

TEST REPORT

Applicant Name: Dragino Technology Co., Limited.
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LongCheng Street, LongGang District, Shenzhen China
Report Number: 2601R15866E-RF-00A
FCC ID: ZHZPB05-L

Test Standard (s)

FCC PART 15.247

Sample Description

Product Type: LoRaWAN Push Buttons
Model No.: PB05-L
Multiple Model(s) No.: N/A
Trade Mark: N/A
Date Received: 2026/03/13
Issue Date: 2026/06/29

Test Result:	Pass▲
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▲ In the configuration tested, the EUT complied with the standards above.

Prepared and Checked By:

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Allen Bai
RF Engineer

Approved By:

Nancy Wang

Nancy Wang
RF Supervisor

Note: The information marked * is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	2601R15866E-RF-00A	Original Report	2026/06/29

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Frequency Range	902.3-914.9MHz
Maximum Conducted Peak Output Power	-5.74dBm
Technique	Hybrid System
Antenna Specification [#]	0.5dBi (provided by the applicant)
Voltage Range	DC 3V from battery
Sample serial number	3ICX-3 for Radiated Emissions Test 3ICX-4 for RF Conducted Test (Assigned by BACL, Shenzhen)
Sample/EUT Status	Good condition
Adapter Information	N/A

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission's rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209 and 15.247 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2020, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

And KDB 558074 D01 15.247 Meas Guidance v05r02.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		52.29kHz(k=1.96, 95% level of confidence)
RF output power, conducted		1.57dB(k=1.96, 95% level of confidence)
Conducted Spurious Emission		2.48dB(k=1.96, 95% level of confidence)
AC Power Lines Conducted Emissions	9kHz~150 kHz	3.46dB(k=2, 95% level of confidence)
	150 kHz ~30MHz	3.72dB(k=2, 95% level of confidence)
Radiated Emissions	0.009MHz~30MHz	3.66dB(k=2, 95% level of confidence)
	30MHz~1000MHz (Horizontal)	5.10dB(k=2, 95% level of confidence)
	30MHz~1000MHz (Vertical)	6.28dB(k=2, 95% level of confidence)
	1GHz - 6GHz	6.18dB(k=2, 95% level of confidence)
	6GHz - 18GHz	6.62dB(k=2, 95% level of confidence)
	18GHz - 40GHz	6.66dB(k=2, 95% level of confidence)
Temperature		$\pm 0.4^{\circ}\text{C}$
Humidity		$\pm 2\%$
Supply voltages		DC $\pm 0.4\%$; AC $\pm 1\%$

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 5F(B-West) , 6F, 7F, the 3rd Phase of Wan Li Industrial Building D, Shihua Rd, FuTian Free Trade Zone, Shenzhen, China.

Each test item follows test standards and with no deviation.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, test firm registration No.: 715558, the FCC Designation No. : CN5045.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in engineering mode.

Channel List

Channel	Freq.(MHz)	Channel	Freq.(MHz)	Channel	Freq.(MHz)	Channel	Freq.(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

EUT was test with channel 0/31/63.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

“Serial Port Utility.exe[#]” exercise software was used and the power level is 14[#]. The software and power level was provided by the manufacturer.

Support Equipment List and Details

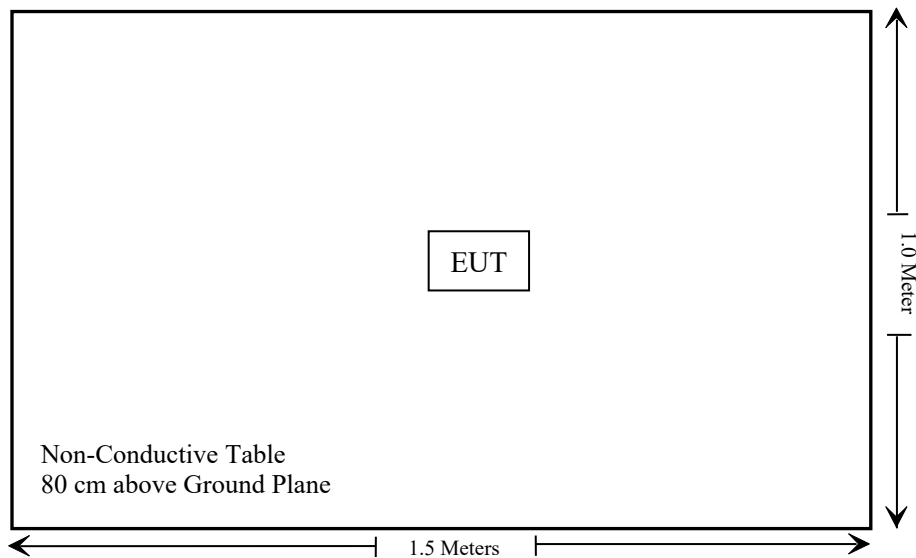
Manufacturer	Description	Model	Serial Number
/	/	/	/

External I/O Cable

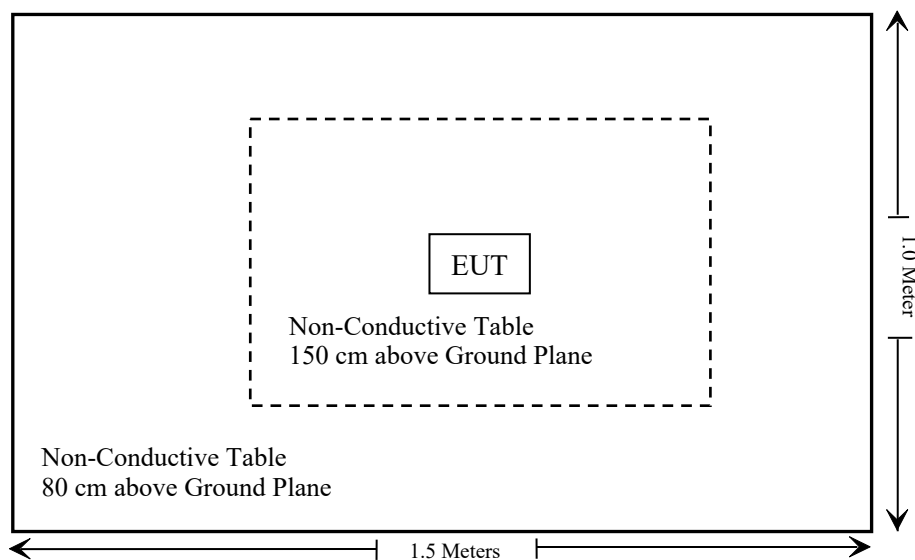
Cable Description	Length (m)	From Port	To
/	/	/	/

Block Diagram of Test Setup

For Radiated Emissions (Below 1G):



For Radiated Emissions (Above 1G):



SUMMARY OF TEST RESULTS

Test Rules	Description of Test	Result
FCC §1.1307(b), § 2.1093	RF Exposure Evaluation	Compliant
FCC §15.203	Antenna Requirement	Compliant
FCC §15.207(a)	AC Line Conducted Emissions	Not Applicable
FCC §15.209, §15.205 & §15.247(d)	Spurious Emissions	Compliant
FCC §15.247(a)(1)(i)	20 dB Emission Bandwidth	Compliant
FCC §15.247(a)(1)	Channel Separation Test	Compliant
FCC §15.247(f)	Time of Occupancy (Dwell Time)	Compliant
FCC §15.247(b)(3)	Peak Output Power Measurement	Compliant
FCC §15.247(d)	Band edges	Compliant
FCC §15.247(d)	Conducted Spurious Emission	Compliant
FCC §15.247(f)	Power Spectral Density	Compliant
C63.10 §11.6	Duty Cycle	/

Not Applicable: The EUT is powered by battery.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2025/09/01	2026/08/31
Sonoma instrument	Pre-amplifier	310 N	186238	2025/09/08	2026/09/07
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2023/07/20	2026/07/19
Unknown	Chamber A Cable	Cable A1	Cable A1	2025/09/08	2026/09/07
Unknown	Chamber A Cable	Cable A2	Cable A2	2025/09/08	2026/09/07
BACL	Active Loop Antenna	1313-1A	4031911	2024/05/14	2027/05/13
Unknown	Chamber A Cable	Cable A3	Cable A3	2025/09/08	2026/09/07
Unknown	Chamber A Cable	Cable A4	Cable A4	2025/09/08	2026/09/07
Audix	EMI Test software	E3	19821b(V9)	NCR	NCR
TDK	Chamber	Chamber A	2#	2023/07/12	2026/07/11
Rohde & Schwarz	Spectrum Analyzer	FSV40	101605	2025/09/01	2026/08/31
A.H.System	Preamplifier	PAM-0118P	489	2025/09/08	2026/09/07
Schwarzbeck	Horn Antenna	BBHA9120D (1201)	1143	2023/07/26	2026/07/25
Unknown	Chamber B Cable	Cable B1	Cable B1	2025/09/08	2026/09/07
Unknown	Chamber B Cable	Cable B2	Cable B2	2025/09/08	2026/09/07
Unknown	Chamber B Cable	Cable B3	Cable B3	2025/09/08	2026/09/07
JD	Filter Switch Unit	DT7220FSU	DS79906	2025/08/12	2026/08/11
JD	Multiplex Switch Test Control Set	DT7220SCU	DS79903	2025/08/12	2026/08/11
Audix	EMI Test software	E3	191218 V9(c)	NCR	NCR
TDK	Chamber	Chamber B	1#	2023/07/14	2026/07/13
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200982	2025/08/12	2026/08/11
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2025/09/01	2026/08/31
Unknown	10dB Attenuator	Unknown	F-03-EM190	2025/06/26	2026/06/25
Unknown	10dB Attenuator	Unknown	F-03-EM190	2026/06/24	2027/06/23

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1307(b) & §2.1093-RF EXPOSURE EVALUATION

Applicable Standard

According to FCC §2.1093 and §1.1307(b)(3), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D04 Interim General RF Exposure Guidance

1-mW Test Exemption:

Per § 1.1307(b)(3)(i)(A), a single RF source is exempt RF device (from the requirement to show data demonstrating compliance to RF exposure limits, as previously mentioned) if the available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption applies to all operating configurations and exposure conditions, for the frequency range 100 kHz to 100 GHz, regardless of fixed, mobile, or portable device exposure conditions. This is a standalone exemption, and it cannot be applied in conjunction with any other test exemption.

Result

For worst case:

Mode	Frequency (MHz)	Antenna Gain [#]	Maximum Tune up conducted power [#]		Exemption Limit (mW)	Test Exemption
			dBm	mW		
Lora-Hybrid	902.3-914.9	0.5	-5	0.32	1	Yes
Lora-DTS	903-914.2	0.5	-3	0.50	1	Yes

Note:

1. Max tune-up conducted power[#] and antenna gain[#] was declared and provided by the applicant
2. The Hybrid and DTS cannot simultaneous transmitting.

Result: Compliant

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to FCC § 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

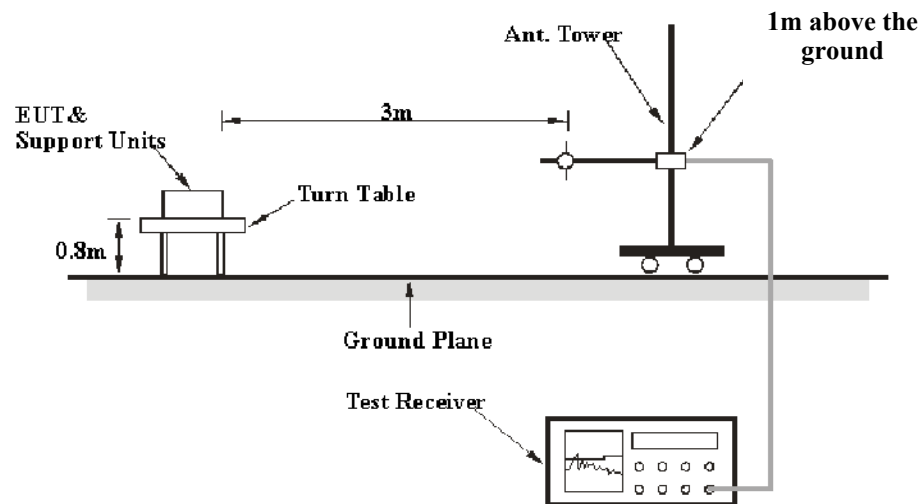
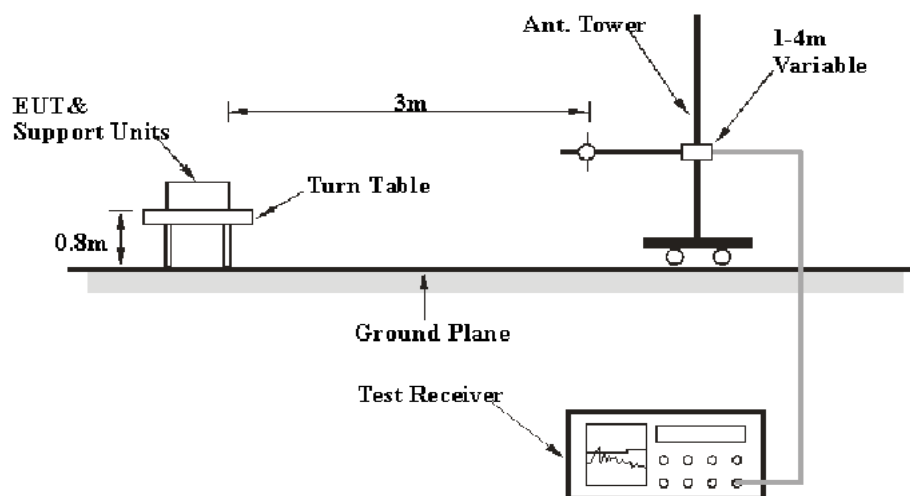
Antenna Connector Construction

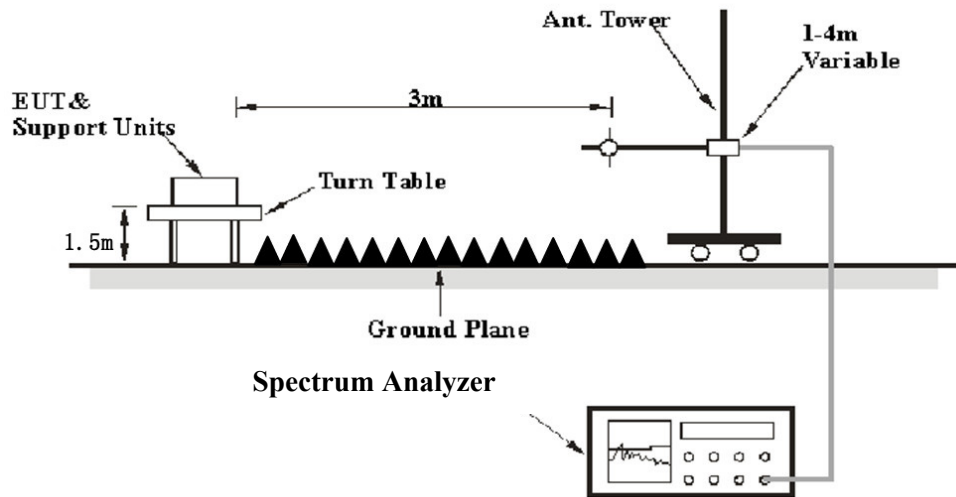
The EUT has an internal antenna arrangement, which was permanently attached, the maximum antenna gain[#] is 0.5dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliant.

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS**Applicable Standard**

FCC §15.247 (d); §15.209; §15.205;

EUT Setup**9 kHz-30MHz:****30MHz-1GHz:**

Above 1GHz:

The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2020. The specification used was the FCC 15.209, and FCC 15.247 limits.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 9 kHz to 10 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

9 kHz-1GHz:

Frequency Range	RBW	Video B/W	IF B/W	Measurement	Detector
9 kHz – 150 kHz	/	/	200 Hz	QP	QP
	300 Hz	1 kHz	/	PK	Peak
150 kHz – 30 MHz	/	/	9 kHz	QP	QP
	10 kHz	30 kHz	/	PK	Peak
30 MHz – 1000 MHz	/	/	120 kHz	QP	QP
	100 kHz	300 kHz	/	PK	Peak

1-10GHz:**Pre-scan**

Measurement	Duty cycle	RBW	Video B/W	Detector
PK	Any	1MHz	3 MHz	Peak
AV	>98%	1MHz	1 kHz	Peak
	<98%	1MHz	>1/Ton, not less than 1kHz	Peak

Final measurement for emission identified during pre-scan

Measurement	Duty cycle	RBW	Video B/W	Detector
PK	Any	1MHz	3 MHz	Peak
AV	>98%	1MHz	10 Hz	Peak
	<98%	1MHz	$\geq 1/\text{Ton}$	Peak

Note: Ton is minimum transmission duration

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All final data was recorded in Quasi-peak detection mode except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz, average detection modes for frequency bands 9–90 kHz and 110–490 kHz, peak and average detection modes for frequencies above 1 GHz.

For 9 kHz-30MHz, the report shall list the six emissions with the smallest margin relative to the limit, for each of the three antenna orientations (parallel, perpendicular, and ground-parallel) unless the margin is greater than 20 dB.

If the maximized peak measured value complies with under the QP/Average limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

All emissions under the average limit and under the noise floor have not recorded in the report.

Factor & Over Limit/Margin Calculation

The Factor is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain. The basic equation is as follows:

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Over Limit/Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, an Over Limit/margin of -7dB means the emission is 7dB below the limit. The equation for calculation is as follows:

$$\begin{aligned} \text{Over Limit/Margin} &= \text{Level/Corrected Amplitude} - \text{Limit} \\ \text{Level / Corrected Amplitude} &= \text{Read Level} + \text{Factor} \end{aligned}$$

Test Data**Environmental Conditions**

Temperature:	19.5~22.6 °C
Relative Humidity:	48~51 %
ATM Pressure:	100.5~101.3 kPa

The testing was performed by Anson Su on 2026-04-03 for below 1GHz and Wing K Ji on 2026-03-31 for above 1GHz.

EUT operation mode: Transmitting

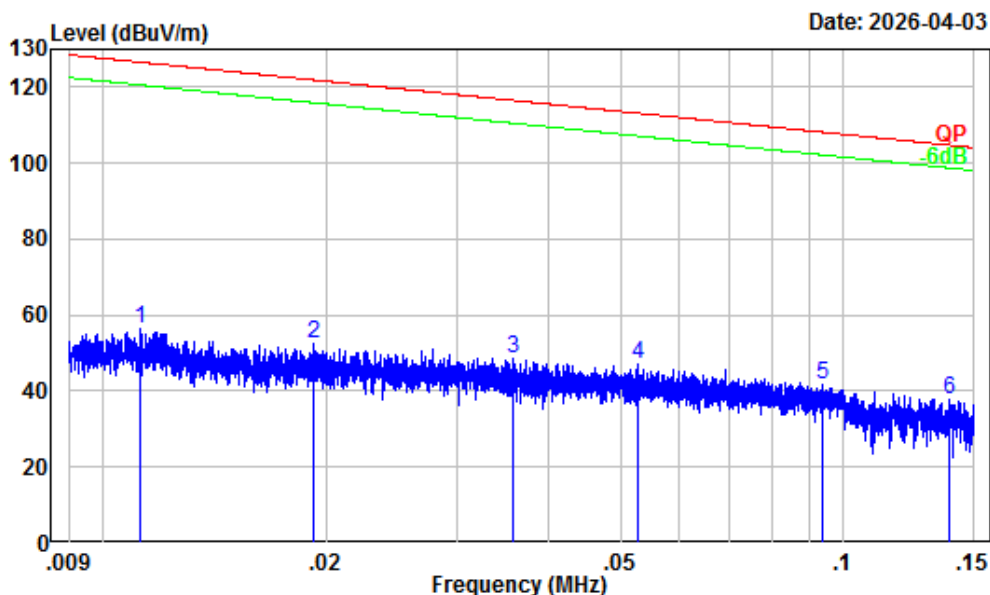
Note: Pre-scan in the X, Y and Z axes of orientation, the worst case Z-axis of orientation was recorded.

Note: For the radiated spurious emission below 30MHz, after pre-scan in the ground-parallel, perpendicular and parallel of orientation, the worst case parallel of orientation were recorded.

9 kHz-30MHz: (Maximum output power mode, High Channel)

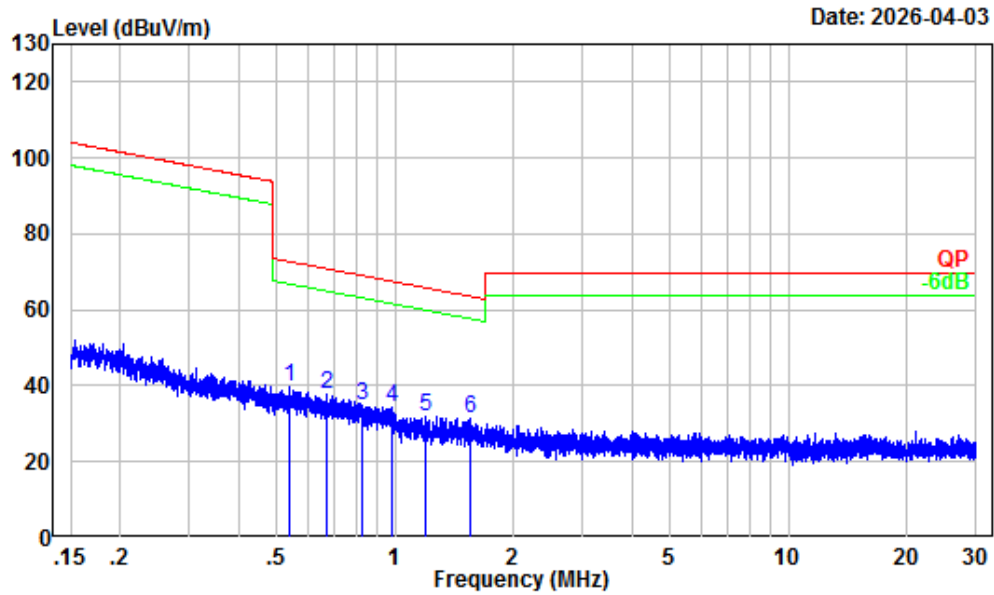
Note: When the test result of peak was less than the limit of QP/Average more than 6dB, just peak value were recorded.

Parallel (worst case)



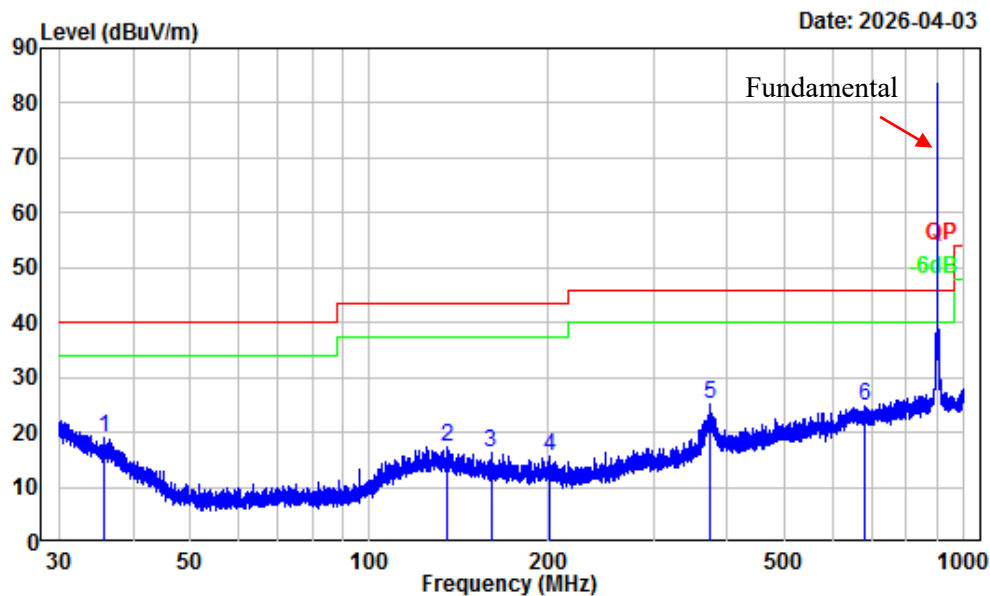
Site : Chamber A
Condition : 3m
Project Number : 2601R15866E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 0.3/1kHz
Tester : Anson Su

	Freq	Factor	Read Level	Limit Level	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB
1	0.011	32.06	24.40	56.46	126.59	-70.13 Peak
2	0.019	30.54	21.92	52.46	121.90	-69.44 Peak
3	0.036	27.88	20.81	48.69	116.51	-67.82 Peak
4	0.053	26.13	21.14	47.27	113.18	-65.91 Peak
5	0.094	22.45	19.02	41.47	108.18	-66.71 Peak
6	0.139	19.69	18.14	37.83	104.73	-66.90 Peak



Site : Chamber A
Condition : 3m
Project Number : 2601R15866E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 10/30kHz
Tester : Anson Su

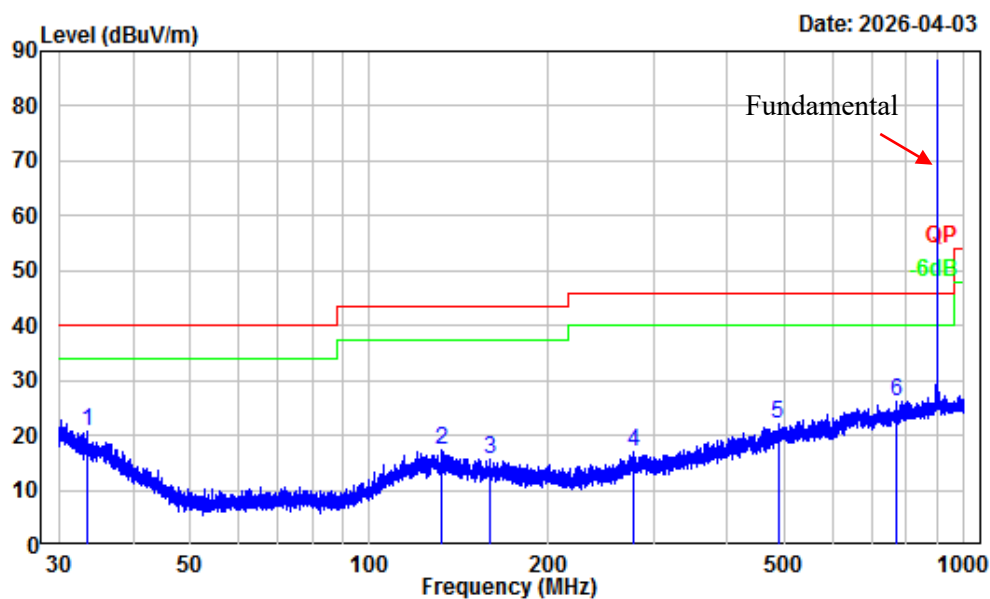
	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	0.540	5.91	33.82	39.73	72.94	-33.21	Peak
2	0.672	4.27	33.33	37.60	70.99	-33.39	Peak
3	0.830	2.48	32.14	34.62	69.13	-34.51	Peak
4	0.981	1.34	33.11	34.45	67.64	-33.19	Peak
5	1.201	0.64	31.35	31.99	65.85	-33.86	Peak
6	1.552	-0.35	31.88	31.53	63.57	-32.04	Peak

30 MHz~1 GHz: (Maximum output power mode, High channel)**Horizontal**

Site : Chamber A
Condition : 3m Horizontal
Project Number : 2601R15866E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Anson Su

	Freq Factor		Read Level		Limit	Over	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	35.671	-9.23	28.28	19.05	40.00	-20.95	Peak
2	135.447	-11.90	29.09	17.19	43.50	-26.31	Peak
3	159.995	-13.04	29.37	16.33	43.50	-27.17	Peak
4	200.600	-13.41	29.18	15.77	43.50	-27.73	Peak
5	373.966	-9.80	35.02	25.22	46.00	-20.78	Peak
6	680.855	-3.77	28.55	24.78	46.00	-21.22	Peak

Vertical



Site : Chamber A
Condition : 3m Vertical
Project Number : 2601R15866E-RF
Test Mode : Transmitting
Detector: Peak RBW/VBW: 100/300kHz
Tester : Anson Su

	Freq Factor		Read	Limit	Over	Remark
	MHz	dB/m	Level	Level	Line	
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB
1	33.445	-7.82	28.57	20.75	40.00	-19.25 Peak
2	131.816	-11.67	29.07	17.40	43.50	-26.10 Peak
3	159.644	-13.04	28.56	15.52	43.50	-27.98 Peak
4	278.189	-11.69	28.75	17.06	46.00	-28.94 Peak
5	486.461	-6.67	28.67	22.00	46.00	-24.00 Peak
6	767.402	-2.97	28.98	26.01	46.00	-19.99 Peak

Above 1 GHz:

Frequency (MHz)	Reading (dBμV)	PK/Ave	Polar (H/V)	Factor (dB/m)	Absolute Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel 902.3MHz							
1804.60	67.16	PK	H	-13.99	53.17	74	-20.83
1804.60	59.91	PK	V	-13.99	45.92	74	-28.08
2706.90	60.73	PK	H	-10.51	50.22	74	-23.78
2706.90	61.60	PK	V	-10.51	51.09	74	-22.91
3609.20	53.76	PK	H	-10.07	43.69	74	-30.31
3609.20	55.07	PK	V	-10.07	45.00	74	-29.00
Middle Channel 908.7MHz							
1817.00	67.69	PK	H	-13.92	53.77	74	-20.23
1817.00	60.31	PK	V	-13.92	46.39	74	-27.61
2725.50	60.41	PK	H	-10.56	49.85	74	-24.15
2725.50	61.82	PK	V	-10.56	51.26	74	-22.74
3634.00	52.82	PK	H	-9.90	42.92	74	-31.08
3634.00	54.31	PK	V	-9.90	44.41	74	-29.59
High Channel 914.9MHz							
1829.80	59.68	PK	H	-13.84	45.84	74	-28.16
1829.80	53.63	PK	V	-13.84	39.79	74	-34.21
2744.70	61.43	PK	H	-10.63	50.80	74	-23.20
2744.70	62.35	PK	V	-10.63	51.72	74	-22.28
3659.60	52.75	PK	H	-9.72	43.03	74	-30.97
3659.60	53.42	PK	V	-9.72	43.70	74	-30.30

Note:

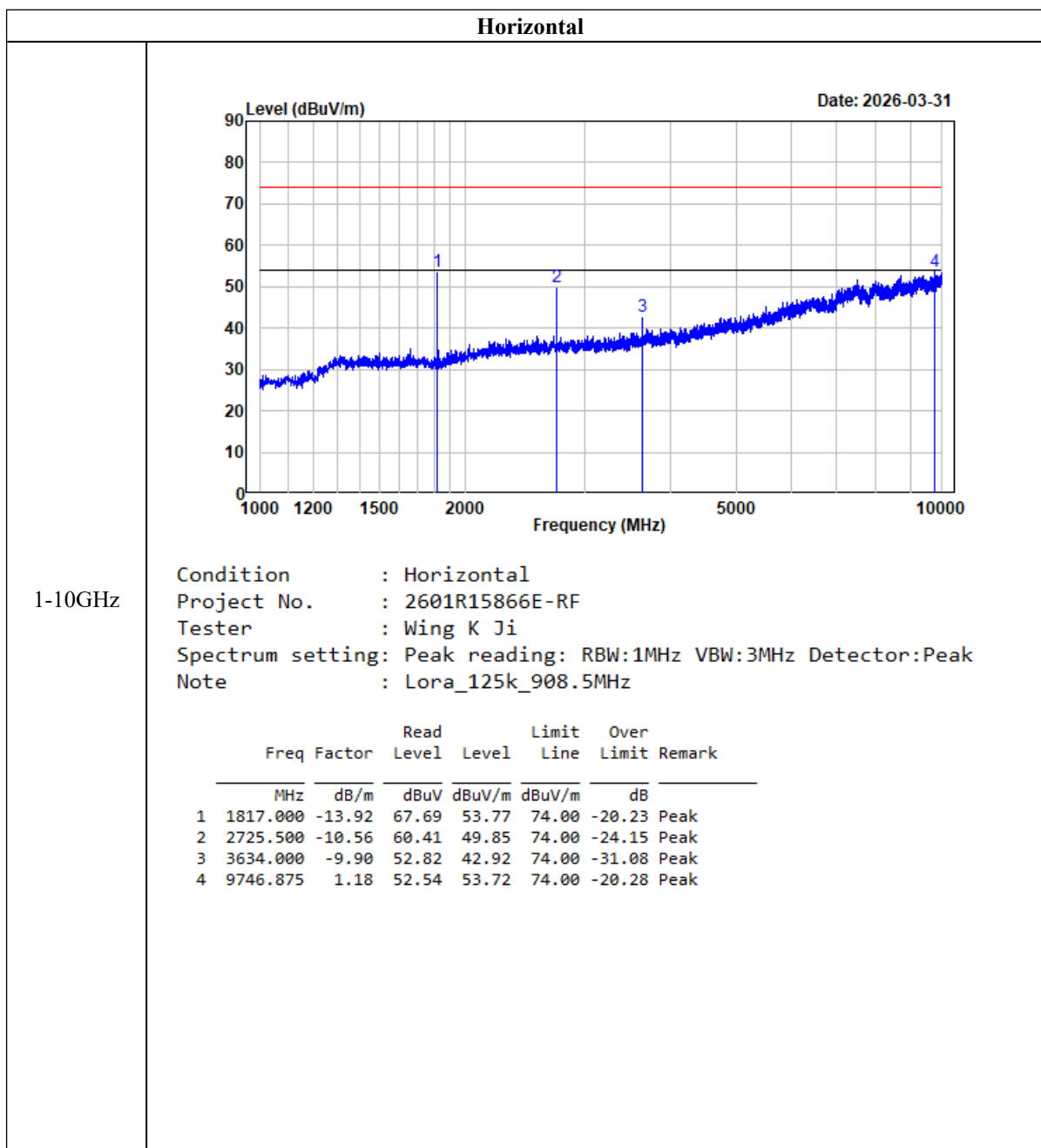
Corrected Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

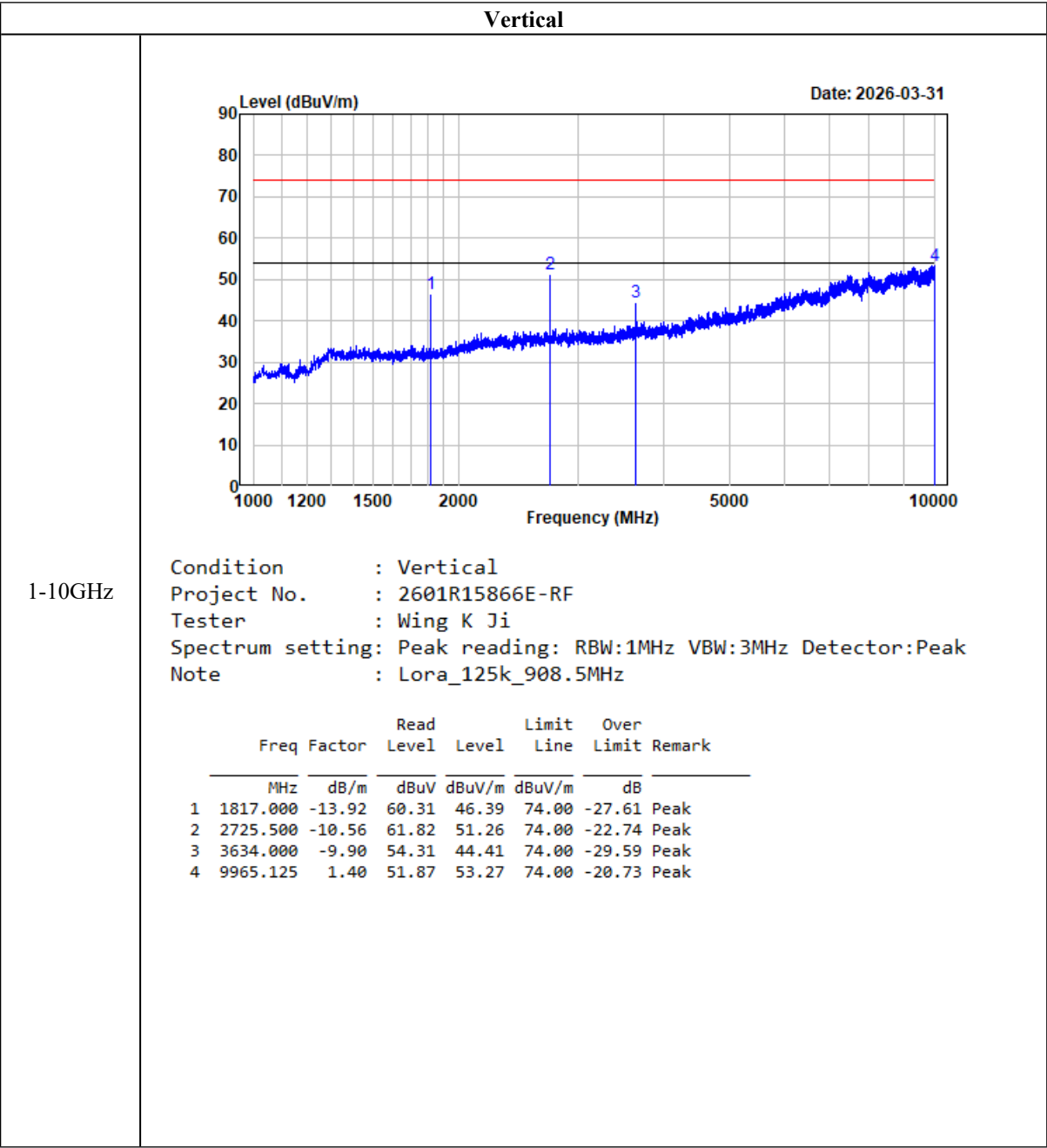
Corrected Amplitude/Level = Corrected Factor + Reading

Margin = Corrected Amplitude/Level - Limit

The other spurious emission which is in the noise floor level was not recorded.

The test result of peak was less than the limit of average, so just peak values were recorded.

Listed with the worst test plot (worst case, middle channel):



FCC §15.247(a) (1) - CHANNEL SEPARATION TEST

Applicable Standard

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. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

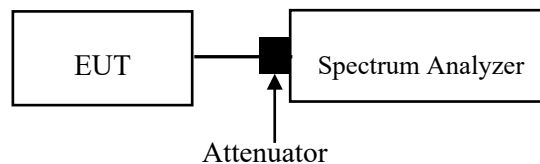
Test Procedure

Test Method: ANSI C63.10-2020 Clause 7.8.2

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

- a) Span: Wide enough to capture the peaks of two adjacent channels.
- b) 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.
- c) Video (or average) bandwidth (VBW) $\geq$ RBW.
- d) Sweep: Auto.
- e) Detector function: Peak.
- f) Trace: Max hold.
- g) Allow the trace to stabilize.

Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined.



Note: Offset (10.5dB) = Attenuator (10dB) + Cable loss (0.5dB)

Test Data

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	52 %
ATM Pressure:	101 kPa

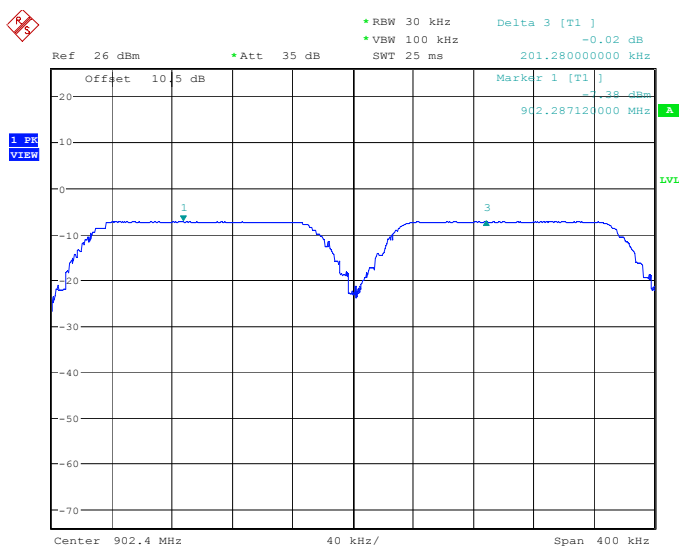
The testing was performed by Cheeb Huang on 2026-04-03.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to following table and plots

Test Mode	Test Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Verdict
Hopping	902.3	0.201	0.140	Pass

Note: Limit ≥ 20 dB bandwidth



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FCC §15.247(a) (1) (i) - 20 dB EMISSION BANDWIDTH

Applicable Standard

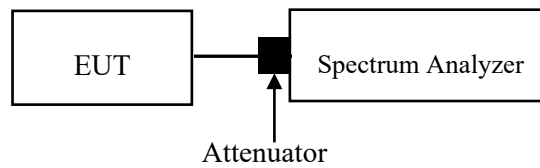
According to §15.247(a) (1) (i) For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds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

Test Procedure

Test Method: ANSI C63.10-2020 Clause 7.8.7 & Clause 6.9.2

- 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 un-modulated 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 $[(\text{reference value}) - xx]$. Alternatively, this calculation may be made by using the marker-delta function of the instrument.
- i) If the reference value is determined by an un-modulated 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 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).



Note: Offset (10.5dB) = Attenuator (10dB) + Cable loss (0.5dB)

Test Data

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	52 %
ATM Pressure:	101 kPa

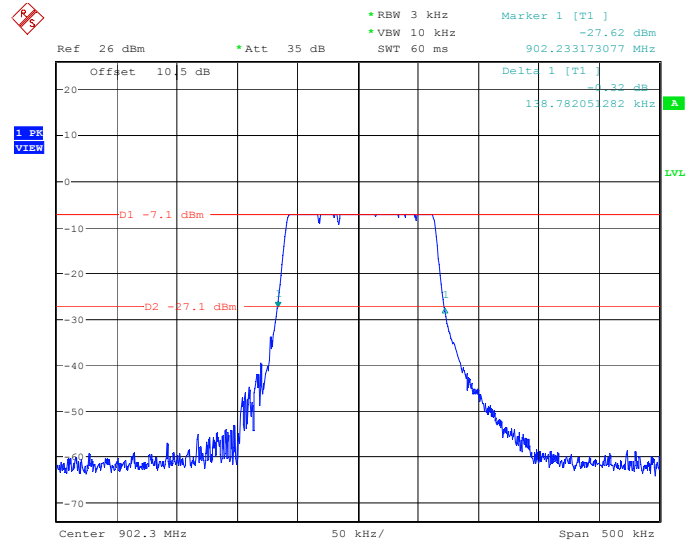
The testing was performed by Cheeb Huang on 2026-04-03.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the following table and plots.

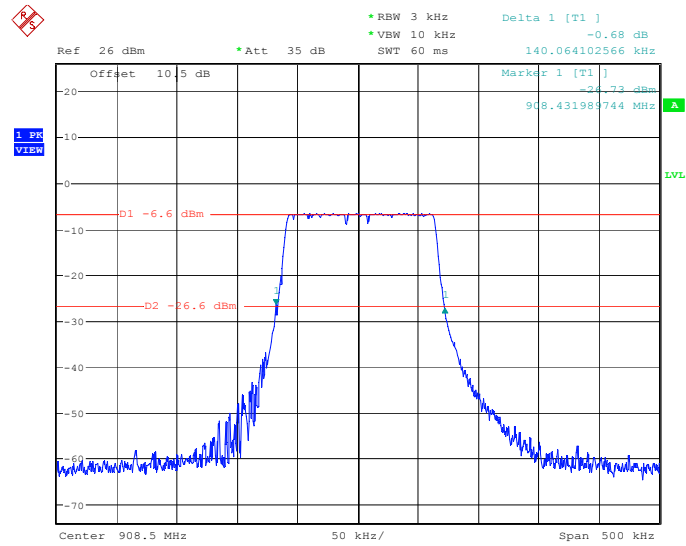
Test Channel	Test Frequency (MHz)	20 dB Bandwidth (MHz)	Limit (MHz)
Low	902.3	0.139	0.5
Middle	908.5	0.140	0.5
High	914.9	0.138	0.5

Low Channel



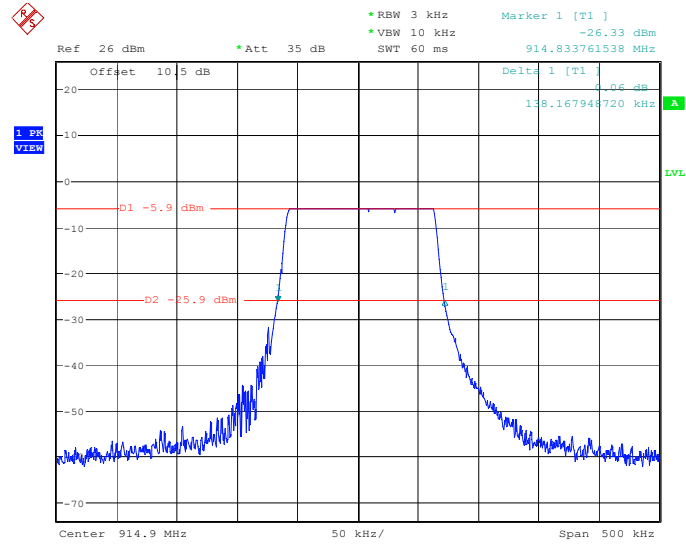
ProjectNo.:2601R15866E-RF Tester:Cheeb Huang
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Middle Channel



ProjectNo.:2601R15866E-RF Tester:Cheeb Huang
Date: 3.APR.2026 09:46:51

High Channel



ProjectNo.:2601R15866E-RF Tester:Cheeb Huang
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FCC §15.247(f) - TIME OF OCCUPANCY (DWELL TIME)

Applicable Standard

FCC §15.247(f)

For the purposes of this section, hybrid systems are those that employ a combination of both frequency hopping and digital modulation techniques. The frequency hopping operation of the hybrid system, with the direct sequence or digital modulation operation turned-off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4.

Test Procedure

Test Method: ANSI C63.10-2020 Clause 7.8.4

The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings:

- a) Span: Zero span, centered on a hopping channel.
- b) RBW shall be $\leq$ channel spacing and where possible RBW should be set $\gg 1 / T$, where T is the expected dwell time per channel.
- c) 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.
- d) Detector function: Peak.
- e) Trace: Max hold.

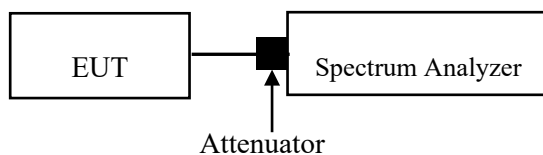
Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time.

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:

$$\begin{aligned} &(\text{Number of hops in the period specified in the requirements}) = (\text{number of hops on spectrum analyzer}) \\ &\times (\text{period specified in the requirements} / \text{analyzer sweep time}) \end{aligned}$$

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.



Note: Offset (10.5dB) = Attenuator (10dB) + Cable loss (0.5dB)

Test Data

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	52 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang on 2026-04-03.

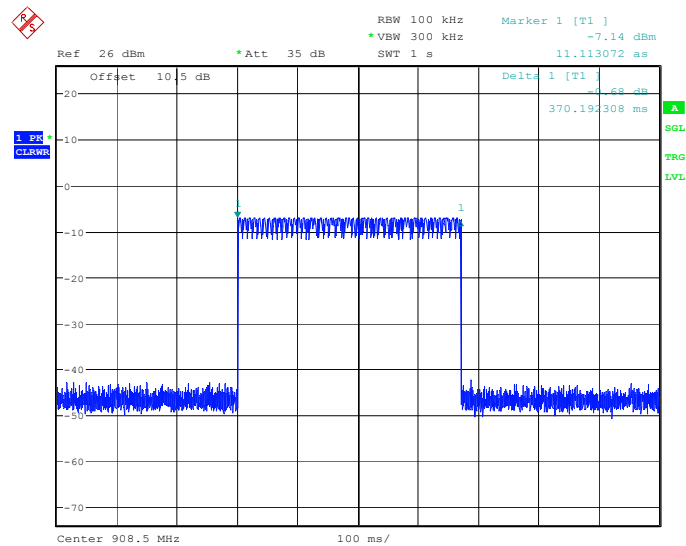
EUT operation mode: Transmitting

Test Result: Compliant. Please refer to following table and plots.

Test Frequency (MHz)	Pulse width (ms)	Observation time(s)	Hopping Number in Observation time	Dwell Time (s)	Limit (s)	Result
908.5	370.000	25.6	1	0.370	0.400	Pass

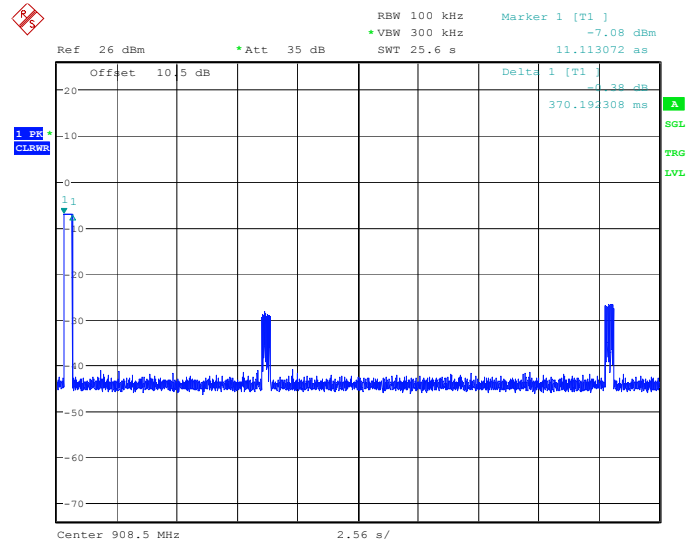
Note: A period time=0.4*64=25.6(s), Total of Dwell Time=Pulse Width*Hopping Number

Pulse Width



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Hopping Numbers in Observation time



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FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

Applicable Standard

FCC §15.247(b) (3)

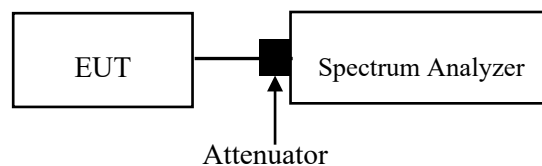
For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

Test Method: ANSI C63.10-2020 Clause 11.9.1.1

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

- a) Set the $RBW \geq DTS$ bandwidth.
- b) Set $VBW \geq [3 \times RBW]$.
- c) Set $span \geq [3 \times RBW]$.
- d) Sweep time = No faster than coupled (auto) time.
- e) Detector = peak.
- f) Trace mode = max-hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.



Note 1: A short RF cable with low cable loss connected to the EUT antenna port, which was provided by client or lab, the cable loss was add with offset into test equipment, the total offset consists of attenuator and/or RF cable loss

Note 2: Offset (10.5dB) = Attenuator (10dB) + Cable loss (0.5dB)

Test Data

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	52 %
ATM Pressure:	101 kPa

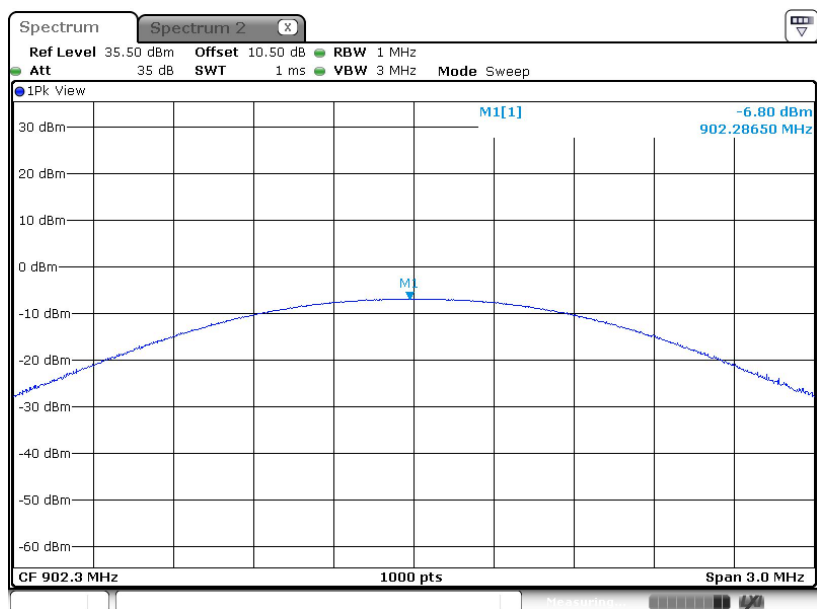
The testing was performed by Ethan Bu on 2026-06-28.

EUT operation mode: Transmitting

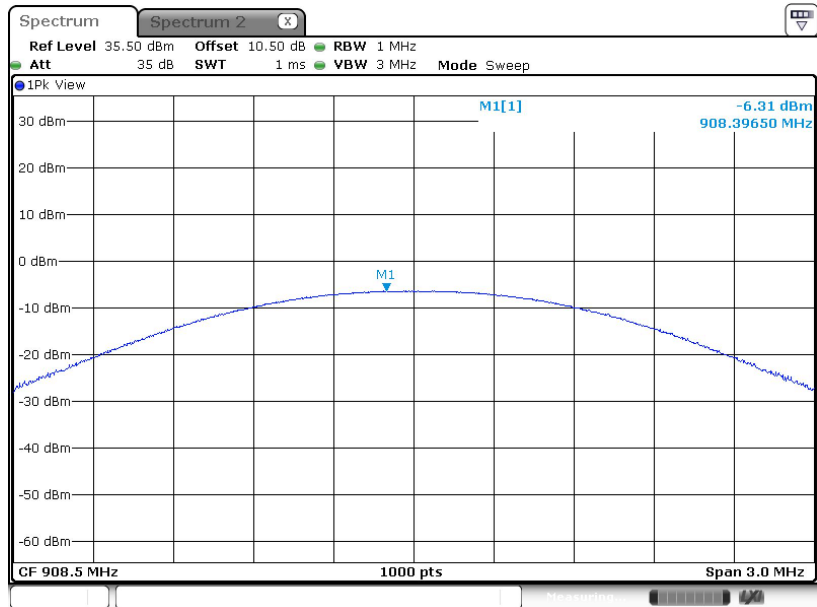
Test Result: Compliant. Please refer to the following table and plots.

Test Channel	Test Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)	Limit (dBm)
Low	902.3	-6.80	≤30
Middle	908.5	-6.31	≤30
High	914.9	-5.74	≤30

Low Channel

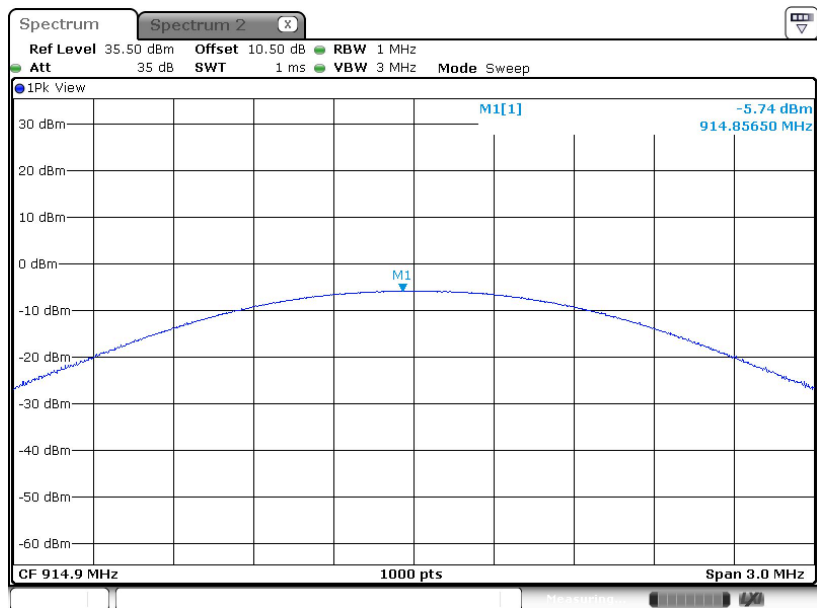


Middle Channel



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Date: 28.JUN.2026 18:50:50

High Channel



ProjectNo.:2601R15866E-RF Tester:Ethan Bu
Date: 28.JUN.2026 18:55:23

FCC §15.247(d) - 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Applicable Standard

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) (see §15.205(c)).

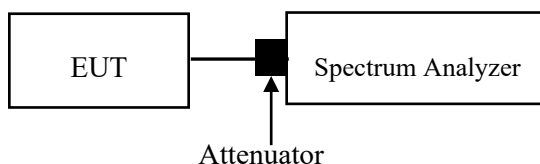
Test Procedure

Test Method: ANSI C63.10-2020 Clause 7.8.6 & Clause 6.10

For band-edge measurements, use the band-edge procedure in 6.10. Band-edge measurements shall be tested both on single channels, and with the EUT hopping

- Set the center frequency and span to encompass frequency range to be measured.
- Set the RBW = 100 kHz.
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements. Report the three highest emissions relative to the limit.



Note: Offset (10.5dB) = Attenuator (10dB) + Cable loss (0.5dB)

Test Data

Environmental Conditions

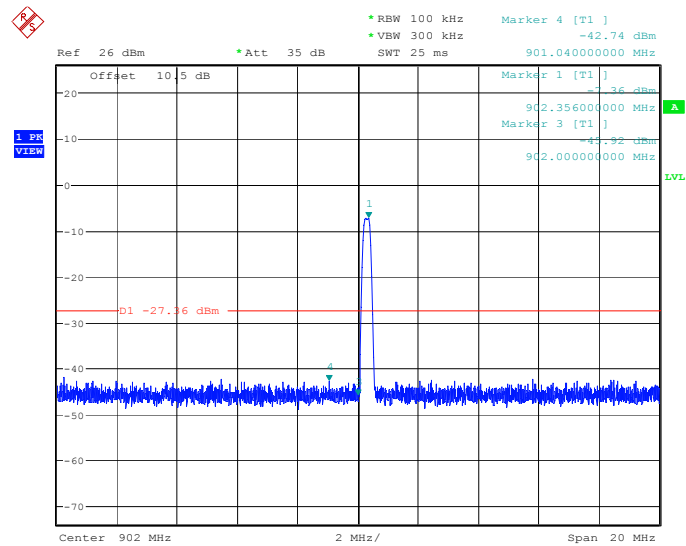
Temperature:	25.2 °C
Relative Humidity:	52 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang on 2026-04-03.

EUT operation mode: Transmitting

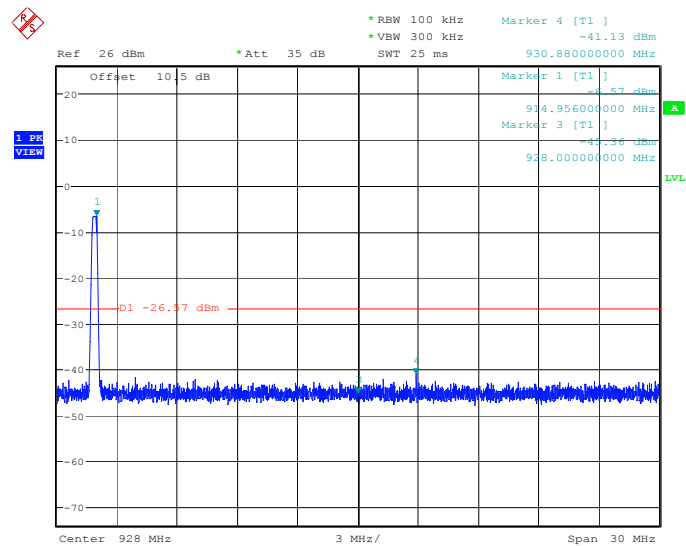
Test Result: Compliant. Please refer to the following plots.

Single Mode Band Edge, Left Side



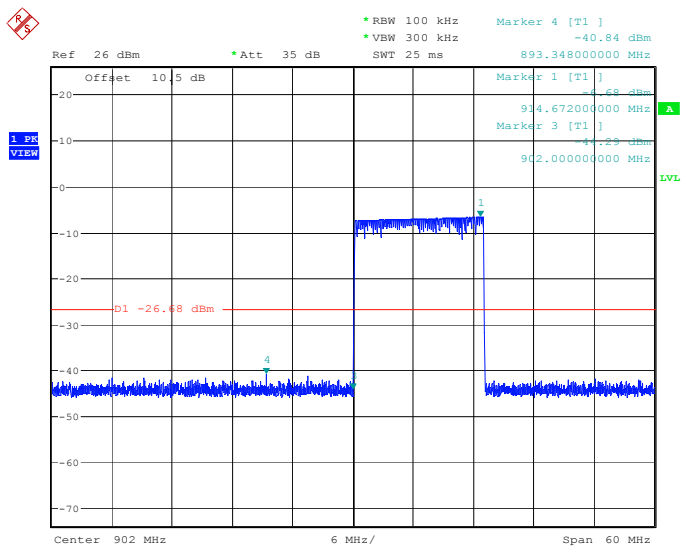
ProjectNo.:2601R15866E-RF Tester:Cheeb Huang
Date: 3.APR.2026 10:06:12

Single Mode Band Edge, Right Side



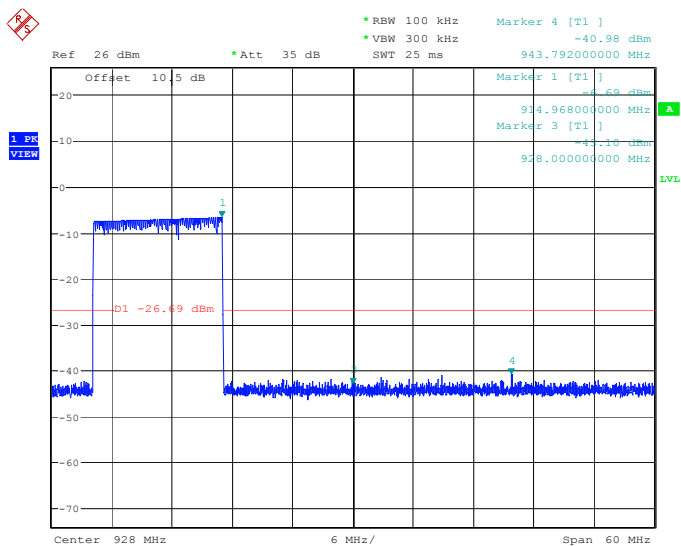
ProjectNo.:2601R15866E-RF Tester:Cheeb Huang
Date: 3.APR.2026 10:08:02

Hopping mode Band Edge, Left Side



ProjectNo.:2601R15866E-RF Tester:Cheeb Huang
Date: 3.APR.2026 10:13:50

Hopping mode Band Edge, Right Side



ProjectNo.:2601R15866E-RF Tester:Cheeb Huang
Date: 3.APR.2026 10:11:28

FCC §15.247(d) - CONDUCTED SPURIOUS EMISSION

Applicable Standard

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) (see §15.205(c)).

Test Procedure

Test Method: ANSI C63.10-2020 Clause 11.11.3

Establish an emission level by using the following procedure:

a) Set the center frequency and span to encompass frequency range to be measured. Note that the frequency range might need to be divided into multiple frequency ranges to retain frequency resolution.

NOTE—the number of points can also be increased for large spans to retain frequency resolution

b) Set the RBW = 100 kHz.

c) Set the VBW $\geq [3 \times \text{RBW}]$.

d) Detector = peak.

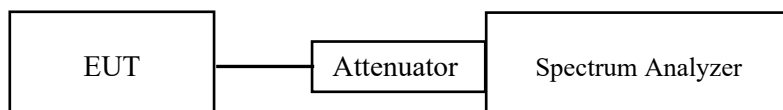
e) Sweep time = No faster than coupled (auto) time.

f) Trace mode = max-hold.

g) Allow trace to fully stabilize.

h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit



Note 1: A short RF cable with low cable loss connected to the EUT antenna port, which was provided by client or lab, the worst case cable loss was add with offset into test equipment, the total offset consists of attenuator and/or RF cable and/or power splitter loss

Note 2: Offset (12.5dB) = Attenuator (10dB) + Cable loss (2.5dB)

Test Data

Environmental Conditions

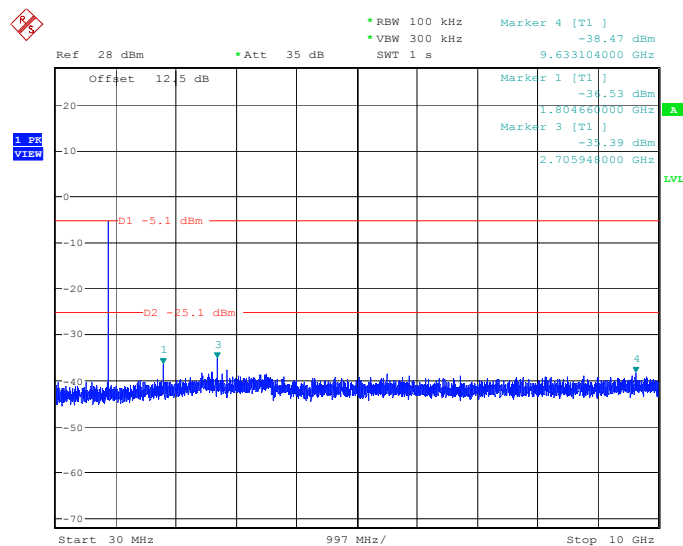
Temperature:	25.2 °C
Relative Humidity:	52 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang on 2026-04-03.

EUT operation mode: Transmitting

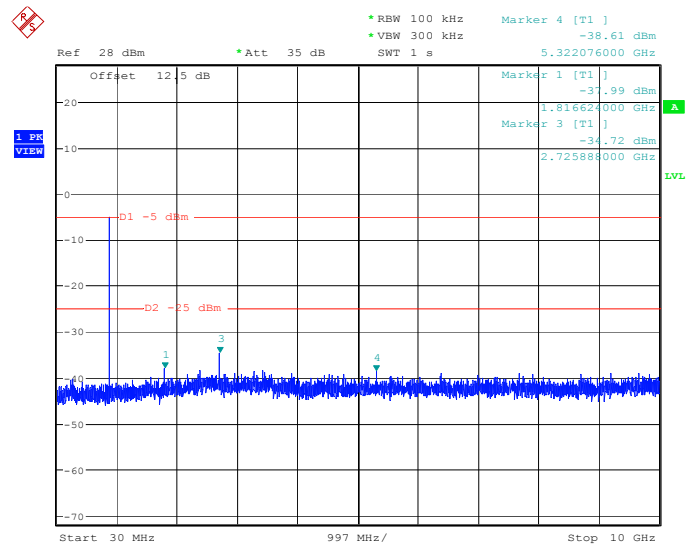
Test Result: Compliant

Low Channel



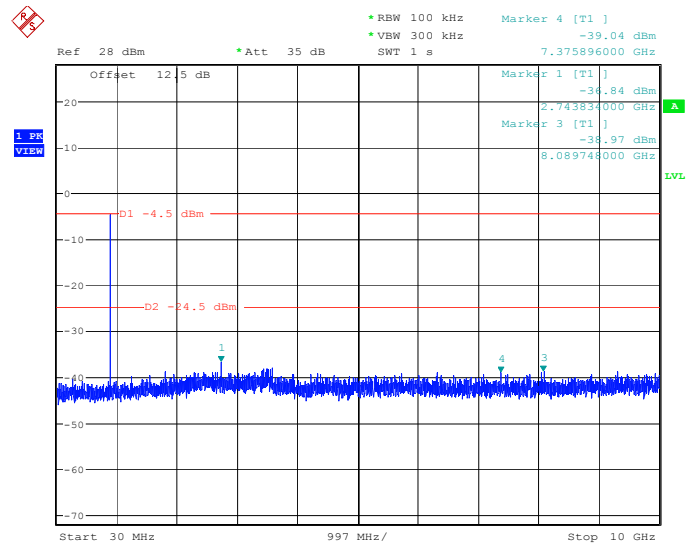
ProjectNo.:2601R15866E-RF Tester:Cheeb Huang
Date: 3.APR.2026 09:51:28

Middle Channel



ProjectNo.:2601R15866E-RF Tester:Cheeb Huang
Date: 3.APR.2026 09:57:39

High Channel



ProjectNo.:2601R15866E-RF Tester:Cheeb Huang
Date: 3.APR.2026 09:56:05

FCC §15.247(f) - POWER SPECTRAL DENSITY

Applicable Standard

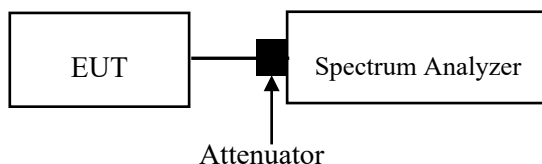
(f) For the purposes of this section, hybrid systems are those that employ a combination of both frequency hopping and digital modulation techniques. The frequency hopping operation of the hybrid system, with the direct sequence or digital modulation operation turned-off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4. The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Procedure

Test Method: ANSI C63.10-2020 Clause 11.10.2

The following procedure shall be used if maximum peak conducted output power was used to determine compliance, and it is optional if the maximum conducted (average) output power was used to determine compliance:

- Set analyzer center frequency to DTS channel center frequency.
- Set the span >1.5 times the DTS bandwidth.
- Set the RBW to $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set the VBW $\geq [3 \times \text{RBW}]$.
- Detector = peak.
- Sweep time = No faster than coupled (auto) time.
- Trace mode = max-hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.
- If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.



Note 1: A short RF cable with low cable loss connected to the EUT antenna port, which was provided by client or lab, the cable loss was add with offset into test equipment, the total offset consists of attenuator and/or RF cable loss

Note 2: Offset (10.5dB) = Attenuator (10dB) + Cable loss (0.5dB)

Test Data

Environmental Conditions

Temperature:	25.2 °C
Relative Humidity:	52 %
ATM Pressure:	101 kPa

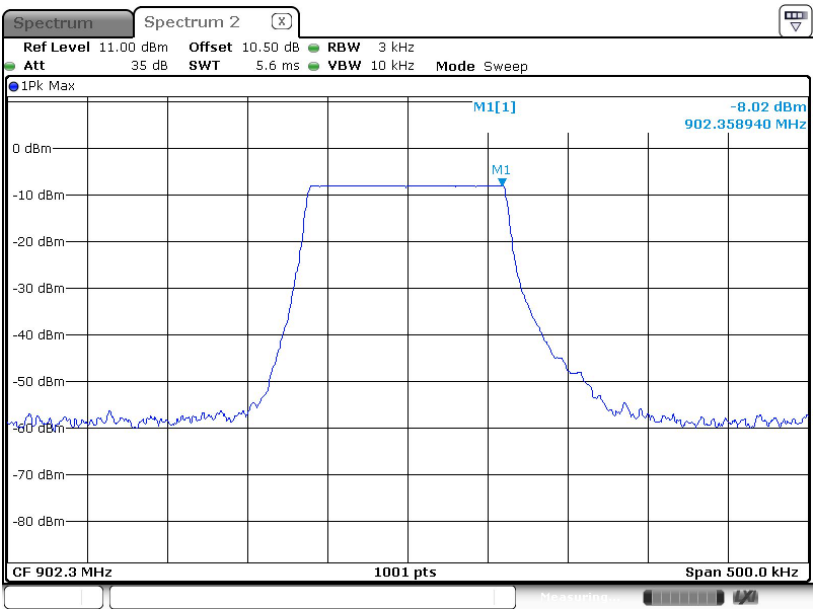
The testing was performed by Ethan Bu on 2026-06-28.

EUT operation mode: Transmitting

Test Result: Compliant. Please refer to the following table and plots.

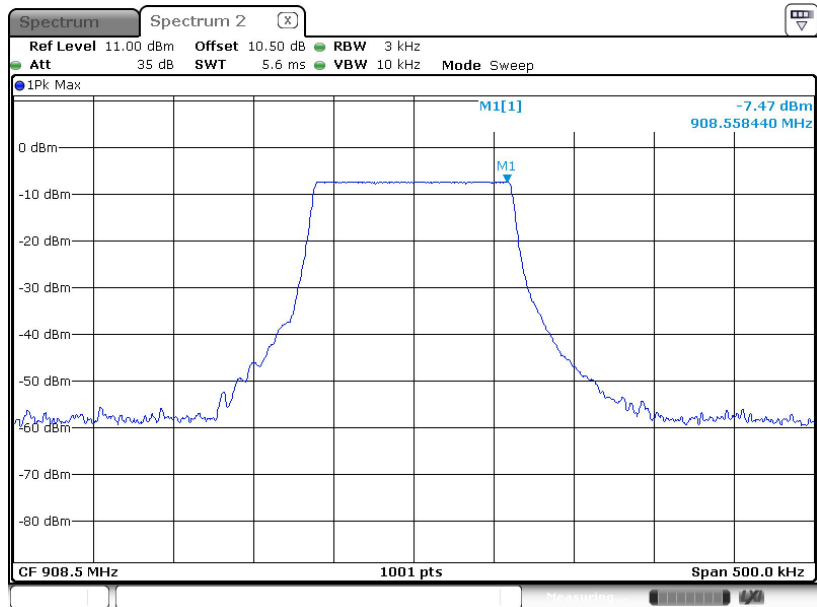
Test Channel	Test Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
Low	902.3	-8.02	≤8.00
Middle	908.5	-7.47	≤8.00
High	914.9	-6.86	≤8.00

Low Channel



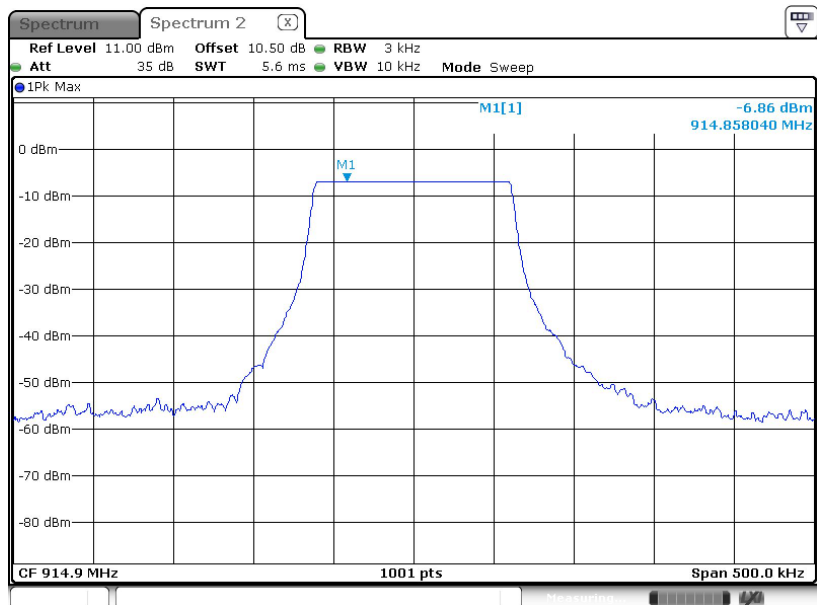
ProjectNo.:2601R15866E-RF Tester:Ethan Bu
Date: 28 JUN 2026 18:48:07

Middle Channel



ProjectNo.:2601R15866E-RF Tester:Ethan Bu
Date: 28.JUN.2026 18:52:00

High Channel



ProjectNo.:2601R15866E-RF Tester:Ethan Bu
Date: 28.JUN.2026 18:54:18

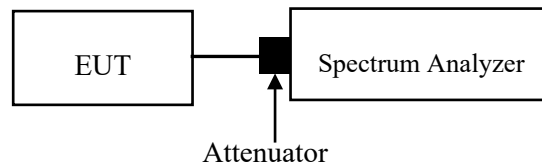
C63.10 §11.6- DUTY CYCLE

Test Procedure

According to ANSI C63.10-2020 Section 11.6

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the ON and OFF times of the transmitted signal:

- 1) Set the center frequency of the instrument to the center frequency of the transmission.
- 2) Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value.
- 3) Set $VBW \geq RBW$. Set detector = peak or average.
- 4) The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring the duty cycle shall not be used if $T \leq 16.7 \mu s$.)



Note: Offset (10.5dB) = Attenuator (10dB) + Cable loss (0.5dB)

Test Data

Environmental Conditions

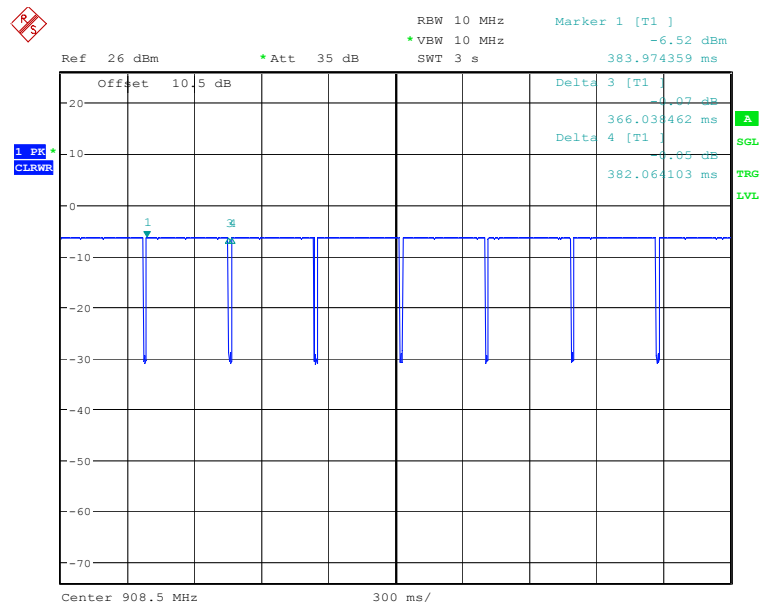
Temperature:	25.2 °C
Relative Humidity:	52 %
ATM Pressure:	101 kPa

The testing was performed by Cheeb Huang on 2026-04-03.

EUT operation mode: Transmitting

Test Result: Compliant.

Test Frequency (MHz)	T _{on} (ms)	T _{on+off} (ms)	Duty cycle (%)	1/T _{on} (Hz)	VBW Setting (Hz)
908.5	366	382	95.81	3	10



ProjectNo.:2601R15866E-RF Tester:Cheeb Huang
Date: 3.APR.2026 10:02:31

EUT PHOTOGRAPHS

Please refer to the attachment 2601R15866E-RF-EXP External photo and 2601R15866E-RF-INP Internal photo.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment 2601R15866E-RF-TSPA Test Setup photo.

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