

Test Report

Product: Solar Repeater Kit

Trade Mark: KEEPTEN

Model No: D5L, D5L-R1, D5L-R2, D5L-R3,
D5L-R4, D5L-R5, D5L-R6, D5L-H1,
D5L-H2, D5L-H3, D5L-H4, D5L-H5,
D5L-H6, D5L-1A, D5L-2A, D5L-S1,
D5L-S2, D5L-S3, D5L-S4, D5L-S5,
D5L-S6, D5L-L1, D5L-L2, D5L-L3,
D5L-L4, D5L-L5, D5L-L6, D5L-G1,
D5L-G2, D5L-G3, D5L-G4, D5L-G5,
D5L-G6, D5L-E1, D5L-E2, D5L-E3,
D5L-E4, D5L-E5, D5L-E6

Report Number: SZNTT26038248E1-2

Test Standards: FCC 47 CFR Part 15 Subpart C

FCC ID: 2BE4P-D5L

Test Result: PASS

Date of Issue: Sep. 18, 2026

Prepared for

Shenzhen KeepTeen Electronic Technology Co., Ltd.
Room 502,5th Floor, No.1 Longtang Industrial Zone, Henggang Street,
Longgang District, Shenzhen

Prepared by

Shenzhen NTT Testing Technology Co.,Ltd.
1B, Building 2, Factory Building & 103, Building 3, Factory Building, Dayang
Industrial Park, No.4, Industrial Avenue, Tangwei Community, Fuhai Sub-district
Bao 'an District, Shenzhen City, China

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Revision History of This Test Report

[illegible]

TEST RESULT CERTIFICATION

Applicant's name	Shenzhen KeepTeen Electronic Technology Co., Ltd.
Address	Room 502,5th Floor, No.1 Longtang Industrial Zone, Henggang Street, Longgang District, Shenzhen
Manufacturer's Name	Shenzhen KeepTeen Electronic Technology Co., Ltd.
Address	Room 502,5th Floor, No.1 Longtang Industrial Zone, Henggang Street, Longgang District, Shenzhen
Product description	
Product name	Solar Repeater Kit
Trademark	KEEPTEN
Model Name	D5L
Serial Model.....	D5L-R1, D5L-R2, D5L-R3 D5L-R4, D5L-R5, D5L-R6, D5L-H1, D5L-H2, D5L-H3, D5L-H4, D5L-H5, D5L-H6, D5L-1A, D5L-2A, D5L-S1, D5L-S2, D5L-S3, D5L-S4, D5L-S5, D5L-S6, D5L-L1, D5L-L2, D5L-L3, D5L-L4, D5L-L5, D5L-L6, D5L-G1, D5L-G2, D5L-G3, D5L-G4, D5L-G5, D5L-G6, D5L-E1, D5L-E2, D5L-E3, D5L-E4, D5L-E5, D5L-E6
Standards	FCC 47 CFR Part 15.247
Test procedure	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
Date of Test	
Date (s) of performance of tests	Jun. 06, 2026 to Sep. 18, 2026
Test Result.....	Pass
This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Shenzhen NTT Testing Technology Co.,Ltd.	

Prepared by(Test Engineer):
Cindy Qin

Cindy Qin

Reviewer(Supervisor):
Ken Wu

Ken Wu

Approved(Manager):
Abel Yu



1 General Description

1.1 Description of EUT

Product name:	KEEPTEEN
Model name:	D5L
Series Model:	D5L-R1, D5L-R2, D5L-R3 D5L-R4, D5L-R5, D5L-R6, D5L-H1, D5L-H2, D5L-H3, D5L-H4, D5L-H5, D5L-H6, D5L-1A, D5L-2A, D5L-S1, D5L-S2, D5L-S3, D5L-S4, D5L-S5, D5L-S6, D5L-L1, D5L-L2, D5L-L3, D5L-L4, D5L-L5, D5L-L6, D5L-G1, D5L-G2, D5L-G3, D5L-G4, D5L-G5, D5L-G6, D5L-E1, D5L-E2, D5L-E3, D5L-E4, D5L-E5, D5L-E6
Different of series model:	All the model are the same circuit and RF module, only the model names and the number of batteries installed inside are different. Test sample model: D5L
Operation frequency:	923.3-927.5MHz
Modulation type:	LoRa
Antenna type:	External antenna
Antenna gain:	1.42dBi
Maximum Field Strength:	85.09dB μ V/m @3m
Hardware version:	V1.0
Software version:	V1.0
Battery:	Battery Capacity: 3.7Vdc 2600mAh 9.62Wh(4*batteries in parallel)
Power supply:	Input: 5V=1A Battery Capacity: 3.7Vdc 2600mAh 9.62Wh(4*batteries in parallel)

1.2 Test Mode

Test mode	Low channel	Middle channel	High channel
Transmitting (LoRa)	923.3MHz	925.1MHz	927.5MHz
Receiving (LoRa)	923.3MHz	925.1MHz	927.5MHz

1.3 Operation Channel List

CH No.	Frequency (MHz)	CH No.	Frequency (MHz)	CH No.	Frequency (MHz)	CH No.	Frequency (MHz)
1	923.3	2	923.5	3	924.5	4	925.1
5	925.7	6	926.3	7	926.9	8	927.5

1.4 Test Setup

See photographs of the test setup in the report for the actual setup and connections between EUT and support equipment.

1.5 EUT Operation Test Setup

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

Test software Version		Engineering Mode	
Frequency			
Parameters	Default	Default	Default
RF cable			
Description	Connector	Length	Supplied by
Antenna Cable	SMA	10cm	Applicant

Note: Disclaimer: the loss of RF cable is too small and can be ignored.

1.6 Ancillary equipment list

Equipment	Model	S/N	Manufacturer
Adapter	JY-05100C	/	JIYIN

2 Summary of Test Result

错误!未找到引用源。 Test Cases				
No.	Test Item	Test Requirement	Test Method	Result
1	Antenna Requirement	FCC 47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	Pass
2	Peak Output Power	FCC 47 CFR Part 15 Subpart C Section 15.247 (b)(3)	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	Pass
3	Conducted Emission	FCC 47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	Pass
4	Radiated Emission	FCC 47 CFR Part 15 Subpart C Section 15.249 (a)/15.209/15.205	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	Pass
5	Power Spectral Density	FCC 47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	Pass
6	6dB Bandwidth	FCC 47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	Pass
7	Duty Cycle	558074 D01 15.247 Meas Guidance v05r02 Chapter 6	/	Pass
8	Band Edge Emission	FCC 47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	Pass
9	Spurious RF Conducted Emissions	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	Pass
Disclaimer and Explanations: The declared of product specification and data (e.g., antenna gain, RF specification, etc) for EUT presented in the report are provided by the customer, and the customer takes all the responsibilities for the accuracy of product specification.				

3 Test Facilities and Accreditations

3.1 Test Laboratory

Test Site	Shenzhen NTT Testing Technology Co.,Ltd.
Test Site Location	1B, Building 2, Factory Building & 103, Building 3, Factory Building, Dayang Industrial Park, No.4, Industrial Avenue, Tangwei Community, Fuhai Sub-district, Bao 'an District, Shenzhen City, China
Telephone:	0755-27889935
FCC Designation Number	CN3446
FCC Test Firm Registration Number	129414

3.2 Environmental Conditions

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

Temperature:	15°C~35°C
Relative Humidity:	20%~75%
Air Pressure:	98kPa~101kPa

3.3 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

The data and results quoted in this document are true and accurate values, and uncertainties are not involved in the calculations.

In addition, components and mass production processes that are similar to testing equipment may introduce additional deviations, and the manufacturer is solely responsible for the continued compliance of the equipment.

Parameter	Uncertainty
RF output power, conducted	$\pm 1.0\text{dB}$
Power Spectral Density, conducted	$\pm 2.2\text{dB}$
Radio Frequency	$\pm 1 \times 10^{-6}$
Bandwidth	$\pm 1.5 \times 10^{-6}$
Time	$\pm 2\%$
Duty Cycle	$\pm 2\%$
Temperature	$\pm 1^\circ\text{C}$
Humidity	$\pm 5\%$
DC and low frequency voltages	$\pm 3\%$
Conducted Emissions (150kHz~30MHz)	$\pm 3.64\text{dB}$
Radiated Emission(9KHz~30MHz)	$\pm 4.51\text{dB}$
Radiated Emission(30MHz~1GHz)	$\pm 5.03\text{dB}$
Radiated Emission(1GHz~25GHz)	$\pm 4.74\text{dB}$
Remark:When making a conformity declaration based on test results for regulations/standards or specifications,the default is to use Clause 4.2.1of ILAC-G8:09/2019 and the guidelines on decision rules and	

conformity declaration in IEC Guide 115:2023.

3.4 Test Software

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ-EMC	Ver.EMC-CON 3A1.1+
2	EMC radiation test system	FALA	EZ-EMC	Ver.FA-03A2 RE+
3	RF test system	TACHOY	RFTest	V1.0.0
4	RF communication test system	TACHOY	RFTest	V1.0.0

4 List of Test Equipment

4.1 List of Test Equipment

Conducted Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	HSRCE944	/	HTEC	2025/04/30	2028/04/29
EMI Test Receiver	ESCI	100881/003	ROHDE&SCHWARZ	2026/09/04	2027/09/03
LISN	AMN6500	101185	ROHDE&SCHWARZ	2026/09/04	2027/09/03
LISN	NNLK 8129	00603	SCHWARZBECK	2026/09/04	2027/09/03
Pulse Limiters	VTSD 9561 F	00343	SCHWARZBECK	2026/09/04	2027/09/03
Cable	RG223-2M	/	RG	2026/09/04	2027/09/03

Radiated Test Site(Below 1G and Above 1G)&RF Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2025/07/24	2028/07/23
EMI Test Receiver	ESPI	101018	ROHDE&SCHWARZ	2026/09/04	2027/09/03
Amplifier (30MHz-1GHz)	BBV 9745	00431	SCHWARZBECK	2026/09/04	2027/09/03
Bilog Antenna (30MHz-1GHz)	VULB9168	1858	SCHWARZBECK	2026/09/05	2027/09/04
Horn antenna (1GHz-18GHz)	BBHA 9120 D	02622	SCHWARZBECK	2026/09/05	2027/09/04
Preamplifier (1GHz-18GHz)	BBV 9718D	0024	SCHWARZBECK	2026/09/04	2027/09/03
Spectrum Analyzer (10Hz-40GHz)	FSV 40	100952	ROHDE&SCHWARZ	2026/09/04	2027/09/03
Preamplifier (18GHz-40GHz)	BBV 9721	0056	SCHWARZBECK	2026/09/04	2027/09/03
Double Ridge Guide Horn Antenna (18GHz-40GHz)	SAS-574	588	A.H.System	2026/09/05	2027/09/04
Loop Antenna (9KHz-30MHz)	FMZB 1513-60	00115	SCHWARZBECK	2026/09/04	2027/09/03
MXG Signal Analyzer	N9020A	MY49100730	Agilent	2026/09/04	2027/09/03
MXG Vector Signal Generator	N5182A	MY50144920	Agilent	2026/09/04	2027/09/03

WIDEBAND RADIO COMMUNICATION TESTER	CMW500	/	ROHDE&SCHWARZ	2026/09/07	2027/09/06
Power Sensor	MW100-RFC B-2	MW260105N TT-64	MWRFtest	2026/09/04	2027/09/03
RF Swith	MW100-RFC B-1	MW260105N TT-64	MWRFtest	2026/09/04	2027/09/03
Cable	RG223-3M	/	DA	2026/09/04	2027/09/03
Cable	RG223-12 M	/	DA	2026/09/04	2027/09/03
Cable	SFT205-NM NMSW-2.5M	/	DA	2026/09/04	2027/09/03
Cable	SFT205-NM NM-12M	/	DA	2026/09/04	2027/09/03
Cable	UCA500-NJ WSM-1.5M	017	MWRFtest	2026/09/04	2027/09/03

5 Test Item And Results

5.1 Antenna Requirement

5.1.1 Standard Requirement

15.203 requirement: For intentional device, according to 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

5.1.2 Test Result

The EUT antenna is External antenna. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

5.2 Conducted Emission

5.2.1 Limits

Limits – Class B		
Frequency (MHz)	Limit (dBμV)	
	Quasi-Peak	Average
0.15 to 0.5	66 to 56*	56 to 46*
0.5 to 5	56	46
5 to 30	60	50

Note:

- the tighter limit applies at the band edges.
- the limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

5.2.2 Test Procedures

a) EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

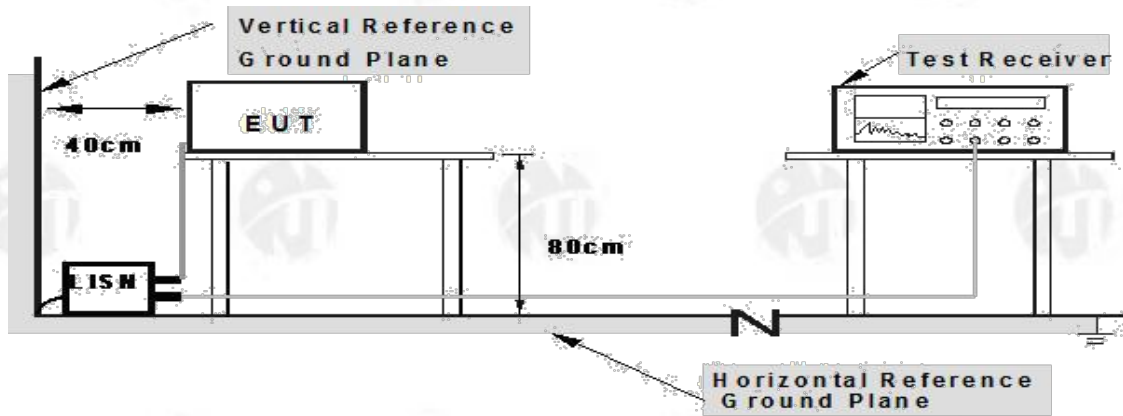
b) The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN is at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item – photographs of the test setup.



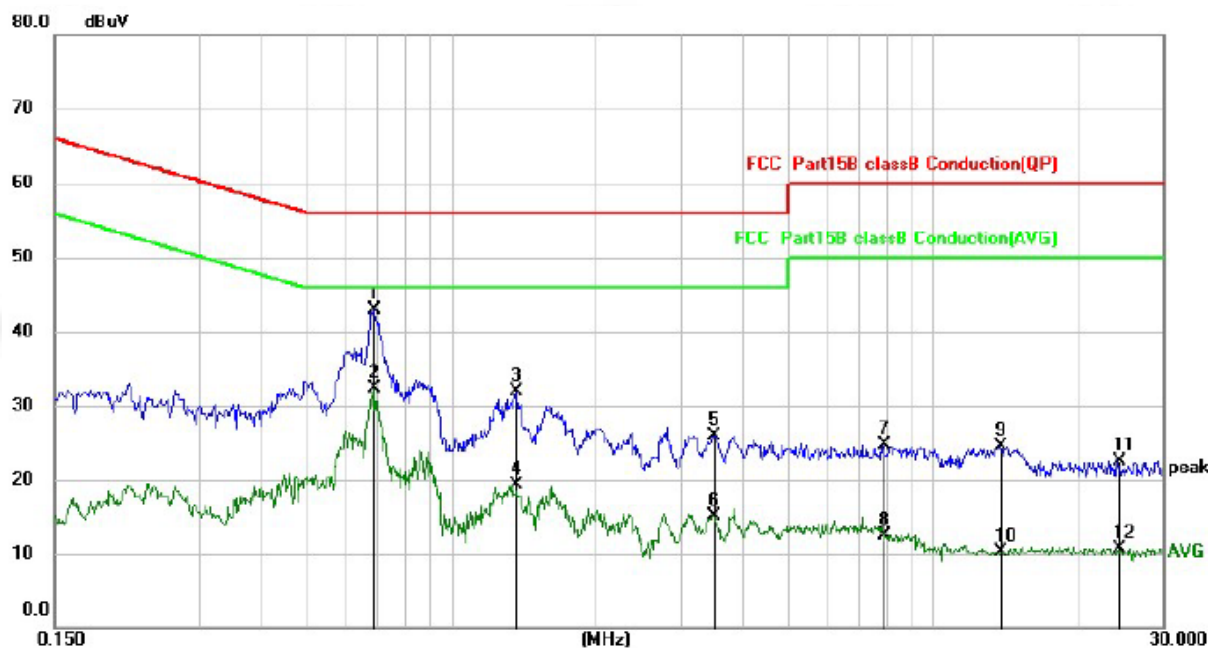
5.2.3 Test Setup



5.2.4 Test Result



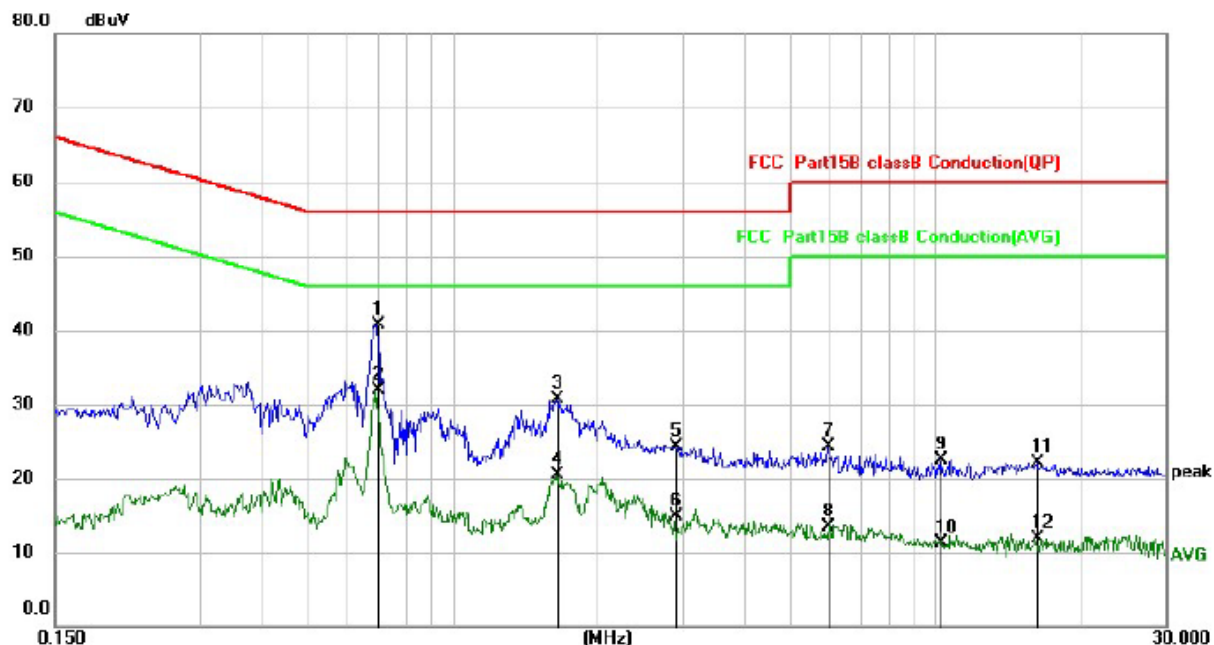
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase:	L
Test Voltage :	DC 5V from Adapter Input AC 120V/60Hz	Test Mode:	High channel(Worst case)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	*	0.6900	32.10	10.71	42.81	56.00	-13.19	QP
2		0.6900	21.57	10.71	32.28	46.00	-13.72	AVG
3		1.3619	20.73	11.18	31.91	56.00	-24.09	QP
4		1.3619	8.12	11.18	19.30	46.00	-26.70	AVG
5		3.4940	14.05	11.91	25.96	56.00	-30.04	QP
6		3.4940	3.21	11.91	15.12	46.00	-30.88	AVG
7		7.8700	11.65	13.03	24.68	60.00	-35.32	QP
8		7.8700	-0.43	13.03	12.60	50.00	-37.40	AVG
9		13.8259	11.22	13.32	24.54	60.00	-35.46	QP
10		13.8259	-3.03	13.32	10.29	50.00	-39.71	AVG
11		24.1780	8.51	13.95	22.46	60.00	-37.54	QP
12		24.1780	-3.15	13.95	10.80	50.00	-39.20	AVG



Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase:	N
Test Voltage :	DC 5V from Adapter Input AC 120V/60Hz	Test Mode:	High channel(Worst case)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.6979	30.03	10.72	40.75	56.00	-15.25	QP
2	*	0.6979	21.17	10.72	31.89	46.00	-14.11	AVG
3		1.6419	19.33	11.35	30.68	56.00	-25.32	QP
4		1.6419	9.11	11.35	20.46	46.00	-25.54	AVG
5		2.8980	12.60	11.78	24.38	56.00	-31.62	QP
6		2.8980	3.15	11.78	14.93	46.00	-31.07	AVG
7		5.9739	11.73	12.58	24.31	60.00	-35.69	QP
8		5.9739	1.02	12.58	13.60	50.00	-36.40	AVG
9		10.2418	9.26	13.24	22.50	60.00	-37.50	QP
10		10.2418	-1.94	13.24	11.30	50.00	-38.70	AVG
11		16.2939	8.67	13.40	22.07	60.00	-37.93	QP
12		16.2939	-1.42	13.40	11.98	50.00	-38.02	AVG

5.3 Radiated Emission

5.3.1 Limits

Frequencies (MHz)	Field Strength (microvolt/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

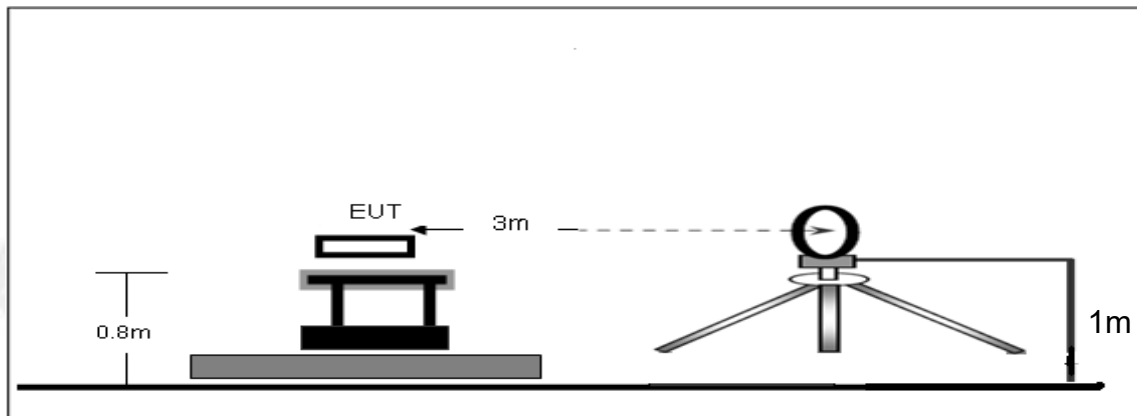
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200kHz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

5.3.2 Test Procedures

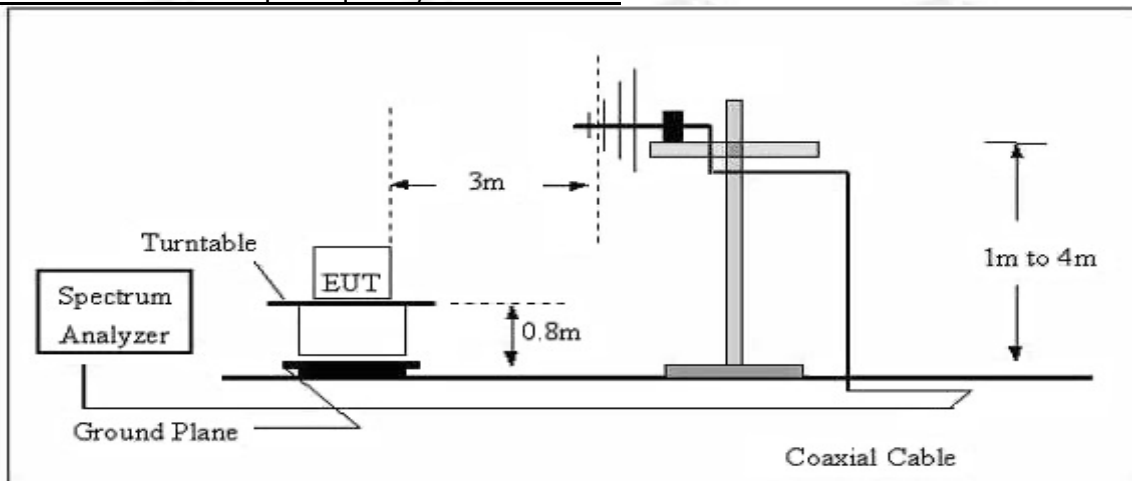
- The radiated emission tests were performed in the 3 meters.
- The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
- The height of the test antenna shall vary between 1m to 4m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- If the peak mode measured value compliance with and lower than quasi peak mode limit, the EUT shall be deemed to meet QP limits and then no additional QP mode measurement performed.
- If the peak mode measured value compliance with and lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.
- For the actual test configuration, please refer to the related item – EUT test photos.

5.3.3 Test Setup

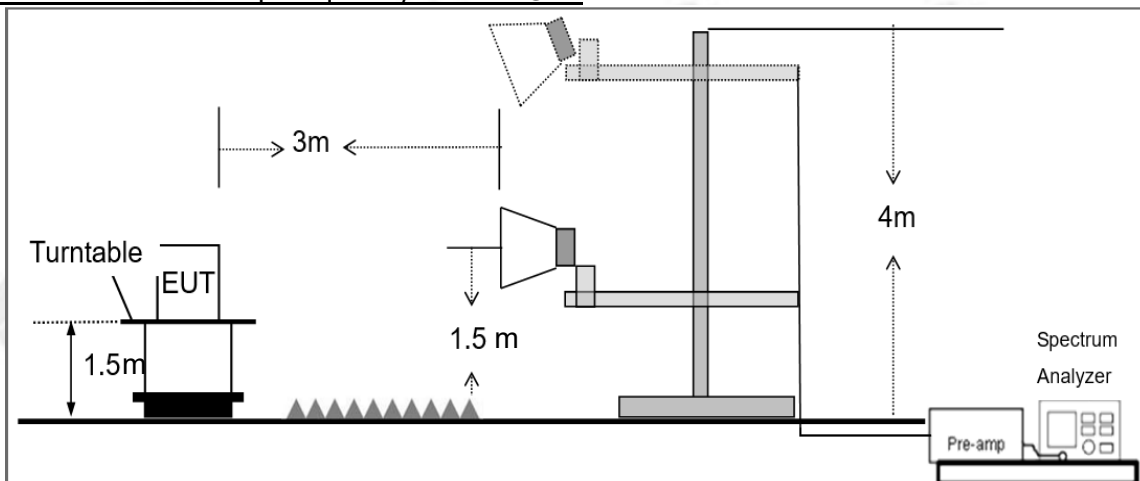
Radiated Emission Test-Up Frequency Below 30MHz



Radiated Emission Test-Up Frequency 30MHz~1GHz



Radiated emission test-up frequency above 1GHz



5.3.4 Test Result

Below 30MHz

Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	--
Test Voltage :	DC 5V from Adapter Input AC 120V/60Hz	Test Mode:	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	Pass
--	--	--	--	Pass

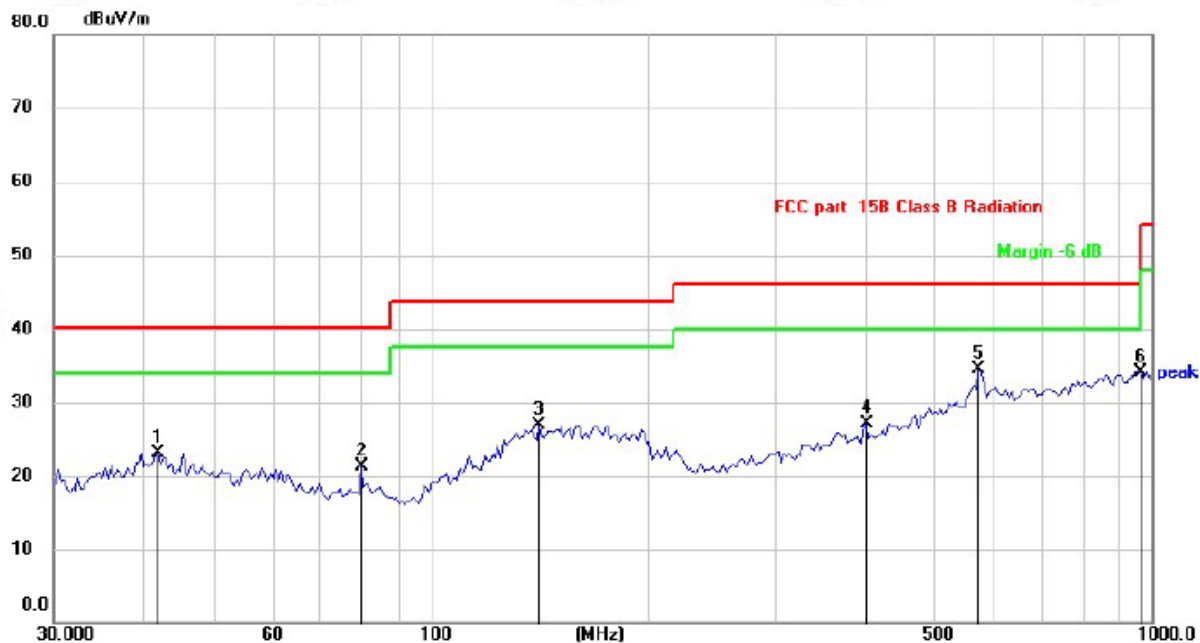
Note:

1. For 9kHz-30MHz, the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);
3. Limit line = specific limits (dBuV) + distance extrapolation factor.



Frequency range (30MHz – 1GHz)

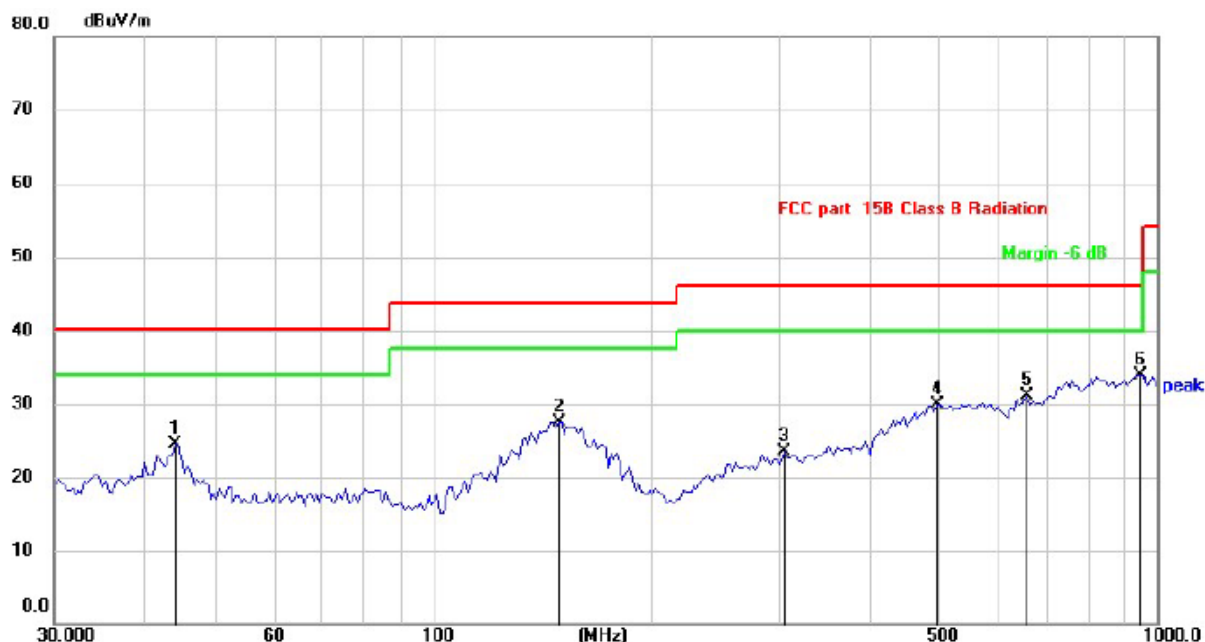
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase:	Vertical
Test Voltage:	DC 5V from Adapter Input AC 120V/60Hz	Test Mode:	High channel(Worst case)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		41.8594	30.02	-6.85	23.17	40.00	-16.83	QP
2		80.0805	29.90	-8.69	21.21	40.00	-18.79	QP
3		141.5776	30.89	-4.08	26.81	43.50	-16.69	QP
4		401.8383	27.86	-0.67	27.19	46.00	-18.81	QP
5	*	575.6341	31.21	3.21	34.42	46.00	-11.58	QP
6		965.5420	25.39	8.72	34.11	54.00	-19.89	QP



Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase:	Horizontal
Test Voltage:	DC 5V from Adapter Input AC 120V/60Hz	Test Mode:	High channel(Worst case)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		44.1200	31.27	-6.78	24.49	40.00	-15.51	QP
2		149.2238	30.50	-2.97	27.53	43.50	-15.97	QP
3		306.2162	26.35	-2.76	23.59	46.00	-22.41	QP
4		495.9343	27.82	2.02	29.84	46.00	-16.16	QP
5		656.5300	26.48	4.60	31.08	46.00	-14.92	QP
6	*	948.7608	25.30	8.60	33.90	46.00	-12.10	QP

5.3.5 Band Edge - Radiated

For 500kHz Bandwidth (923.3 MHz to 927.5 MHz):

Field Strength of the Fundamental Signal and Bandedge								
No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
Lowest Channel_ 923.3MHz								
1	923.335	72.31	4.76	77.07	94	-16.93	QP	Horizontal
2	902	29.94	4.74	34.68	46	-11.32	QP	Horizontal
3	923.393	80.33	4.76	85.09	94	-8.91	QP	Vertical
4	902	29.61	4.74	34.35	46	-11.65	QP	Vertical
Highest Channel_ 927.5MHz								
1	927.528	76.25	5.22	81.47	94	-12.53	QP	Horizontal
2	928	31.11	5.24	36.35	46	-9.65	QP	Horizontal
3	927.531	79.87	5.22	85.09	94	-8.91	QP	Vertical
4	928	31.46	5.24	36.7	46	-9.3	QP	Vertical

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit

5.3.6 Spurious emission in restricted band

For 500KHz Bandwidth (923.3 MHz to 927.5 MHz):

No.	Frequency (MHz)	Reading (dBμV/m)	Correction factor (dB)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
Lowest Channel_923.3MHz								
1	1826.042	51.61	-10.39	41.22	54	-12.78	Average	Horizontal
2	1826.042	62.71	-10.39	52.32	74	-21.68	Peak	Horizontal
3	2729.213	52.77	-6.06	46.71	54	-7.29	Average	Horizontal
4	2729.213	65.69	-6.06	59.63	74	-14.37	Peak	Horizontal
5	3642.513	49.71	-2.87	46.84	54	-7.16	Average	Horizontal
6	3642.513	58.71	-2.87	55.84	74	-18.16	Peak	Horizontal
7	1826.042	58.21	-10.39	47.82	54	-6.18	Average	Vertical
8	1826.042	72.93	-10.39	62.54	74	-11.46	Peak	Vertical
9	2729.213	52.27	-6.06	46.21	54	-7.79	Average	Vertical
10	2729.213	67.63	-6.06	61.57	74	-12.43	Peak	Vertical
11	3642.513	48.93	-2.87	46.06	54	-7.94	Average	Vertical
12	3642.513	56.41	-2.87	53.54	74	-20.46	Peak	Vertical
Middle Channel_925.1MHz								
1	1804.11	47.38	-10.42	36.96	54	-17.04	Average	Horizontal
2	1804.11	58.22	-10.42	47.8	74	-26.2	Peak	Horizontal
3	2726.978	50.31	-6.1	44.21	54	-9.79	Average	Horizontal
4	2726.978	63.81	-6.1	57.71	74	-16.29	Peak	Horizontal
5	3619.731	48.62	-2.94	45.68	54	-8.32	Average	Horizontal
6	3619.731	55.82	-2.94	52.88	74	-21.12	Peak	Horizontal
7	9024.803	42.36	3.95	46.31	54	-7.69	Average	Horizontal
8	9024.803	54.69	3.95	58.64	74	-15.36	Peak	Horizontal
9	1804.11	67.21	-10.42	56.79	54	2.79	Average	Vertical
10	1804.11	71.82	-10.42	61.4	74	-12.6	Peak	Vertical
11	2726.978	51.51	-6.1	45.41	54	-8.59	Average	Vertical
12	2726.978	62.14	-6.1	56.04	74	-17.96	Peak	Vertical
13	3619.731	48.61	-2.94	45.67	54	-8.33	Average	Vertical
14	3619.731	55.01	-2.94	52.07	74	-21.93	Peak	Vertical
15	9024.803	45.57	-1.28	44.29	54	-9.71	Average	Vertical
16	9024.803	56.64	-1.28	55.36	74	-18.64	Peak	Vertical
17	8122.012	47.59	2.24	49.83	54	-4.17	Average	Vertical
18	8122.012	55.8	2.24	58.04	74	-15.96	Peak	Vertical
19	9024.803	44.85	3.95	48.8	54	-5.2	Average	Vertical
20	9024.803	52.12	3.95	56.07	74	-17.93	Peak	Vertical

Highest Channel_927.5MHz								
1	1837.483	51.62	-10.35	41.27	54	-12.73	Average	Horizontal
2	1837.483	58.31	-10.34	47.97	74	-26.03	Peak	Horizontal
3	2782.21	52.93	-6.04	46.89	54	-7.11	Average	Horizontal
4	2786.21	68.51	-6.04	62.47	74	-11.53	Peak	Horizontal
5	3617.316	45.61	-2.78	42.83	54	-11.17	Average	Horizontal
6	3617.316	52.17	-2.78	49.39	74	-24.61	Peak	Horizontal
7	8231.823	41.32	2.47	43.79	54	-10.21	Average	Horizontal
8	8230.823	49.37	2.47	51.84	74	-22.16	Peak	Horizontal
9	9145.515	43.7	3.85	47.55	54	-6.45	Average	Horizontal
10	9145.515	51.79	3.85	55.64	74	-18.36	Peak	Horizontal
11	1837.483	54.7	-6.04	48.66	54	-5.34	Average	Horizontal
12	1837.483	67.7	-6.04	61.66	74	-12.34	Peak	Horizontal
13	2786.21	47.4	-2.78	44.62	54	-9.38	Average	Vertical
14	2786.21	56.56	-2.78	53.78	74	-20.22	Peak	Vertical
15	3617.316	45.18	-1.24	43.94	54	-10.06	Average	Vertical
16	3617.316	56.61	-1.24	55.37	74	-18.63	Peak	Vertical
17	8231.823	45.12	2.47	47.59	54	-6.41	Average	Vertical
18	8230.823	55.78	2.47	58.25	74	-15.75	Peak	Vertical
19	9145.515	45.16	3.85	49.01	54	-4.99	Average	Vertical
20	9145.515	58.88	3.85	62.73	74	-11.27	Peak	Vertical

5.4 Peak Output Power

5.4.1 Limit

FCC Part15 Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(b)(3)	Peak output power	1 watt or 30dBm	2400-2483.5

5.4.2 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
RBW=2MHz, VBW=10MHz, Detector=Peak
- (3) The EUT was set to continuously transmitting in the max power during the test.

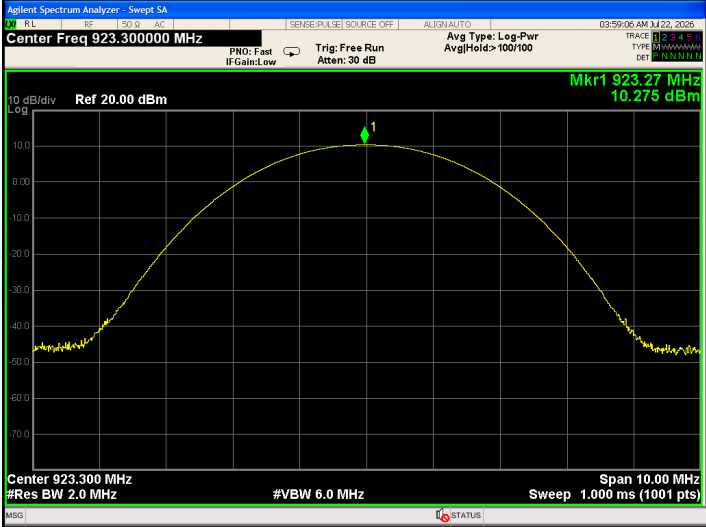
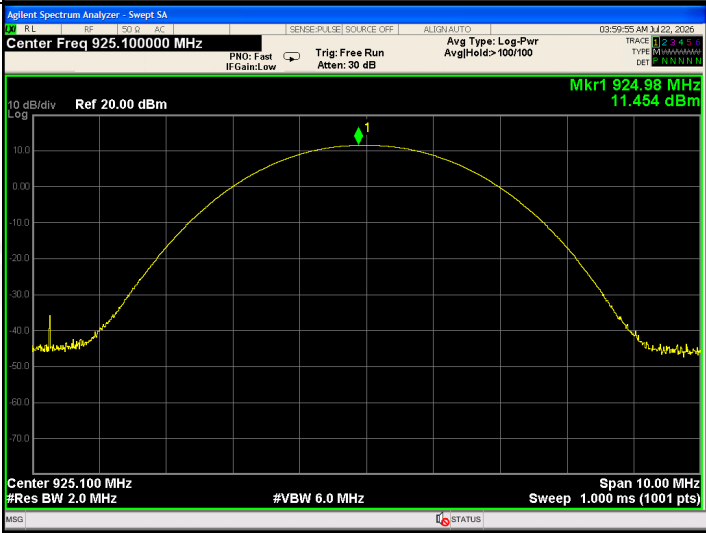
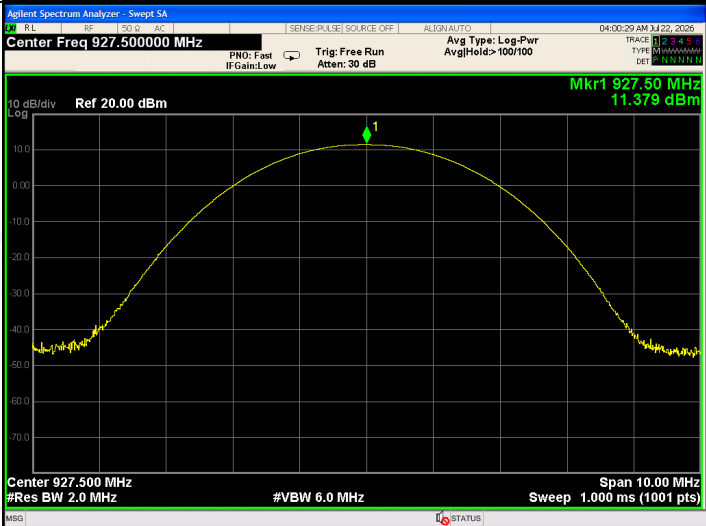
5.4.3 Test Setup



5.4.4 Test Results

Mode	Channel.	Maximum Output Power [dBm]	Limit[dBm]	Verdict
LoRa	LCH	10.275	30	PASS
	MCH	11.454	30	PASS
	HCH	11.379	30	PASS

Test Graph:

LoRa Low channel	 Agilent Spectrum Analyzer - Swept SA Center Freq 923.300000 MHz #Res BW 2.0 MHz #VBW 6.0 MHz Span 10.00 MHz Sweep 1.000 ms (1001 pts) Mkr1 923.27 MHz 10.275 dBm
LoRa Mid channel	 Agilent Spectrum Analyzer - Swept SA Center Freq 925.100000 MHz #Res BW 2.0 MHz #VBW 6.0 MHz Span 10.00 MHz Sweep 1.000 ms (1001 pts) Mkr1 924.98 MHz 11.454 dBm
LoRa High channel	 Agilent Spectrum Analyzer - Swept SA Center Freq 927.500000 MHz #Res BW 2.0 MHz #VBW 6.0 MHz Span 10.00 MHz Sweep 1.000 ms (1001 pts) Mkr1 927.50 MHz 11.379 dBm

5.5 Power Spectral Density

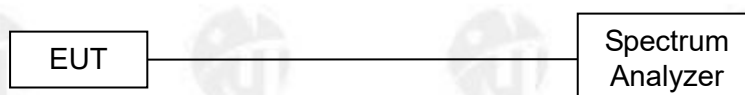
5.5.1 Limit

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247	Power Spectral Density	8 dBm (in any 3kHz)	2400-2483.5

5.5.2 Test Procedure

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW ≥ 3 kHz.
4. Set the VBW $\geq 3 \times$ RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.5.3 Test Setup



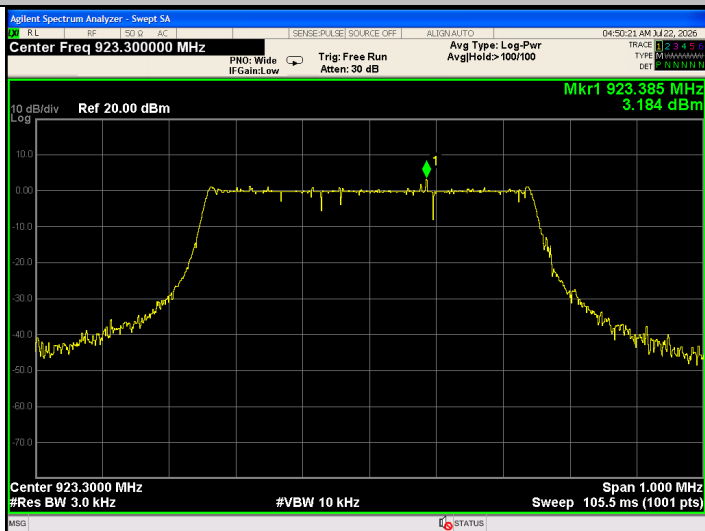
5.5.4 Test Results

Mode	Channel.	Power Spectral Density (dBm/3KHz)	Limit(dBm/3KHz)	Verdict
LoRa	LCH	3.184	8	PASS
LoRa	MCH	1.249	8	PASS
LoRa	HCH	6.245	8	PASS

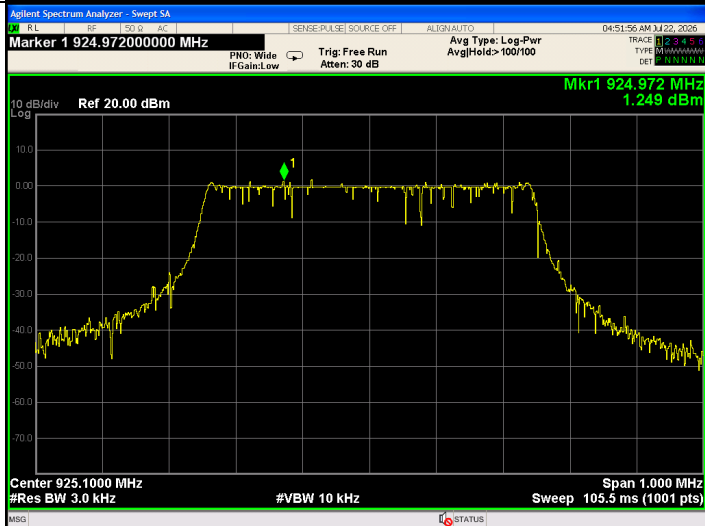
Test Graph

Graphs

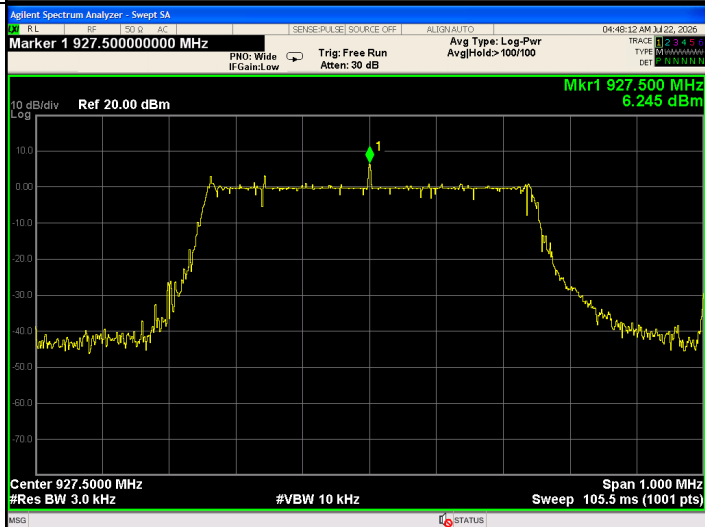
LoRa/LCH



LoRa/MCH



LoRa/HCH



5.6 6dB Bandwidth

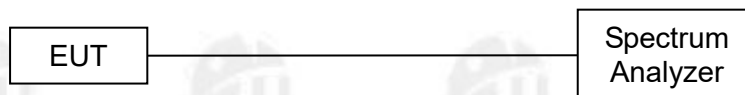
5.6.1 Limit

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(a)(2)	Bandwidth	$\geq 500\text{kHz}$ (6dB bandwidth)	2400-2483.5

5.6.2 Test Procedure

1. Set RBW= shall be in the range of 1% to 5% of the OBW but not less than 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = No faster than coupled (auto) time.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

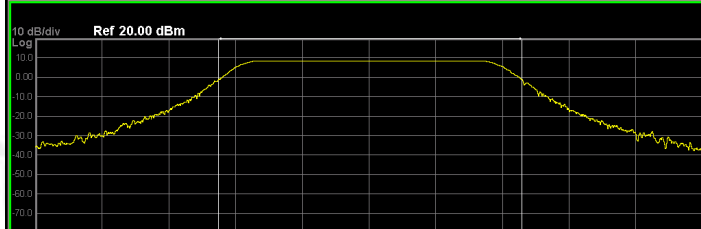
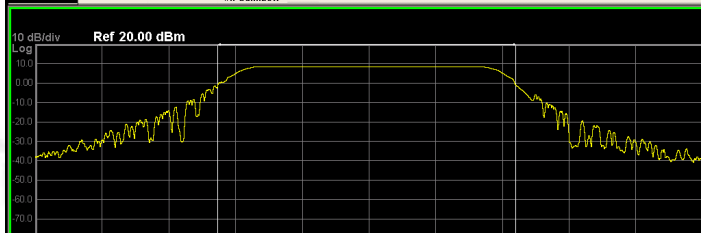
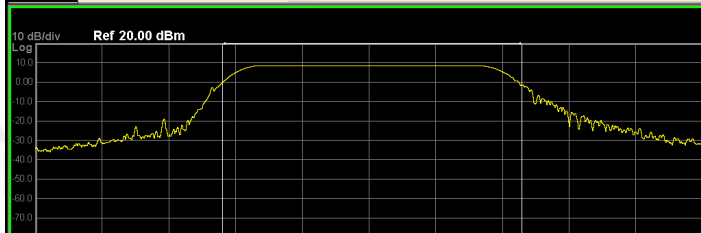
5.6.3 Test Setup



5.6.4 Test Results

Test Mode	Frequency	6dB Bandwidth (MHz)	Result
LoRa	Low channel	0.6361	PASS
	Mid channel	0.6395	PASS
	High channel	0.6372	PASS

Test Graph:

LoRa Low channel	Agilent Spectrum Analyzer - Occupied BW Center Freq 923.300000 MHz Center Freq: 923.300000 MHz Trig: Free Run #Att: 30 dB Radio Std: None Radio Device: BTS 10 dB/div Ref 20.00 dBm  Center 923.3 MHz #Res BW 100 kHz #VBW 300 kHz Span 1.5 MHz Sweep 1 ms Occupied Bandwidth 680.98 kHz Transmit Freq Error 2.613 kHz OBW Power 99.00 % x dB Bandwidth 636.1 kHz x dB -6.00 dB MSG
LoRa Mid channel	Agilent Spectrum Analyzer - Occupied BW Center Freq 925.100000 MHz Center Freq: 925.100000 MHz Trig: Free Run #Att: 30 dB Radio Std: None Radio Device: BTS 10 dB/div Ref 20.00 dBm  Center 925.1 MHz #Res BW 100 kHz #VBW 300 kHz Span 1.5 MHz Sweep 1 ms Occupied Bandwidth 668.75 kHz Transmit Freq Error -4.226 kHz OBW Power 99.00 % x dB Bandwidth 639.5 kHz x dB -6.00 dB MSG
LoRa High channel	Agilent Spectrum Analyzer - Occupied BW Center Freq 927.500000 MHz Center Freq: 927.500000 MHz Trig: Free Run #Att: 30 dB Radio Std: None Radio Device: BTS 10 dB/div Ref 20.00 dBm  Center 927.5 MHz #Res BW 100 kHz #VBW 300 kHz Span 1.5 MHz Sweep 1 ms Occupied Bandwidth 670.26 kHz Transmit Freq Error 8.088 kHz OBW Power 99.00 % x dB Bandwidth 637.2 kHz x dB -6.00 dB MSG

5.7 Duty Cycle

5.7.1 Limit

No limit requirement.

5.7.2 Test Procedure

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. Set the center frequency of the instrument to the center frequency of the transmission. Set $RBW \geq OBW$ if possible; otherwise, set RBW to the largest available value. Set $VBW \geq RBW$. Set detector = peak or average. 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 duty cycle shall not be used if $T \leq 16.7$ microseconds.)

The transmitter output is connected to the Spectrum Analyzer. We tested according to the zero-span measurement method, 6.0(b) in KDB 558074 D01 DTS Meas Guidance v05r02.

The largest available value of RBW is 10 MHz and VBW is 10 MHz. The zero-span method of measuring duty cycle shall not be used if $T \leq 6.25$ microseconds. ($50/6.25 = 8$)

The zero-span method was used because all measured T data are > 6.25 microseconds and both RBW and VBW are $> 50/T$.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

Span = Zero Span

RBW = 10MHz (the largest available value)

VBW = 10MHz ($\geq$ RBW)

Number of points in Sweep > 100

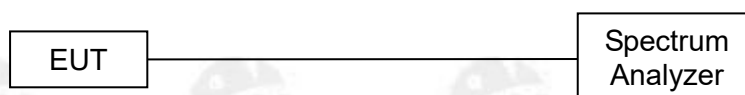
Detector function = peak

Trace = Clear write

Measure Total and Ton

Calculate Duty Cycle = $Ton / Total$

5.7.3 Test Setup



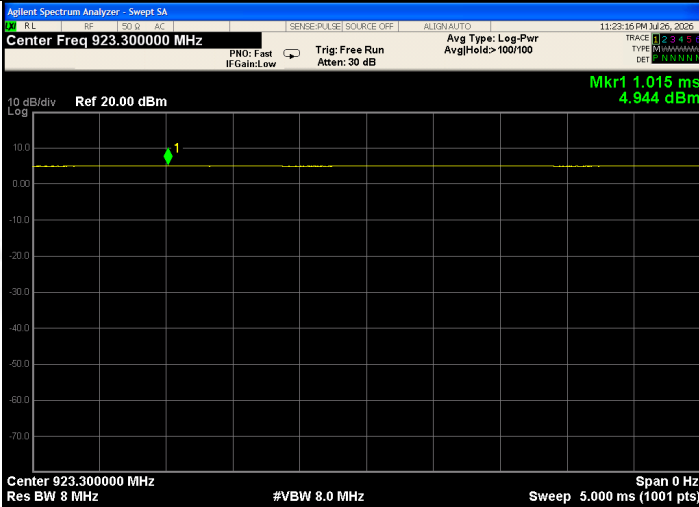
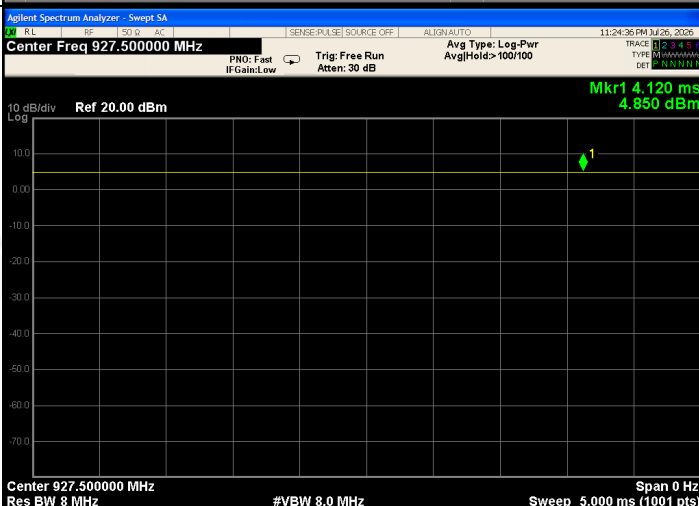
5.7.4 Test Results



Duty Cycle

Mode	Channel.	Duty Cycle(%)	Correction Factor (dB)
LoRa	LCH	100	0
	MCH	100	0
	HCH	100	0

Duty Cycle:

LoRa Low channel	 Agilent Spectrum Analyzer - Swept SA Center Freq 923.300000 MHz Res BW 8 MHz #VBW 8.0 MHz Sweep 5.000 ms (1001 pts) Mkr1 1.015 ms 4.944 dBm	
LoRa Mid channel	 Agilent Spectrum Analyzer - Swept SA Center Freq 925.100000 MHz Res BW 8 MHz #VBW 8.0 MHz Sweep 5.000 ms (1001 pts) Mkr1 3.565 ms 4.893 dBm	
LoRa High channel	 Agilent Spectrum Analyzer - Swept SA Center Freq 927.500000 MHz Res BW 8 MHz #VBW 8.0 MHz Sweep 5.000 ms (1001 pts) Mkr1 4.120 ms 4.850 dBm	

5.8 Conducted Band Edge

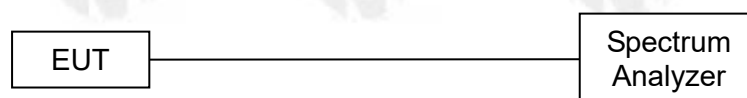
5.8.1 Limit

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)).

5.8.2 Test Procedure

- Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- Repeat above procedures until all measured frequencies were complete.

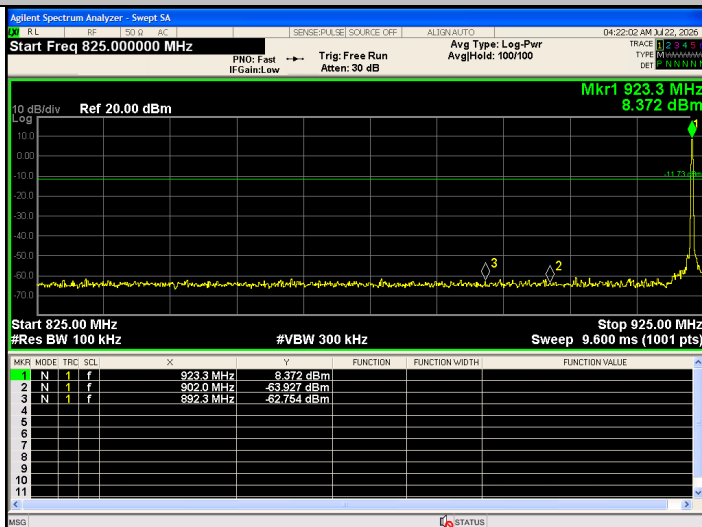
5.8.3 Test Setup



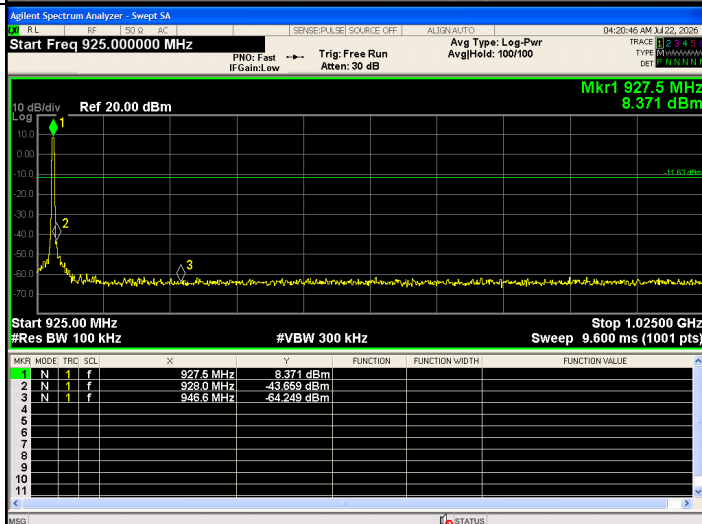
5.8.4 Test Results

BAND EDGE Graphs

LoRa/LCH



LoRa/HCH



5.9 Spurious RF Conducted Emissions

5.9.1 Limit

Below -20dB of the highest emission level in operating band.

5.9.2 Measuring Instruments

The Measuring equipment is listed in the section 4 of this test report.

5.9.3 Test Procedure

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW= 300kHz to measure the peak field strength, and measure frequency range from 9kHz to 26.5GHz.

5.9.4 Test Setup



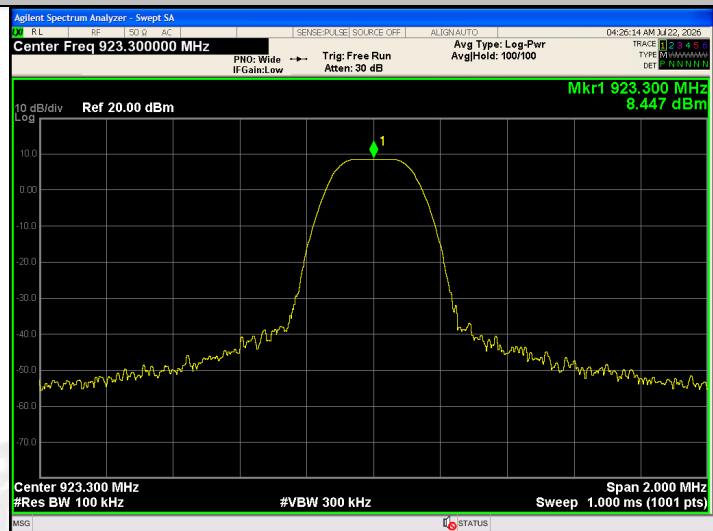
5.9.5 Test Results

Note:

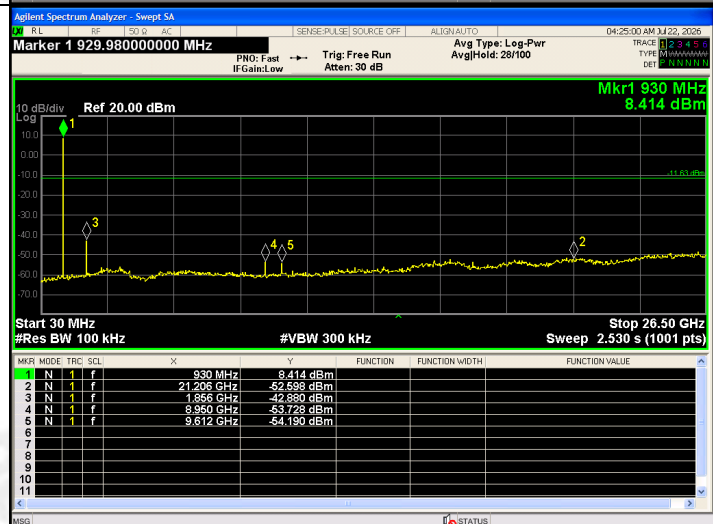
1: The measurement frequency range is from 9kHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.

RF Conducted Spurious Emissions Graphs

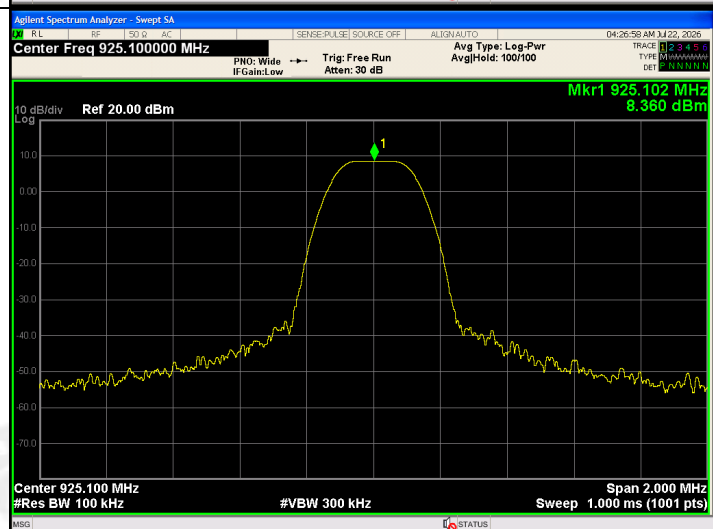
LoRa/LCH



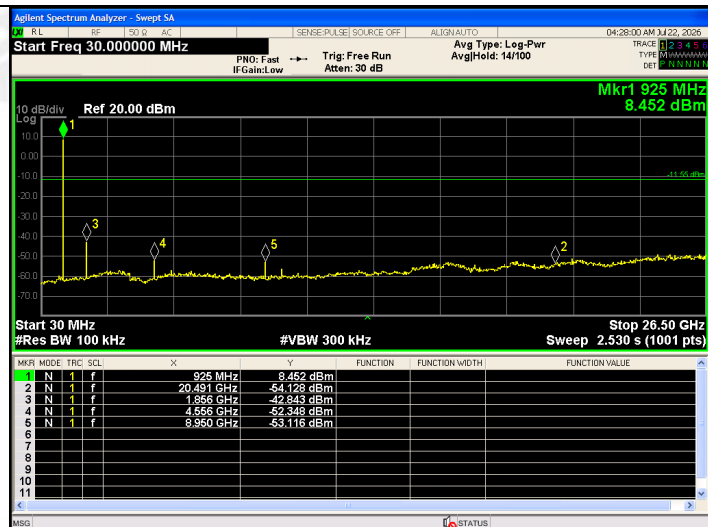
LoRa/LCH



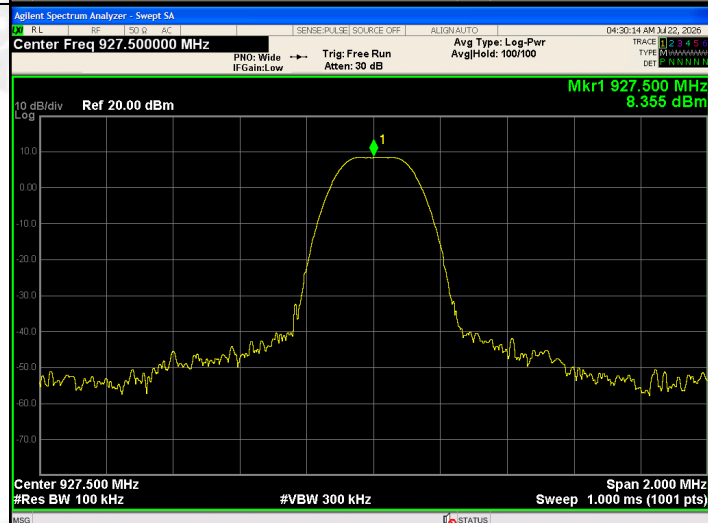
LoRa/MCH



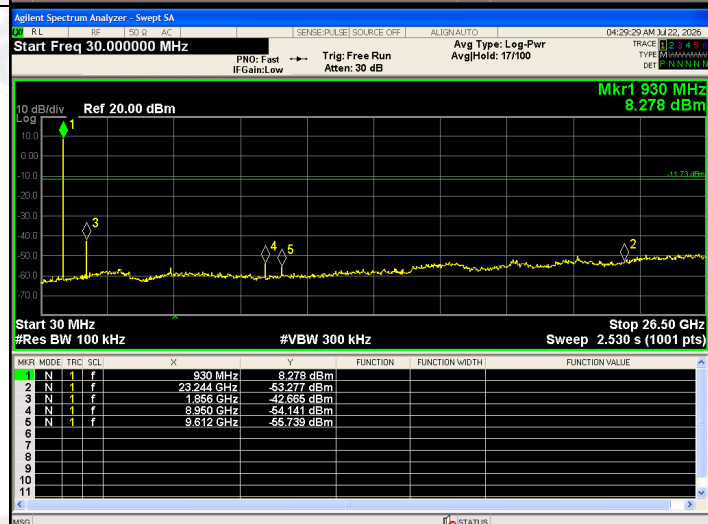
LoRa/MCH



LoRa/HCH



LoRa/HCH



6 Photographs of the Test Setup

Please see EUT Photo for details.

7 Photographs of the EUT

Please see EUT Photo for details.

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