: Vertical



Channel Frequency: 914.2MHz

Polarization: Horizontal

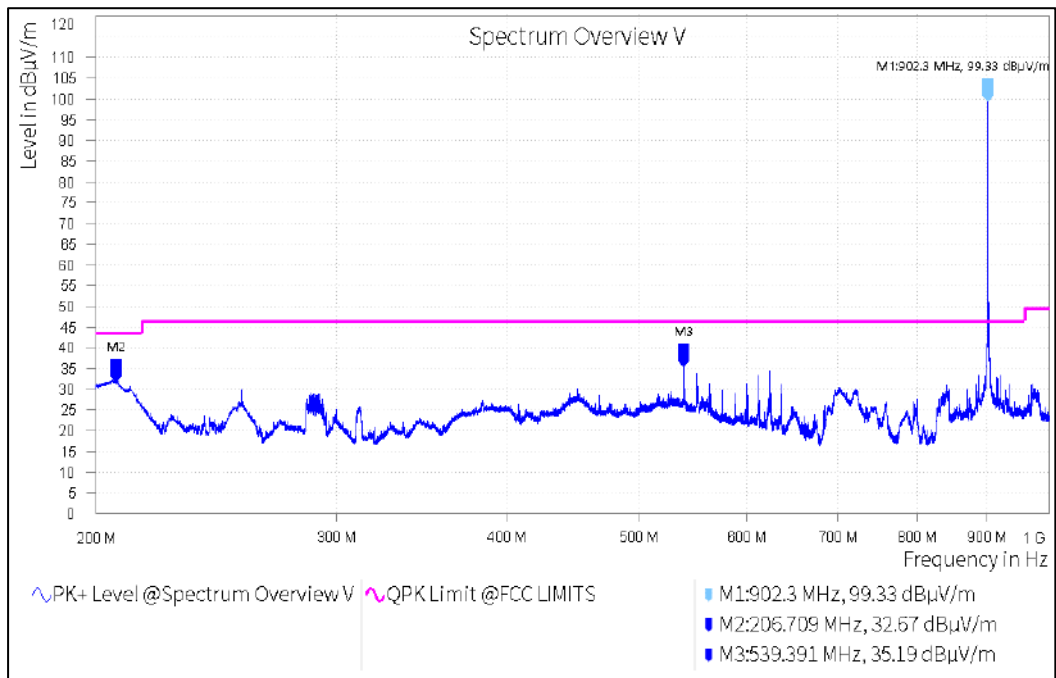
Report Reference. No.: 91800100101001

Modulation: FHSS

Channel Frequency (MHz)	Antenna Polarization	Measured Frequency (MHz)	Measured peak value (dBμV/m)	Limit (dBμV/m)	Margin (dB)
902.3	Vertical	902.300	99.33	--	--
		206.709	32.67	46	-13.33
		539.391	35.19	46	-10.81
	Horizontal	902.300	99.15	--	--
		636.890	38.68	46	-7.32
		832.730	21.00	46	-25
908.5	Vertical	908.50	99.23	--	--
		207.468	32.37	46	-13.63
		306.736	35.79	46	-10.21
	Horizontal	908.500	99.33	--	--
		255.686	33.02	46	-12.98
		540.140	37.06	46	-8.94
914.9	Vertical	914.900	99.49	--	--
		205.199	31.06	46	-14.94
		539.782	35.41	46	-10.59
	Horizontal	914.900	99.38	--	--
		205.199	32.77	46	-13.23
		540.018	37.36	46	-8.64

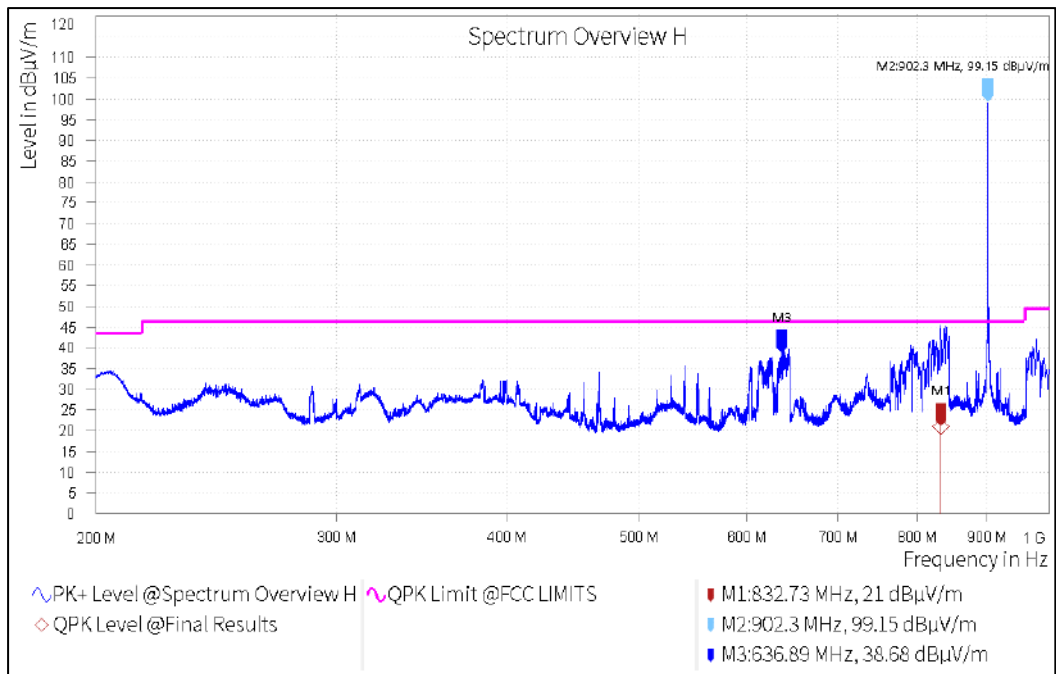
Report Reference. No.: 91800100101001

Test Plots:



Channel Frequency: 902.3MHz

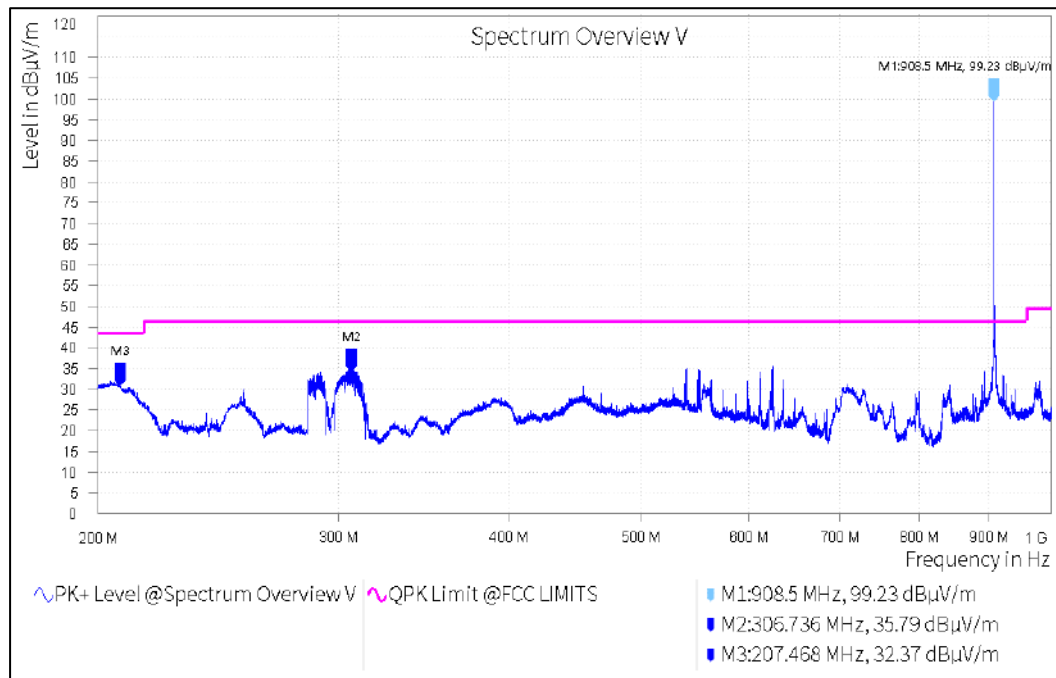
Polarization: Vertical



Channel Frequency: 902.3MHz

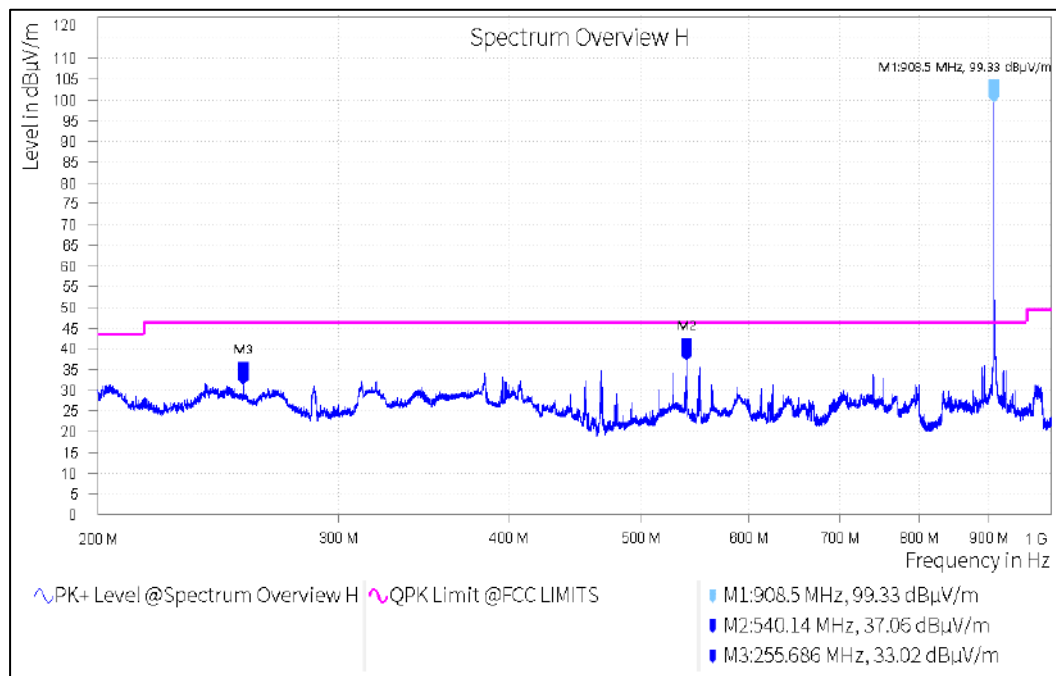
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 908.5MHz

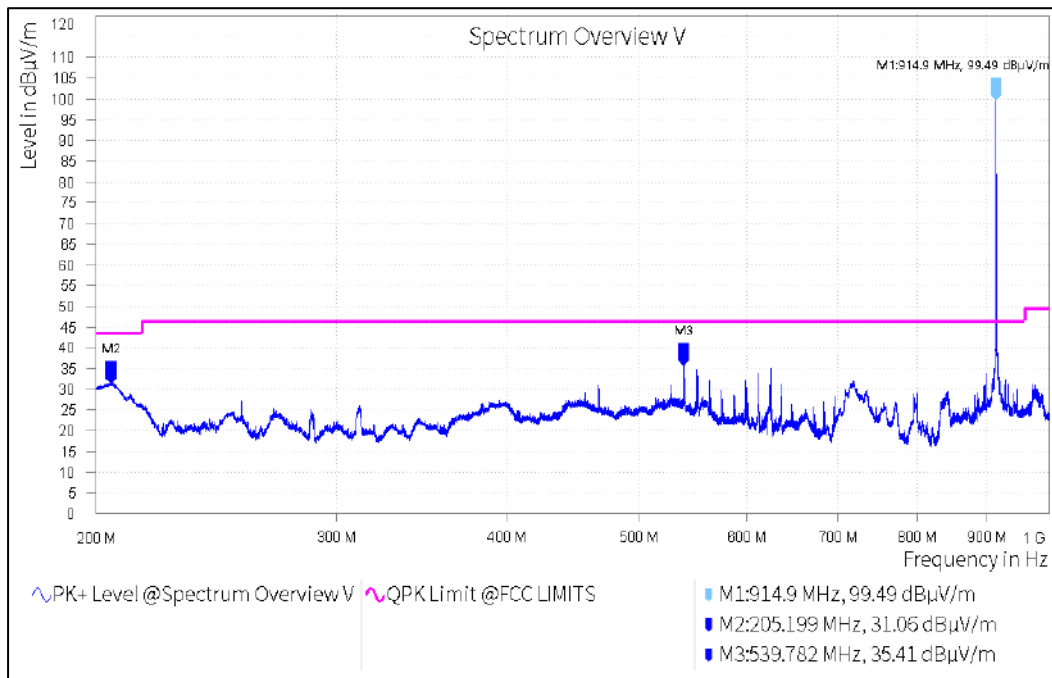
Polarization: Vertical



Channel Frequency: 908.5MHz

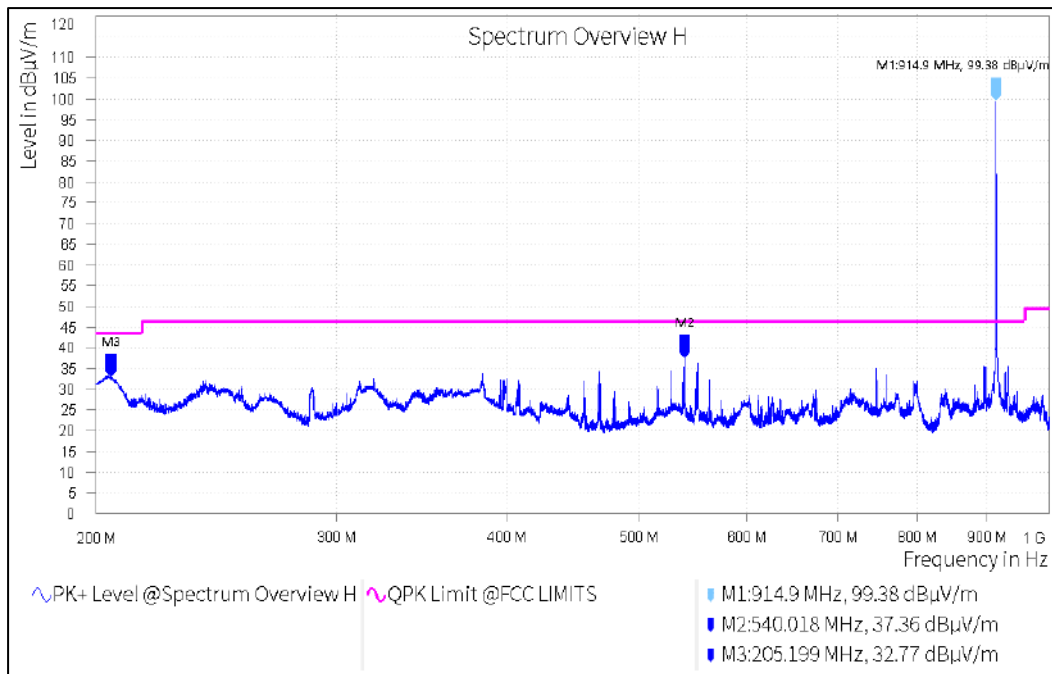
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 914.9MHz

Polarization: Vertical



Channel Frequency: 914.9MHz

Polarization: Horizontal

Report Reference. No.: 91800100101001

Table 12: Test results for the frequencies above 1GHz:

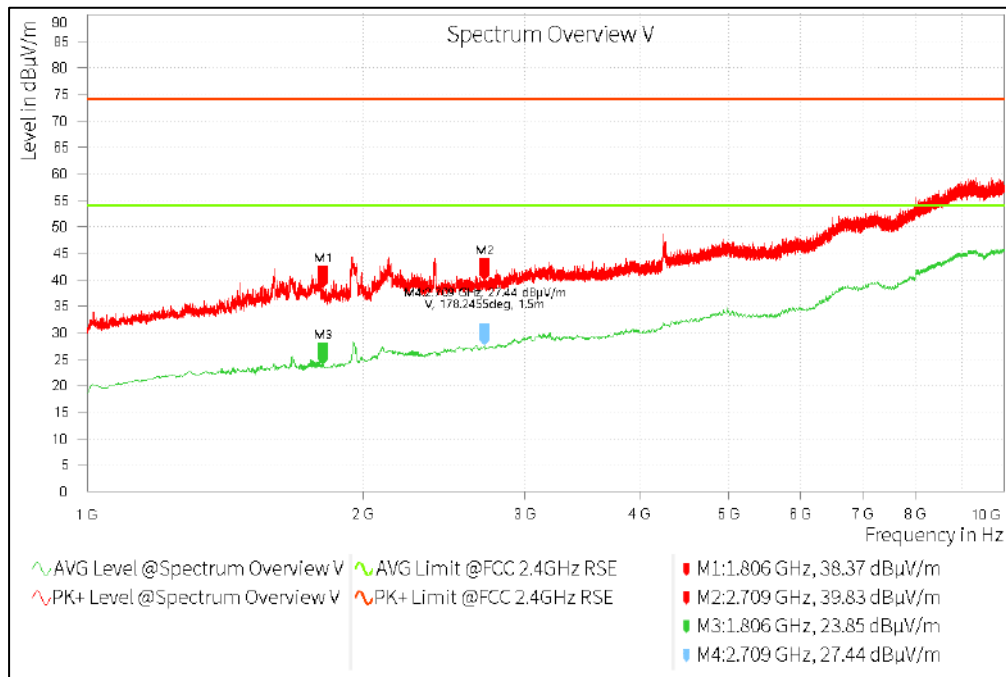
Product: ZEUSR12

Modulation: DTS

Channel Frequency (MHz)	Frequency (MHz)	Antenna Polarization	Measured Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
903	1806(Pk)	Vertical	38.37	74	-35.63
	1806(Av)		23.85	54	-30.15
	2709(Pk)		39.83	74	-34.17
	2709(Av)		27.44	54	-26.56
	1806(Pk)	Horizontal	36.06	74	-37.94
	1806(Av)		23.97	54	-30.03
	2709(Pk)		39.25	74	-34.75
	2709(Av)		26.92	54	-27.08
907.8	1815.6(Pk)	Vertical	41.73	74	-32.27
	1815.6(Av)		26.53	54	-27.47
	2723.4(Pk)		39.28	74	-34.72
	2723.4(Av)		27.46	54	-26.54
	1815.6(Pk)	Horizontal	36.93	74	-37.07
	1815.6(Av)		24.07	54	-29.93
	2723.4(Pk)		37.84	74	-36.16
	2723.4(Av)		26.78	54	-27.22
914.2	1828.4(Pk)	Vertical	39.47	74	-34.53
	1828.4(Av)		24.50	54	-29.50
	2742.6(Pk)		38.56	74	-35.44
	2742.6(Av)		27.22	54	-26.78
	1828.4(Pk)	Horizontal	36.84	74	-37.16
	1828.4(Av)		24.00	54	-30.00
	2742.6(Pk)		38.74	74	-35.26
	2742.6(Av)		26.98	54	-27.02

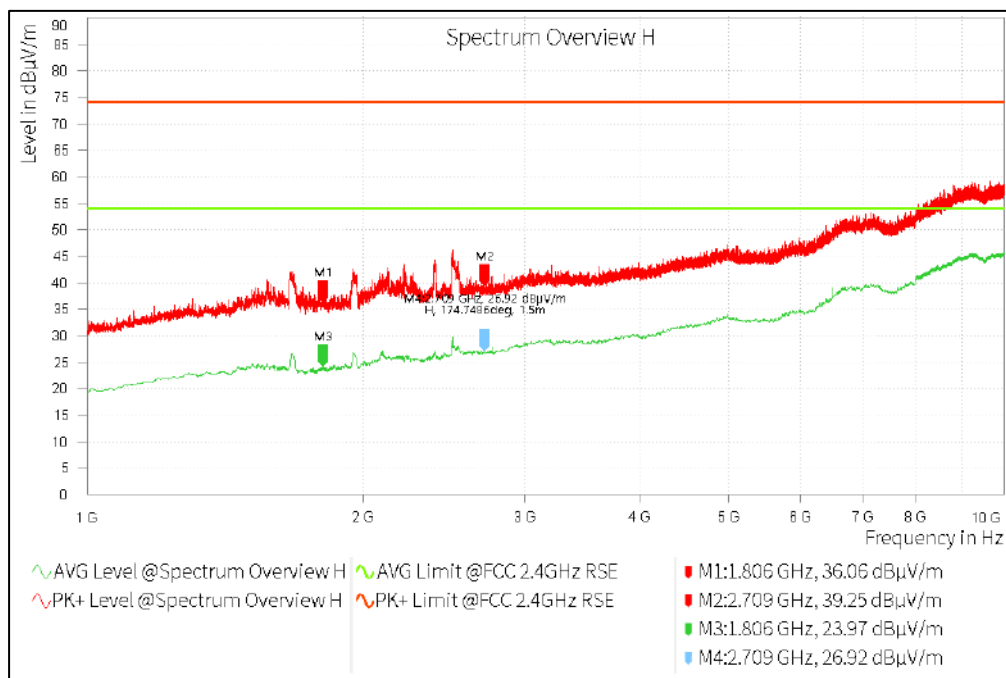
Report Reference. No.: 91800100101001

Test Plots



Channel Frequency: 903MHz

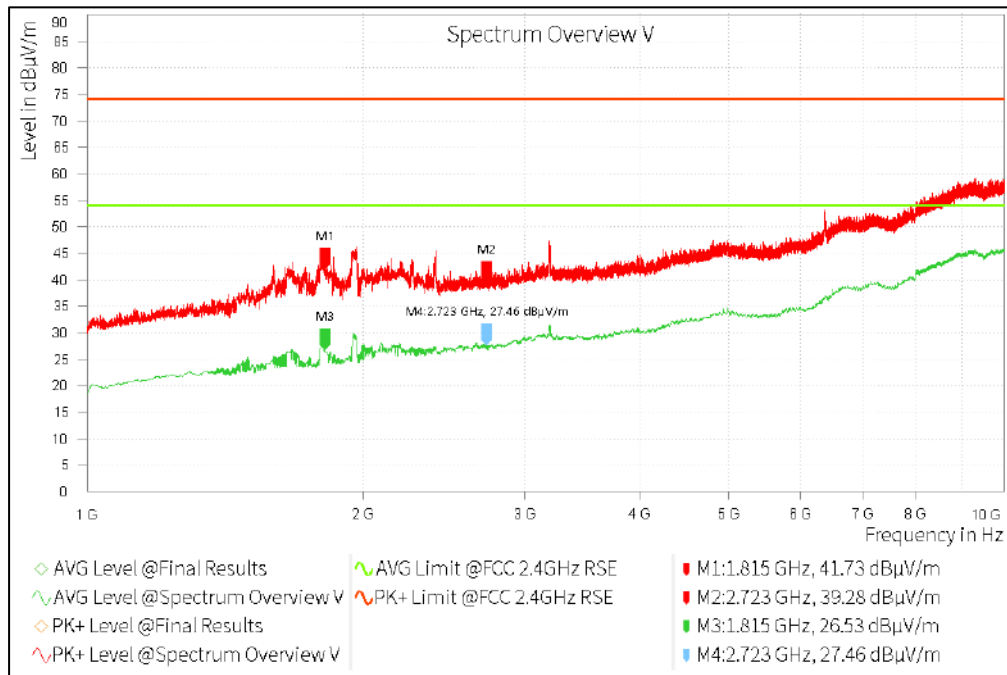
Polarization: Vertical



Channel Frequency: 903MHz

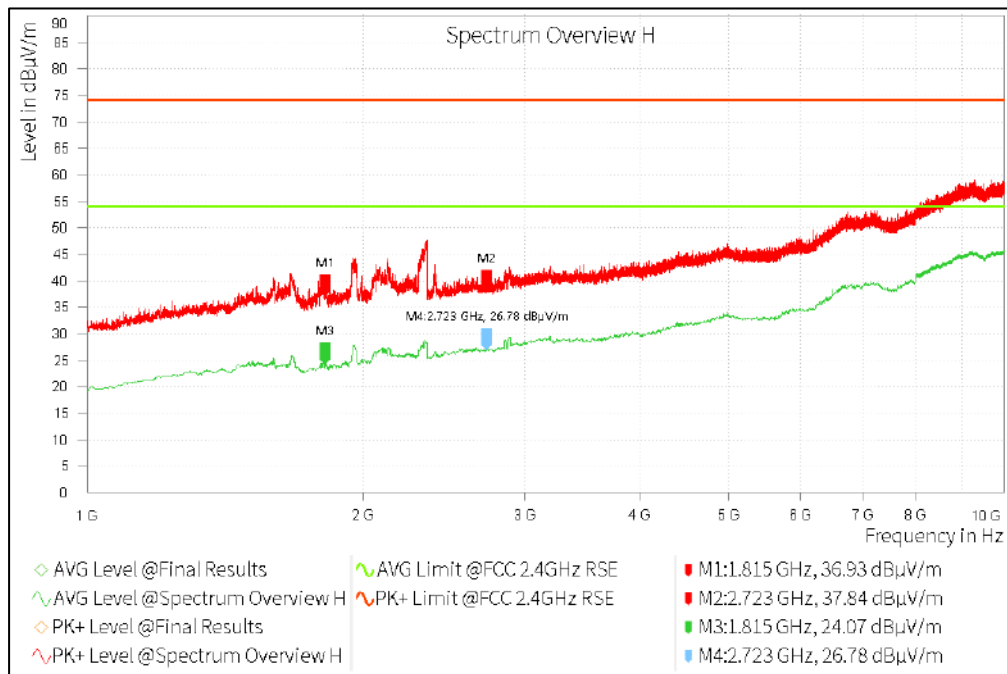
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 907.8MHz

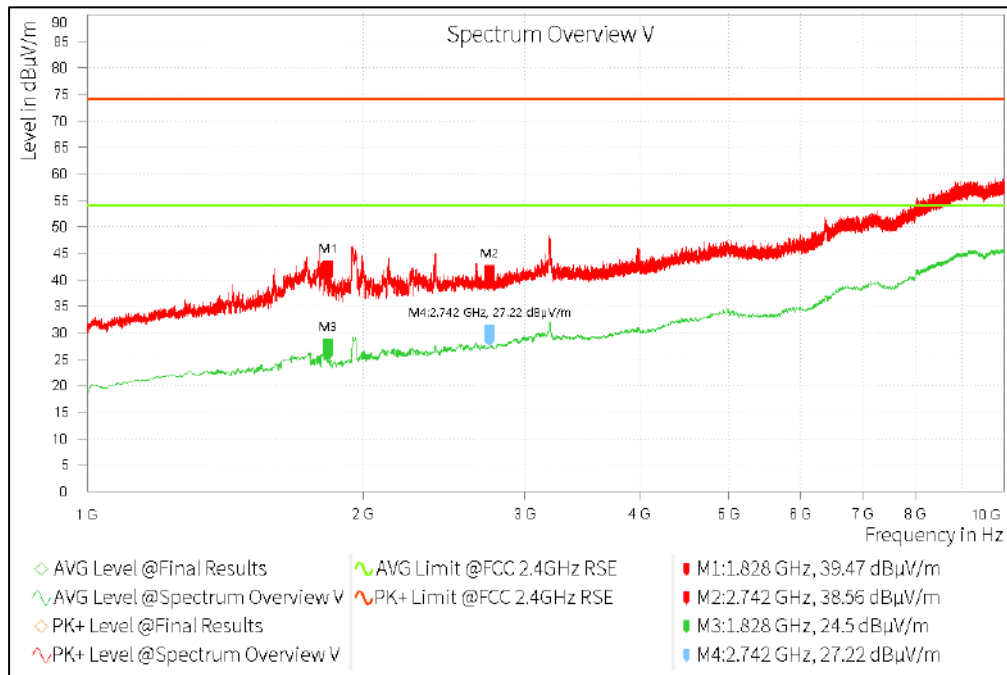
Polarization: Vertical



Channel Frequency: 907.8MHz

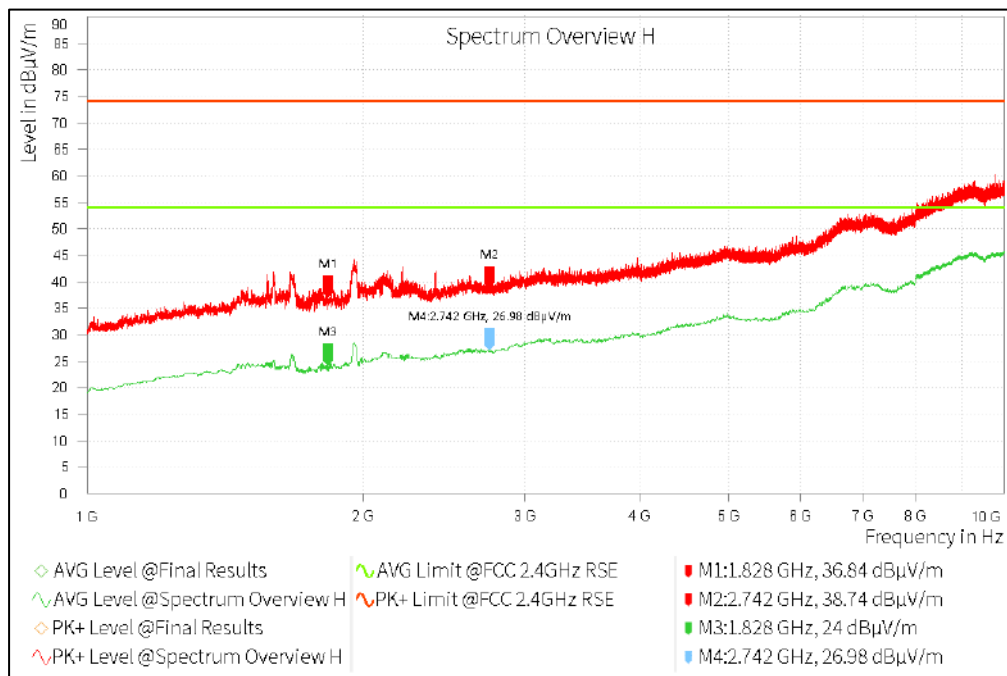
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 914.2MHz

Polarization: Vertical



Channel Frequency: 914.2MHz

Polarization: Horizontal

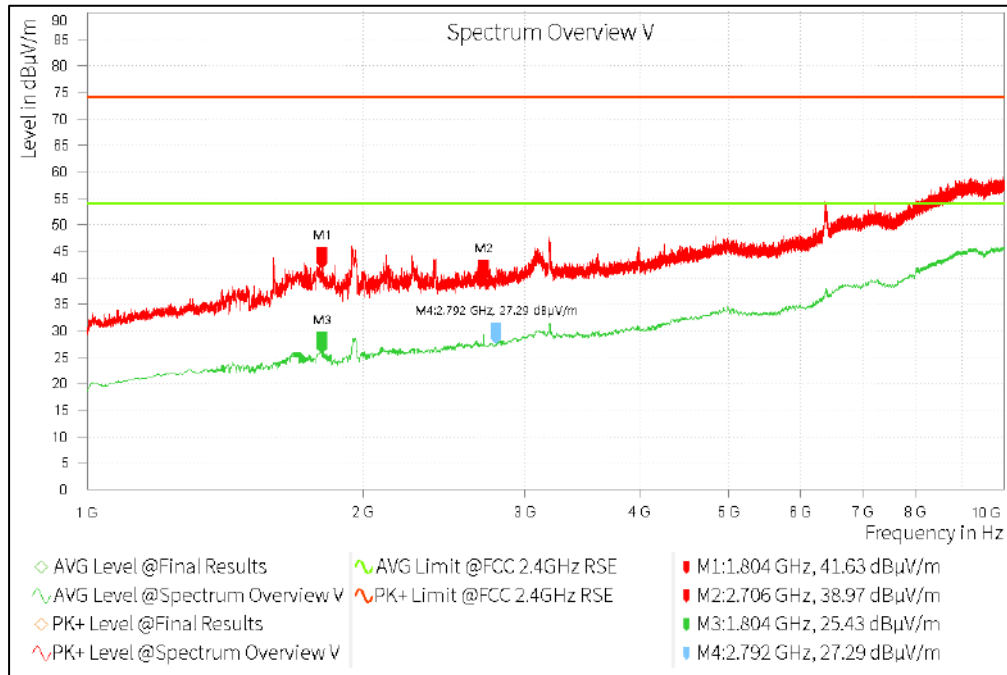
Report Reference. No.: 91800100101001

Modulation: FHSS

Channel Frequency (MHz)	Frequency (MHz)	Antenna Polarization	Measured Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
902.3	1804(Pk)	Vertical	41.63	74	-32.37
	1804(Av)		25.43	54	-28.57
	2706(Pk)		38.97	74	-35.03
	2706(Av)		27.29	54	-26.71
	1804(Pk)	Horizontal	36.97	74	-37.03
	1804(Av)		25.35	54	-28.65
	2706(Pk)		38.79	74	-35.21
	2706(Av)		28.08	54	-25.92
908.5	1817(Pk)	Vertical	39.24	74	-34.76
	1817(Av)		25.98	54	-28.02
	2725.5(Pk)		38.65	74	-35.35
	2725.5(Av)		26.99	54	-27.01
	1817(Pk)	Horizontal	38.82	74	-35.18
	1817(Av)		28.16	54	-25.84
	2725.5(Pk)		38.42	74	-35.58
	2725.5(Av)		26.96	54	-27.04
914.9	1829.8(Pk)	Vertical	38.31	74	-35.69
	1829.8(Av)		24.61	54	-29.39
	2744.7(Pk)		39.29	74	-34.71
	2744.7(Av)		27.31	54	-26.69
	1829.8(Pk)	Horizontal	36.27	74	-37.73
	1829.8(Av)		23.94	54	-30.06
	2744.7(Pk)		39.00	74	-35.00
	2744.7(Av)		26.99	54	-27.01

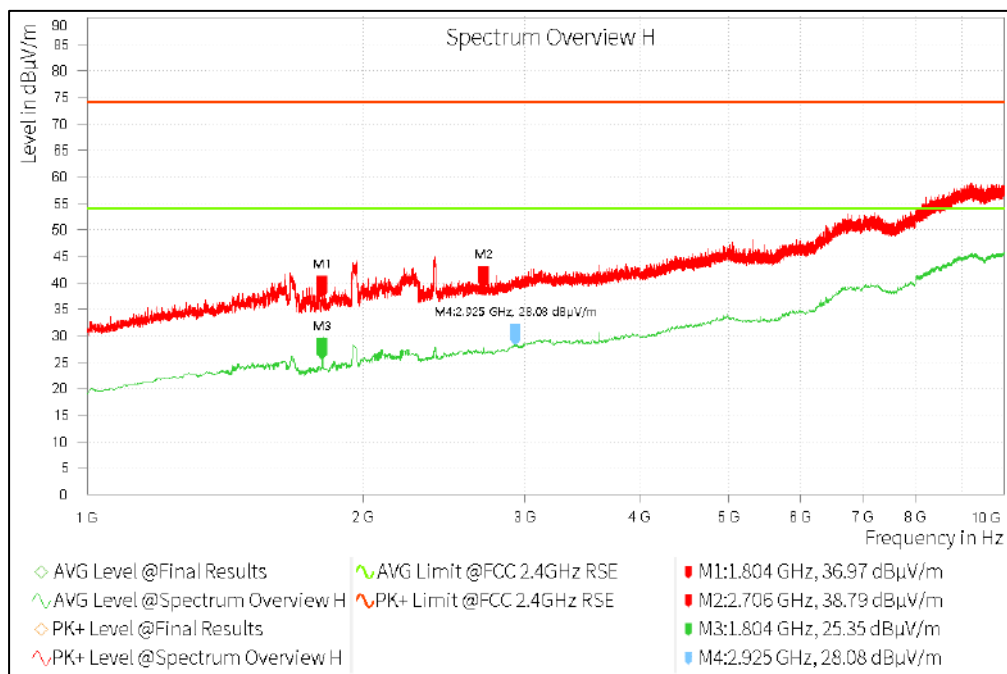
Report Reference. No.: 91800100101001

Test Plots



Channel Frequency: 902.3MHz

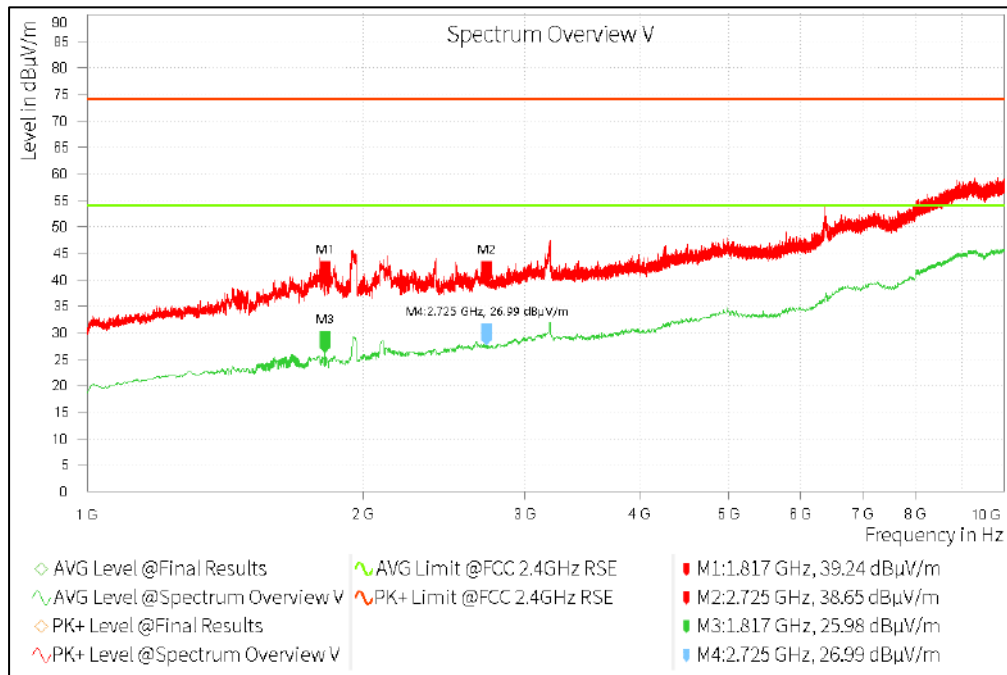
Polarization: Vertical



Channel Frequency: 902.3MHz

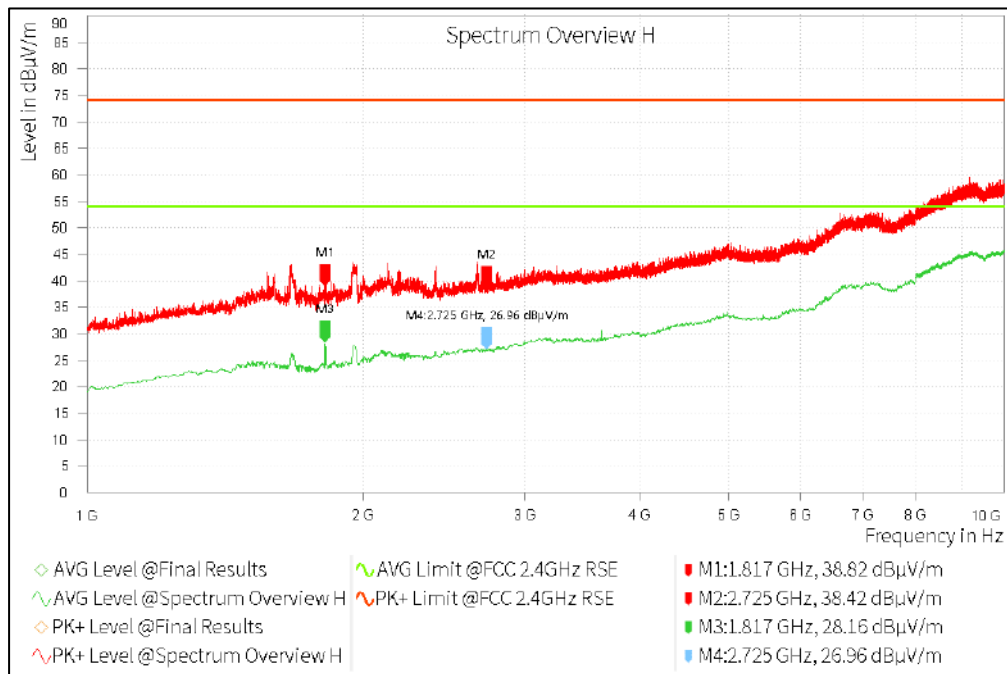
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 908.5MHz

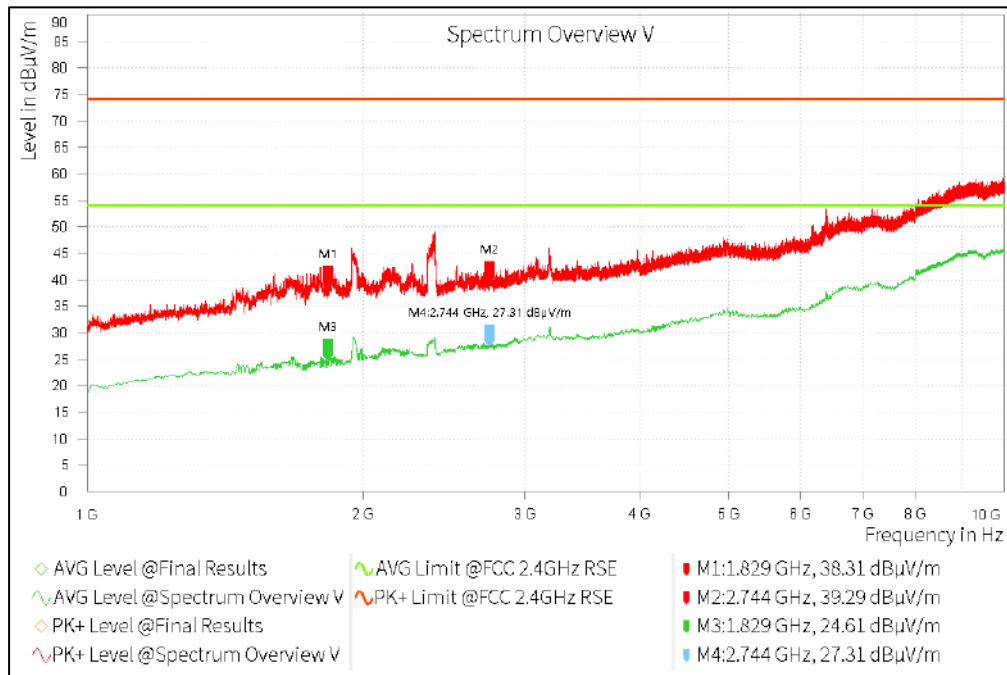
Polarization: Vertical



Channel Frequency: 908.5MHz

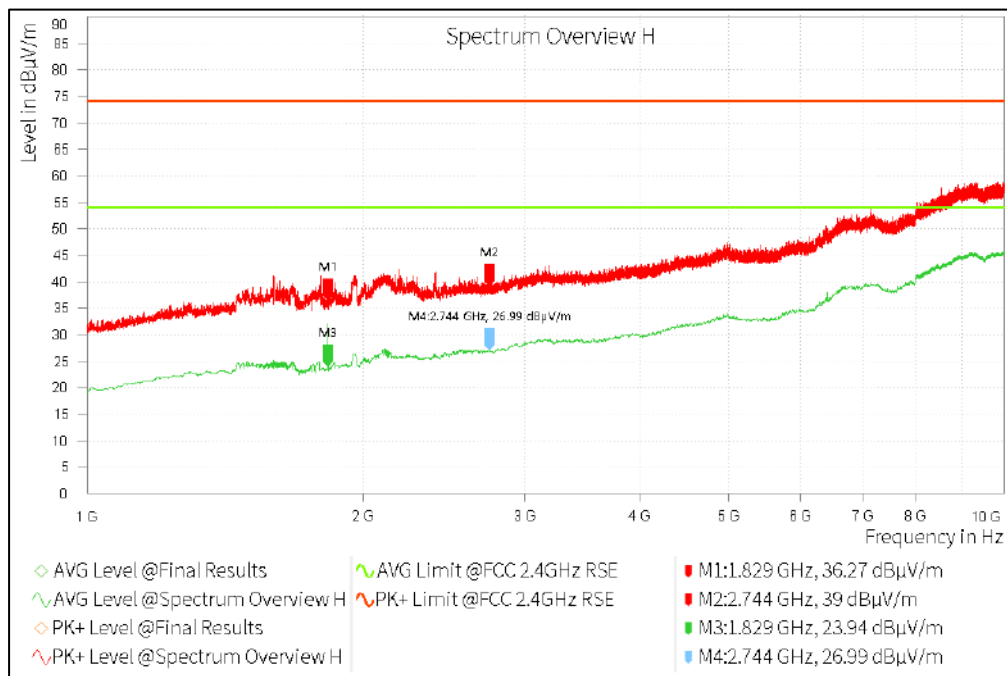
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 914.9MHz

Polarization: Vertical



Channel Frequency: 914.9MHz

Polarization: Horizontal

Report Reference. No.: 91800100101001

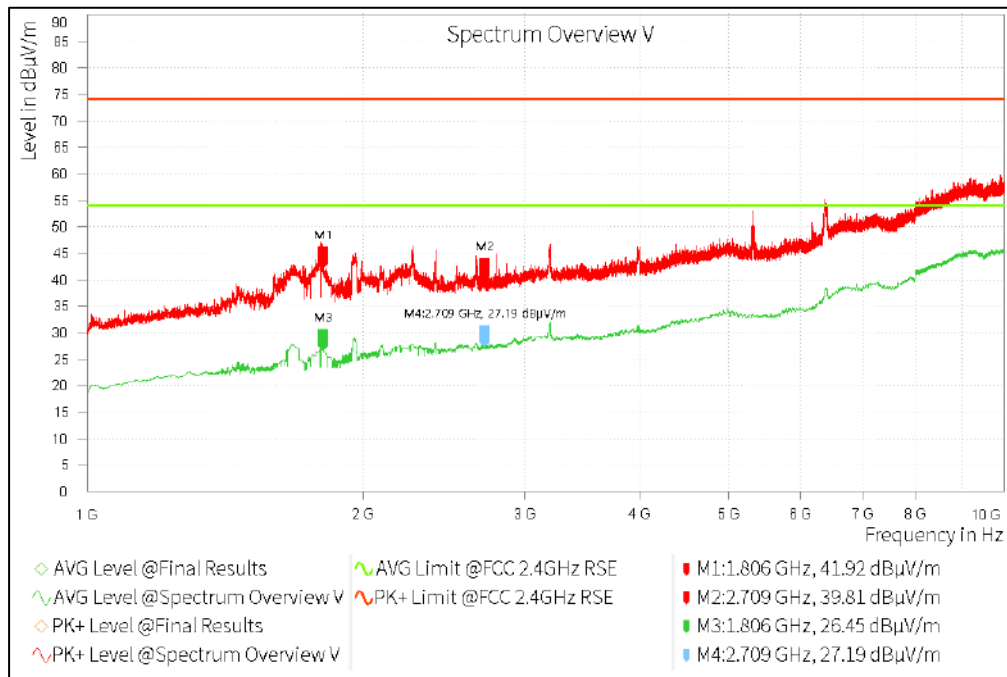
Product: ZEUSR2

Modulation: DTS

Channel Frequency (MHz)	Frequency (MHz)	Antenna Polarization	Measured Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
903	1806(Pk)	Vertical	41.92	74	-32.08
	1806(Av)		26.45	54	-27.55
	2709(Pk)		39.81	74	-34.19
	2709(Av)		27.19	54	-26.81
	1806(Pk)	Horizontal	39.07	74	-34.93
	1806(Av)		26.60	54	-27.40
	2709(Pk)		39.48	74	-34.52
	2709(Av)		28.56	54	-25.44
907.8	1815.6(Pk)	Vertical	41.96	74	-32.04
	1815.6(Av)		25.59	54	-28.41
	2723.4(Pk)		39.15	74	-34.85
	2723.4(Av)		27.25	54	-26.75
	1815.6(Pk)	Horizontal	36.85	74	-37.15
	1815.6(Av)		24.12	54	-29.88
	2723.4(Pk)		38.35	74	-35.65
	2723.4(Av)		26.86	54	-27.14
914.2	1828.4(Pk)	Vertical	40.85	74	-33.15
	1828.4(Av)		25.14	54	-28.86
	2742.6(Pk)		40.07	74	-33.93
	2742.6(Av)		28.07	54	-25.93
	1828.4(Pk)	Horizontal	35.64	74	-38.36
	1828.4(Av)		23.81	54	-30.19
	2742.6(Pk)		39.29	74	-34.71
	2742.6(Av)		27.32	54	-26.68

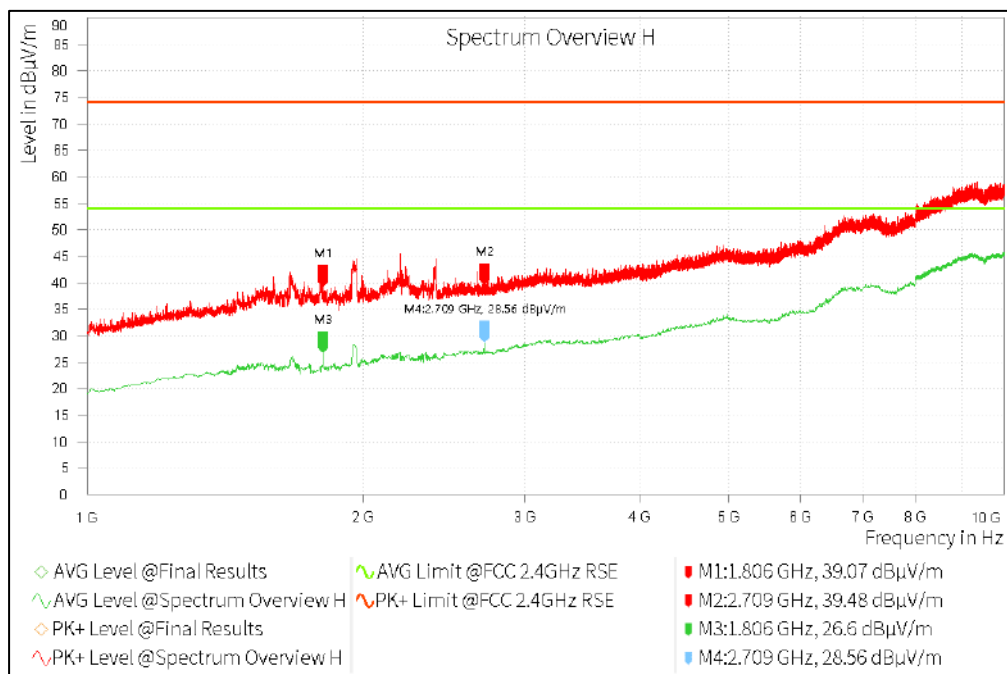
Report Reference. No.: 91800100101001

Test Plots



Channel Frequency: 903MHz

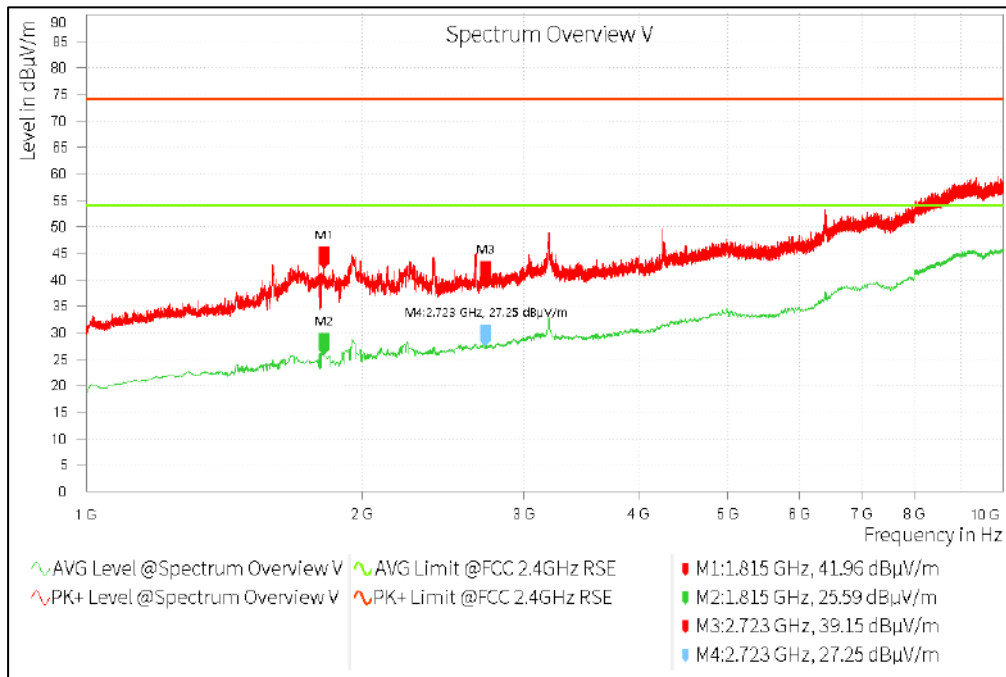
Polarization: Vertical



Channel Frequency: 903MHz

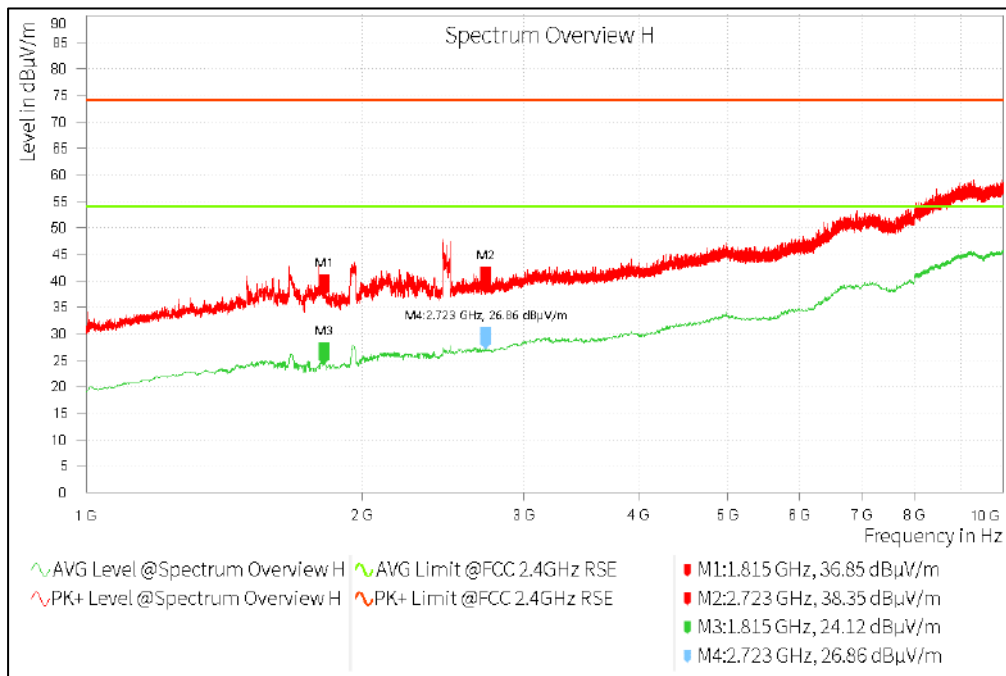
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 907.8MHz

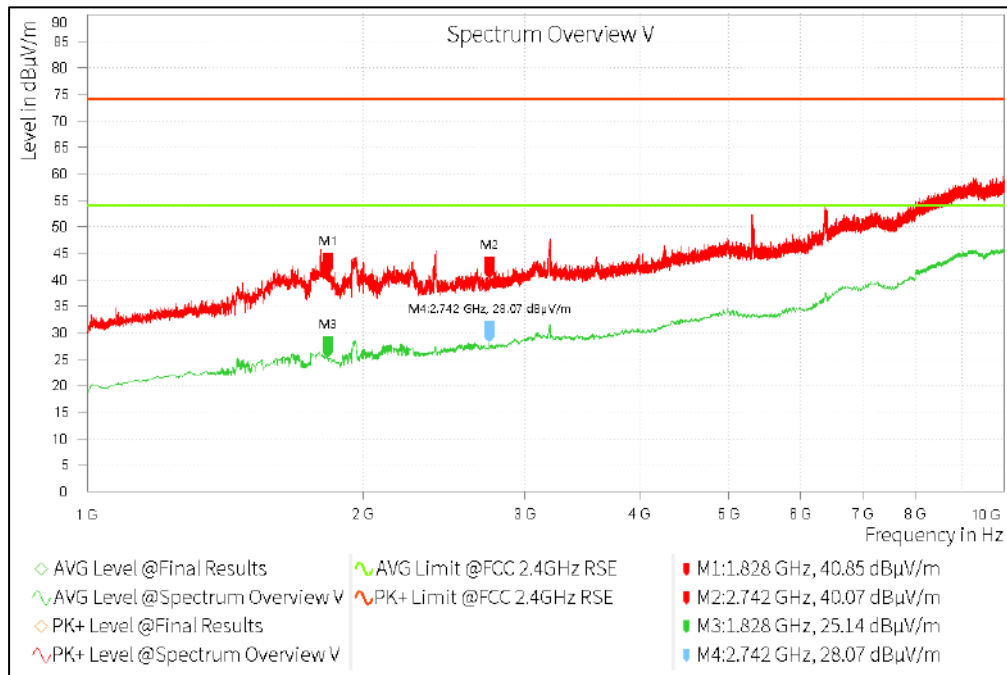
Polarization: Vertical



Channel Frequency: 907.8MHz

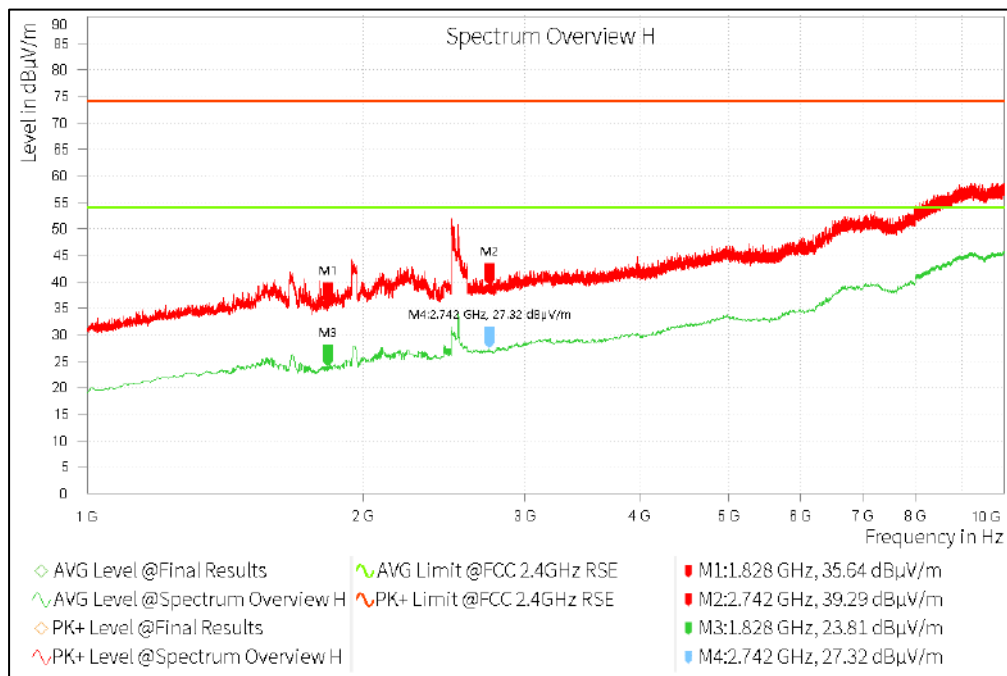
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 914.2MHz

Polarization: Vertical



Channel Frequency: 914.2MHz

Polarization: Horizontal

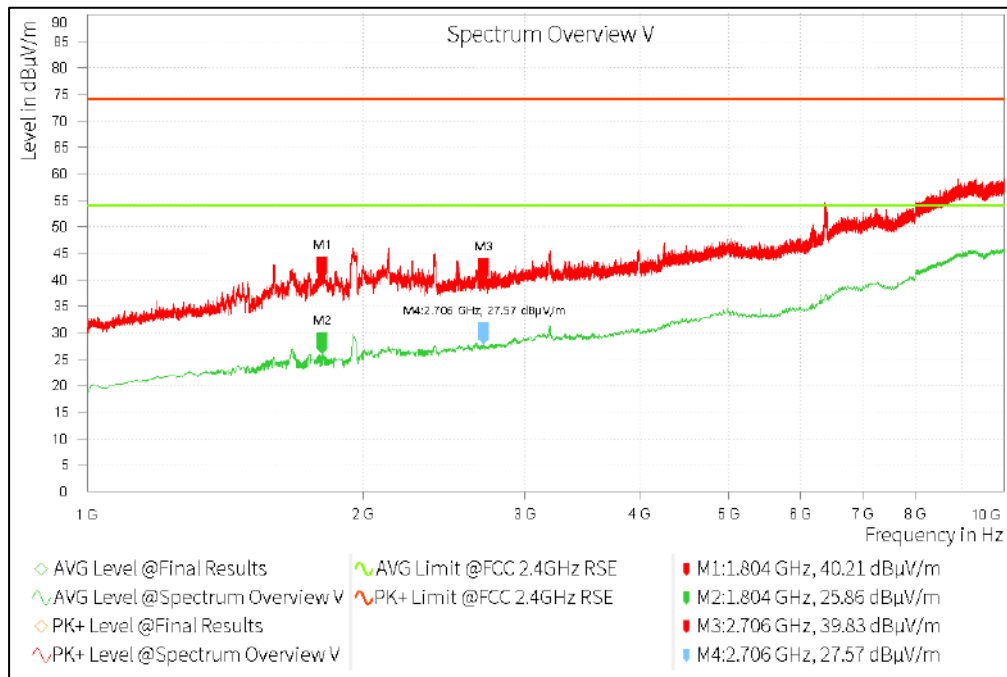
Report Reference. No.: 91800100101001

Modulation: FHSS

Channel Frequency (MHz)	Frequency (MHz)	Antenna Polarization	Measured Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
902.3	1804(Pk)	Vertical	40.21	74	-33.79
	1804(Av)		25.86	54	-28.14
	2706(Pk)		39.83	74	-34.17
	2706(Av)		27.57	54	-26.43
	1804(Pk)	Horizontal	38.44	74	-35.56
	1804(Av)		25.92	54	-28.08
	2706(Pk)		38.36	74	-35.64
	2706(Av)		27.01	54	-26.99
908.5	1817(Pk)	Vertical	41.12	74	-32.88
	1817(Av)		25.34	54	-28.66
	2725.5(Pk)		39.2	74	-34.80
	2725.5(Av)		27.23	54	-26.77
	1817(Pk)	Horizontal	37.89	74	-36.11
	1817(Av)		28.48	54	-25.52
	2725.5(Pk)		48.45	74	-25.55
	2725.5(Av)		29.58	54	-24.42
914.9	1829.8(Pk)	Vertical	37.94	74	-36.06
	1829.8(Av)		24.5	54	-29.50
	2744.7(Pk)		39.56	74	-34.44
	2744.7(Av)		27.7	54	-26.30
	1829.8(Pk)	Horizontal	35.57	74	-38.43
	1829.8(Av)		23.42	54	-30.58
	2744.7(Pk)		38.63	74	-35.37
	2744.7(Av)		27.06	54	-26.94

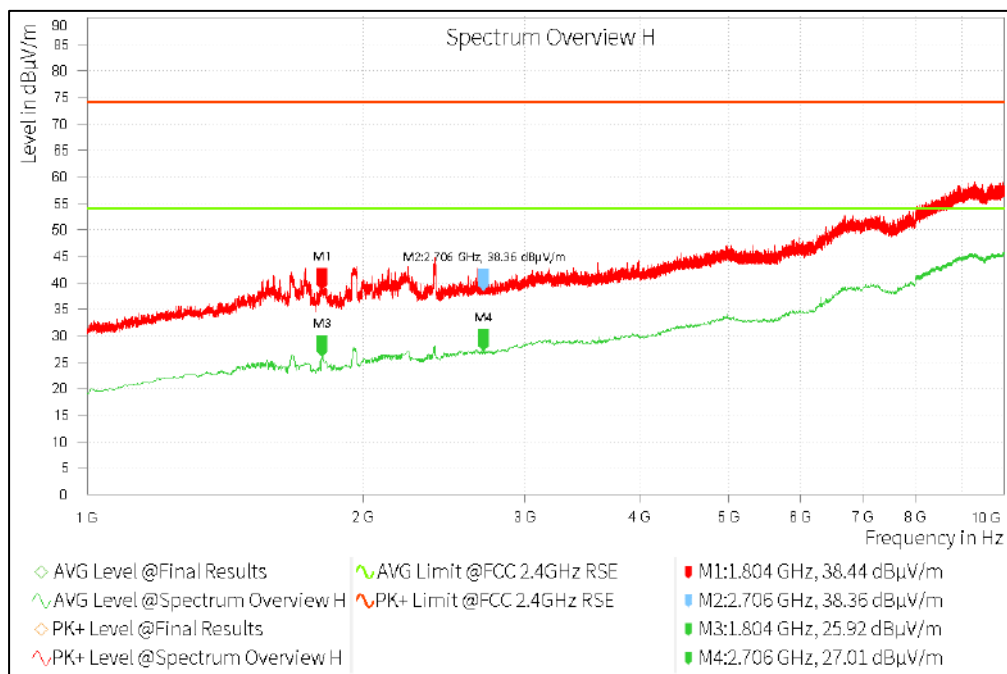
Report Reference. No.: 91800100101001

Test Plots



Channel Frequency: 902.3MHz

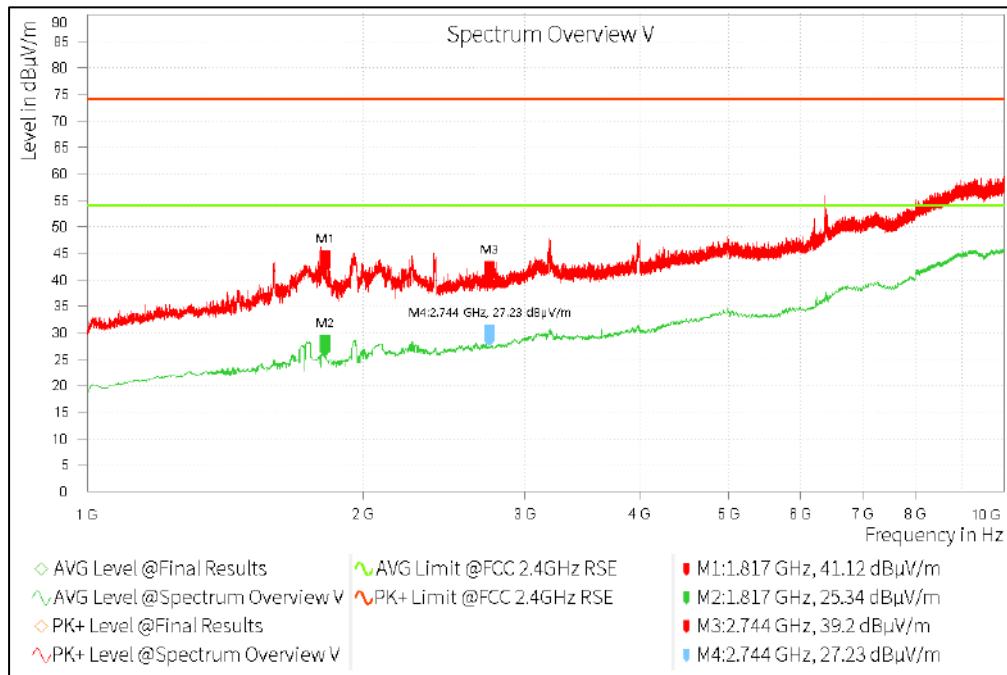
Polarization: Vertical



Channel Frequency: 902.3MHz

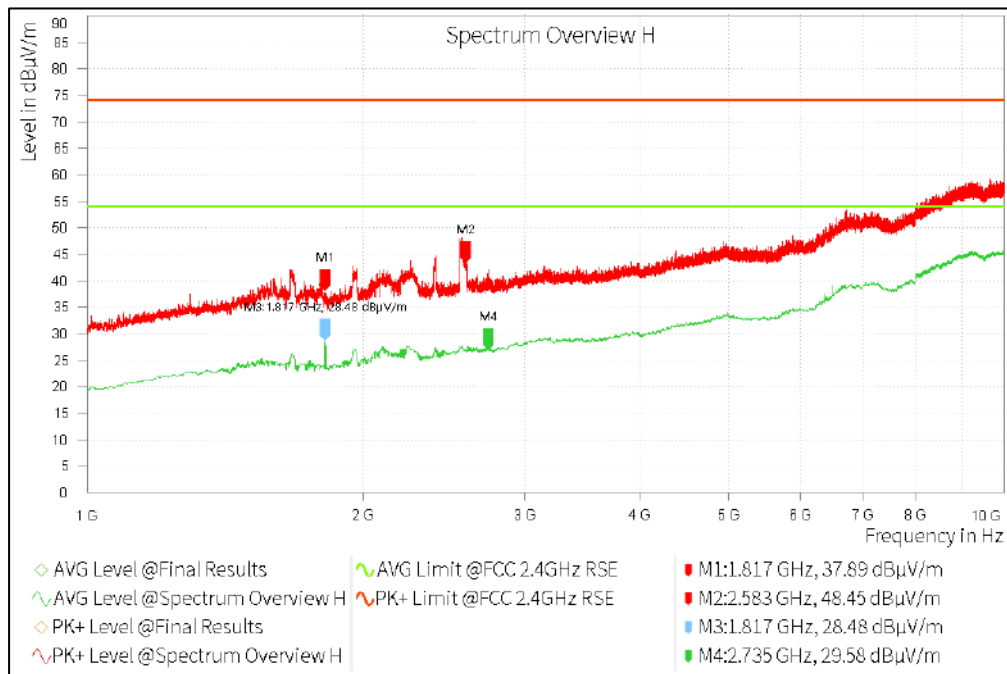
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 908.5MHz

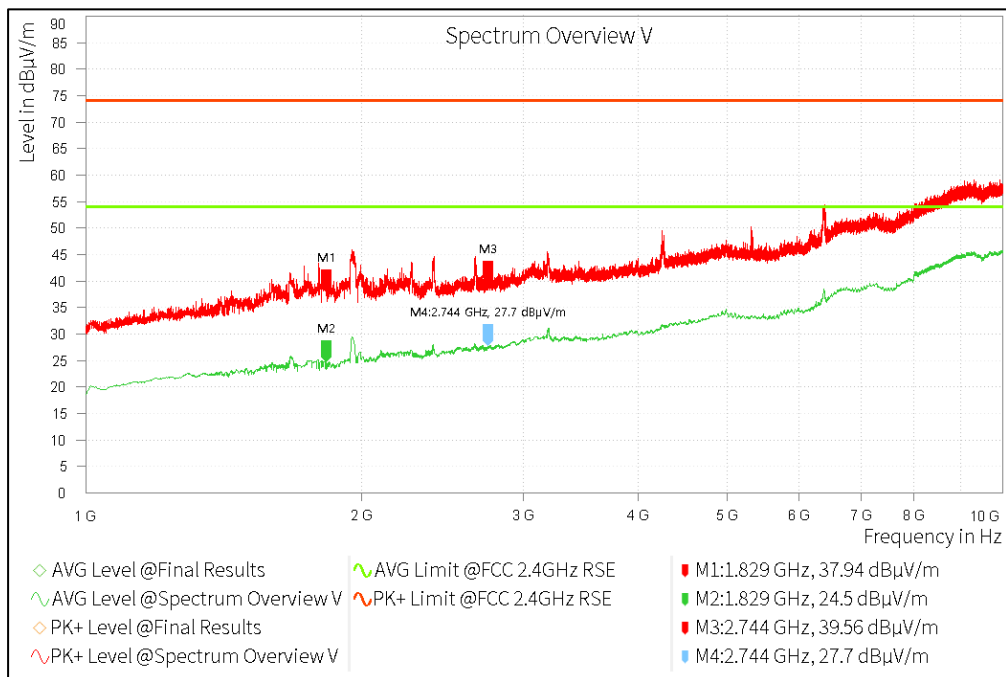
Polarization: Vertical



Channel Frequency: 908.5MHz

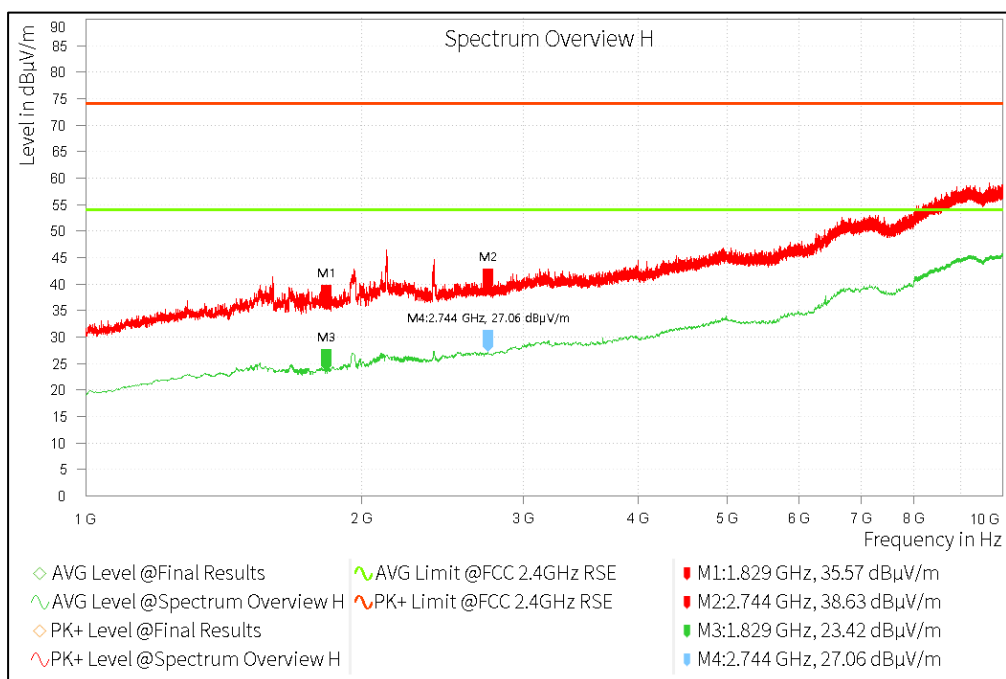
Polarization: Horizontal

Report Reference. No.: 91800100101001



Channel Frequency: 914.9MHz

Polarization: Vertical



Channel Frequency: 914.9MHz

Polarization: Horizontal

Report Reference. No.: 91800100101001

20 TEST CONDITIONS AND RESULTS – Conducted Emissions On AC Power Lines

Test Specification	FCC part 15 Subpart C 15.207 (a) RSS Gen, Section 8.8
Test Method	ANSI C63.10-2020
Measurement Bandwidth	9kHz
Frequency Range	150kHz – 30MHz
Requirement	Refer TEST METHODOLOGY

Table 13: Limits of section 15.207

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak (dBμV)	Average (dBμV)
0.15-0.5	66-56*	56-46*
0.5-5	56	46
5-30	60	50

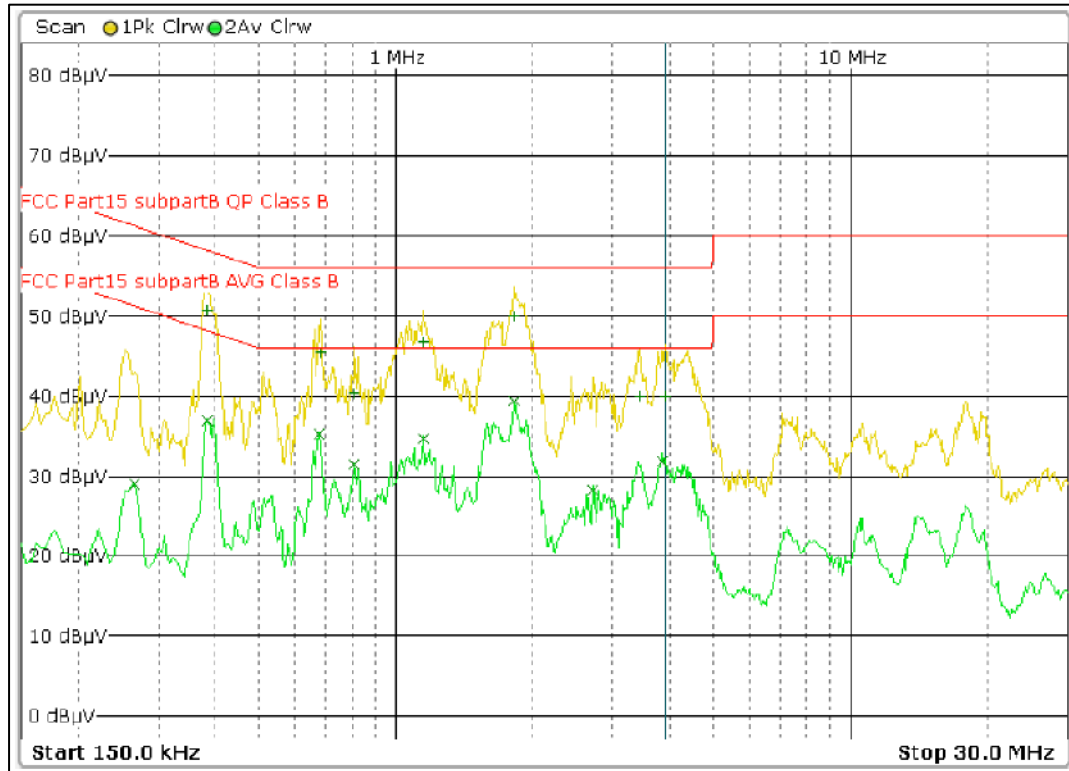
20.1 Environmental Conditions

Temperature	: 24°C
Relative humidity	: 52%
Power supply	: 120V to 480 Vac, 200A, 60 Hz, LoRa with KYZ output

Report Reference. No.: 91800100101001

20.2 Test results

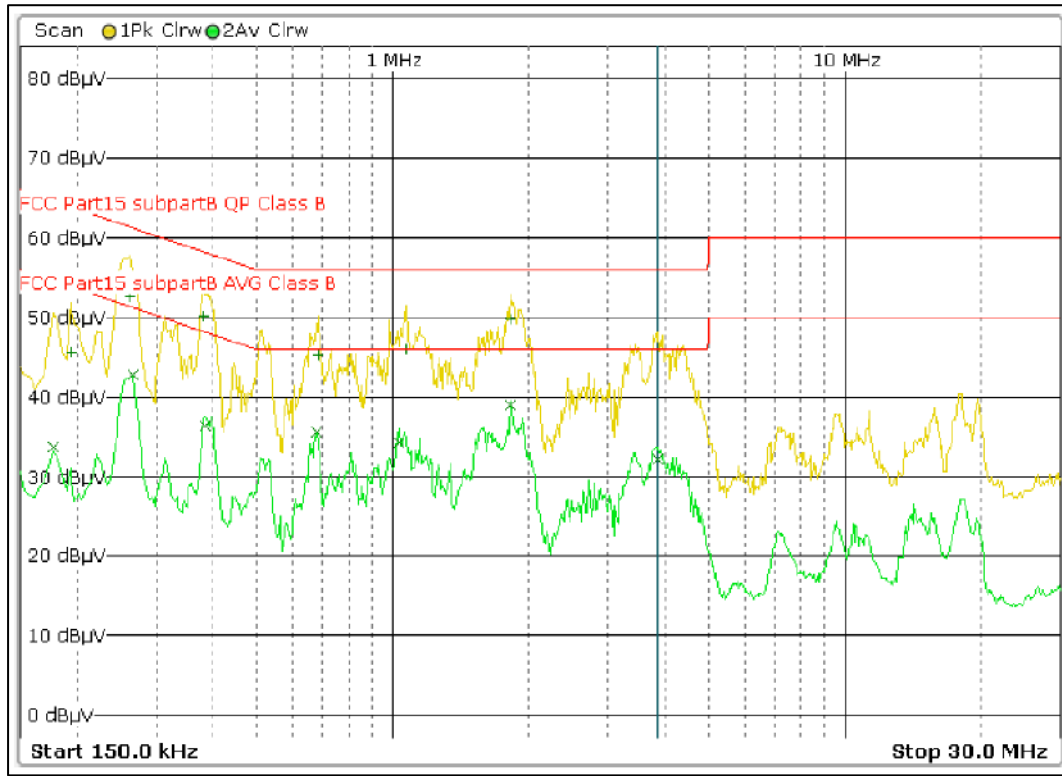
Line 1 Split Phase



Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Detector	Margin (dB)
0.682	45.42	56	Quasi Peak	-10.58
0.810	40.27	56	Quasi Peak	-15.73
1.150	46.75	56	Quasi Peak	-9.25
3.438	39.27	56	Quasi Peak	-16.73
3.914	39.92	56	Quasi Peak	-16.08
0.266	29.01	46	Average	-16.99
0.386	36.96	46	Average	-9.04
0.678	35.27	46	Average	-10.73
0.810	31.45	46	Average	-14.55
1.150	34.68	46	Average	-11.32
2.718	28.21	46	Average	-17.79
3.850	31.86	46	Average	-14.14

Report Reference. No.: 91800100101001

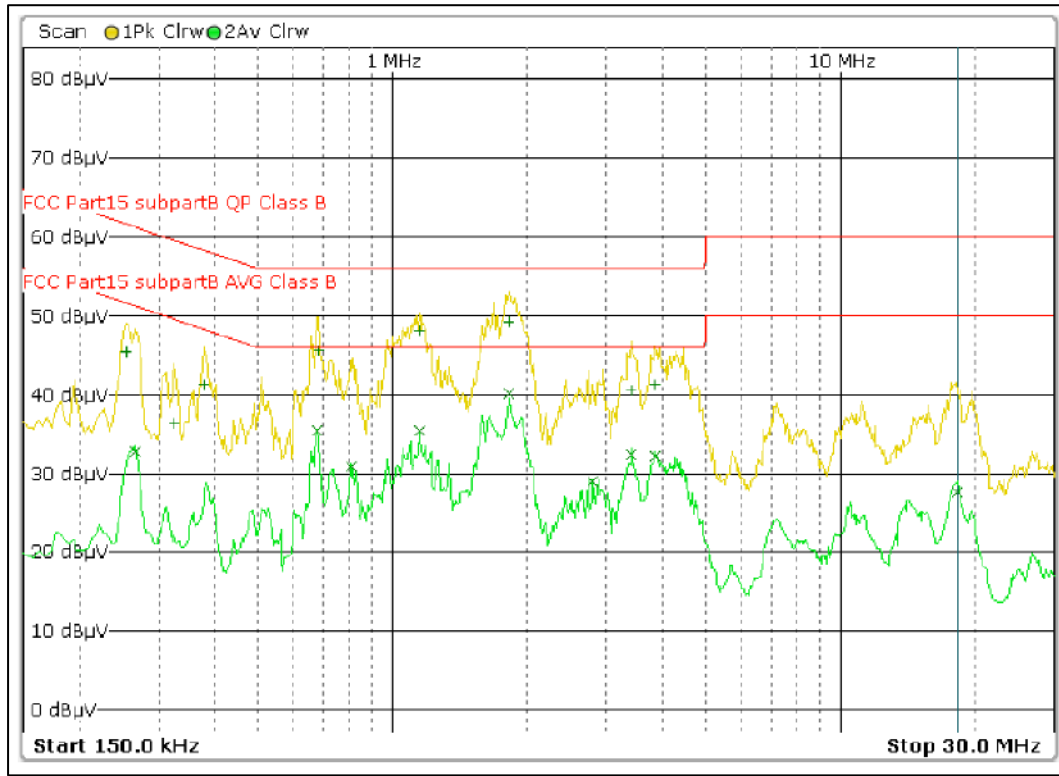
Line 2 Split Phase



Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Detector	Margin (dB)
0.194	45.42	66	Quasi Peak	-20.58
0.262	52.68	66	Quasi Peak	-13.32
0.382	50.09	66	Quasi Peak	-15.91
0.682	45.23	56	Quasi Peak	-10.77
1.070	46.01	56	Quasi Peak	-9.99
1.826	49.70	56	Quasi Peak	-6.30
0.178	33.79	56	Average	-22.21
0.266	42.71	56	Average	-13.29
0.386	36.28	56	Average	-19.72
0.678	35.65	46	Average	-10.35
1.030	34.22	46	Average	-11.78
1.818	38.95	46	Average	-7.05
3.842	32.19	46	Average	-13.81

Report Reference. No.: 91800100101001

Neutral Split Phase



Frequency (MHz)	Level (dBμV)	Limit (dBμV)	Detector	Margin (dB)
0.254	45.51	66	Quasi Peak	-20.49
0.326	36.42	66	Quasi Peak	-29.58
0.378	41.35	66	Quasi Peak	-24.65
0.682	45.62	56	Quasi Peak	-10.38
1.150	48.00	56	Quasi Peak	-8.00
1.818	49.15	56	Quasi Peak	-6.85
3.414	40.15	56	Quasi Peak	-15.85
3.854	41.29	56	Quasi Peak	-14.71
0.266	32.85	56	Average	-23.15
0.678	35.39	46	Average	-10.61
1.150	35.40	46	Average	-10.60
2.798	38.95	46	Average	-7.05
3.418	32.32	46	Average	-13.68
3.854	32.25	46	Average	-13.75
18.206	27.75	50	Average	-22.25

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-----End of Report-----