

FCC Test Report

Report No.: RFCJWN-WTW-P25110582-6

FCC ID: 2AEUP-5DFYA7

Test Model: 5DFYA7

Received Date: 2025/12/5

Test Date: 2025/12/12 ~ 2025/12/14

Issued Date: 2025/12/19

Applicant: Ring LLC

Address: 12515 Cerise Ave, Hawthorne, CA 90250, USA

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location (1): No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, Taiwan

Test Location (2): No. 70, Wenming Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

**FCC Registration /
Designation Number(1):** 788550 / TW0003

**FCC Registration /
Designation Number(2):** 281270 / TW0032



This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT	7
3.2 Description of Test Modes	8
3.2.1 Test Mode Applicability and Tested Channel Detail	9
3.3 Duty Cycle of Test Signal	10
3.4 Description of Support Units	11
3.4.1 Configuration of System under Test	11
3.5 General Description of Applied Standards and references	11
4 Test Types and Results	12
4.1 Radiated Emission and Bandedge Measurement	12
4.1.1 Limits of Radiated Emission and Bandedge Measurement	12
4.1.2 Test Instruments	13
4.1.3 Test Procedures	14
4.1.4 Deviation from Test Standard	15
4.1.5 Test Setup	15
4.1.6 EUT Operating Conditions	16
4.1.7 Test Results	17
4.2 Conducted Emission Measurement	29
4.2.1 Limits of Conducted Emission Measurement	29
4.2.2 Test Instruments	29
4.2.3 Test Procedures	30
4.2.4 Deviation from Test Standard	30
4.2.5 Test Setup	30
4.2.6 EUT Operating Condition	30
4.2.7 Test Results	31
4.3 6dB Bandwidth Measurement	33
4.3.1 Limits of 6dB Bandwidth Measurement	33
4.3.2 Test Setup	33
4.3.3 Test Instruments	33
4.3.4 Test Procedure	33
4.3.5 Deviation from Test Standard	33
4.3.6 EUT Operating Conditions	33
4.3.7 Test Result	34
4.4 Conducted Output Power Measurement	35
4.4.1 Limits of Conducted Output Power Measurement	35
4.4.2 Test Setup	35
4.4.3 Test Instruments	35
4.4.4 Test Procedure	35
4.4.5 Deviation from Test Standard	35
4.4.6 EUT Operating Condition	35
4.4.7 Test Results	35
4.5 Power Spectral Density Measurement	36
4.5.1 Limits of Power Spectral Density Measurement	36
4.5.2 Test Setup	36
4.5.3 Test Instruments	36
4.5.4 Test Procedure	36
4.5.5 Deviation from Test Standard	36

4.5.6 EUT Operating Condition	37
4.5.7 Test Results	37
4.6 Conducted Out of Band Emission Measurement.....	38
4.6.1 Limits of Conducted Out Of Band Emission Measurement.....	38
4.6.2 Test Setup.....	38
4.6.3 Test Instruments	38
4.6.4 Test Procedure	38
4.6.5 Deviation from Test Standard	38
4.6.6 EUT Operating Condition	39
4.6.7 Test Results	39
5 Pictures of Test Arrangements.....	41
Appendix – Information of the Testing Laboratories	42

Release Control Record

Issue No.	Description	Date Issued
RFCJWN-WTW-P25110582-6	Original Release	2025/12/19

1 Certificate of Conformity

Product: Video Doorbell

Brand: ring

Test Model: 5DFYA7

Sample Status: Engineering sample

Applicant: Ring LLC

Test Date: 2025/12/12 ~ 2025/12/14

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10-2020

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :

Vera Huang

Date: 2025/12/19

Vera Huang / Specialist

Approved by :

Jeremy Lin

Date: 2025/12/19

Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	Pass	Meet the requirement of limit. Minimum passing margin is -12.24dB at 0.37818MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -3.5dB at 42.61MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	Pass	Meet the requirement of limit.
15.247(b)	Conducted power	Pass	Meet the requirement of limit.
15.247(e)	Power Spectral Density	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.00 dB
	30 MHz ~ 1 GHz	2.93 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.88 dB
6 dB Bandwidth	-	206.5 Hz
RF Output Power	-	1.371 dB
Power Spectral Density	-	1.017 dB
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.79 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Video Doorbell
Brand	ring
Test Model	5DFYA7
Sample Status	Engineering sample
Power Supply Rating	42.5-57Vdc, 0.6A
Modulation Type	LoRa
Modulation Technology	DTS
Operating Frequency	902.5 MHz – 926.5 MHz
Number of Channel	31
Output Power	308.319 mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	NA
Cable Supplied	NA

Note:

1. The Antenna information is listed as below.

Antenna Gain (dBi)	Frequency Range	Antenna Type	Connector Type
2.5	LoRa 902~928MHz	IFA	N/A

*Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

3.2 Description of Test Modes

31 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	902.5	10	910.5	20	918.5	30	926.5
1	903.3	11	911.3	21	919.3		
2	904.1	12	912.1	22	920.1		
3	904.9	13	912.9	23	920.9		
4	905.7	14	913.7	24	921.7		
5	906.5	15	914.5	25	922.5		
6	907.3	16	915.3	26	923.3		
7	908.1	17	916.1	27	924.1		
8	908.9	18	916.9	28	924.9		
9	909.7	19	917.7	29	925.7		

3.2.1 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition. 2. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
Worst Case:	X-axis/ Y-axis/ Z-axis Worst Condition: Z-axis

EUT Configure Mode	Applicable to				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement
PLC: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz
APCM: Antenna Port Conducted Measurement

Radiated Emission Test (Above 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	0 to 30	0, 15, 30	LoRa

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	0 to 30	0	LoRa

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	0 to 30	0	LoRa

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

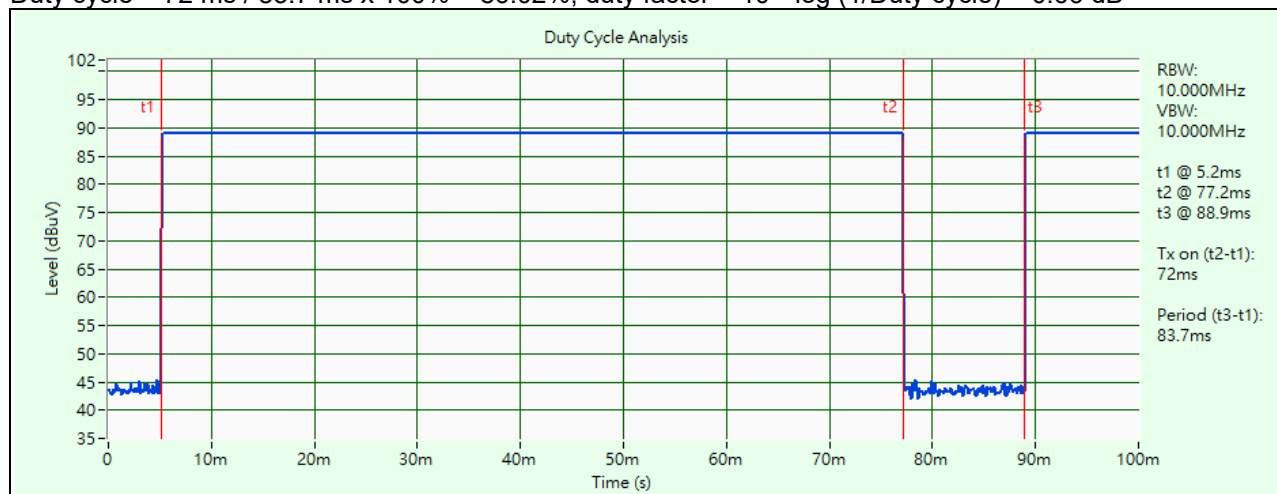
EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	0 to 30	0, 15, 30	LoRa

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	23 deg. C, 68% RH	120Vac, 60Hz	Edison Lee
RE<1G	22 deg. C, 68% RH	120Vac, 60Hz	Greg Lin
PLC	25deg. C, 75%RH	120Vac, 60Hz	Greg Lin
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Jisyong Wang

3.3 Duty Cycle of Test Signal

Duty cycle = 72 ms / 83.7 ms x 100% = 86.02%, duty factor = $10 \cdot \log (1/\text{Duty cycle}) = 0.66 \text{ dB}$



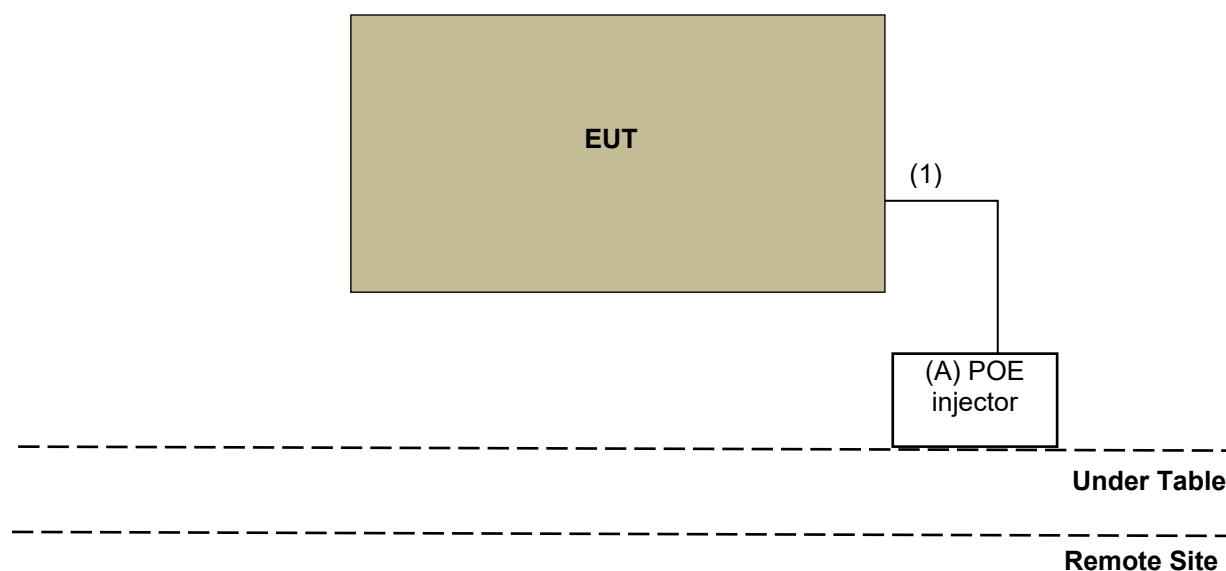
3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	POE injector	LIANCUO	LG-BTG-N601 (2.5G)	N/A	N/A	Supplied by applicant (for RF Setup)

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	RJ-45 Cable	1	1.5	No	0	Provided by Lab (for RF Setup)

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards and references

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

FCC Part 15, Subpart C (15.247)

ANSI C63.10-2020

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 558074 D01 15.247 Meas Guidance v05r02

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 30dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/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

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Antenna Tower Max-Full	MFA-515BSN	N/A	N/A	N/A
Test Receiver Rohde & Schwarz	ESR3	102783	2024/12/17	2025/12/16
Spectrum Analyzer KEYSIGHT	N9020B	MY60110513	2024/12/30	2025/12/29
BILOG Antenna SCHWARZBECK	VULB9168	9168-1214	2025/9/18	2026/9/17
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1170	2025/11/9	2026/11/8
Loop Antenna EMCI	HLA 6121	45745	2025/9/1	2026/8/31
Preamplifier EMCI	EMC330N	980798	2025/1/14	2026/1/13
Preamplifier EMCI	EMC118A45SE	980809	2025/4/24	2026/4/23
Preamplifier EMCI	EMC184045SE	980786	2025/1/14	2026/1/13
RF signal cable EMCI	EMCCFD400-NM-N M-(9000+300+500)	201251+ 201249+ 201248	2025/1/14	2026/1/13
RF signal cable EMCI	EMC101G-KM-KM-(5000+3000+2000)	201261+201258+20 1249	2025/1/14	2026/1/13
Software BV ADT	ADT_Radiated_V7.7 .1.1.1	NA	NA	NA
Antenna Tower Max-Full	MFA-515BSN	NA	NA	NA
Turn Table Max-Full	MFT-201SS	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208676	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in WM Chamber 9.

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode when the test frequencies less than or equal to 1 GHz.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

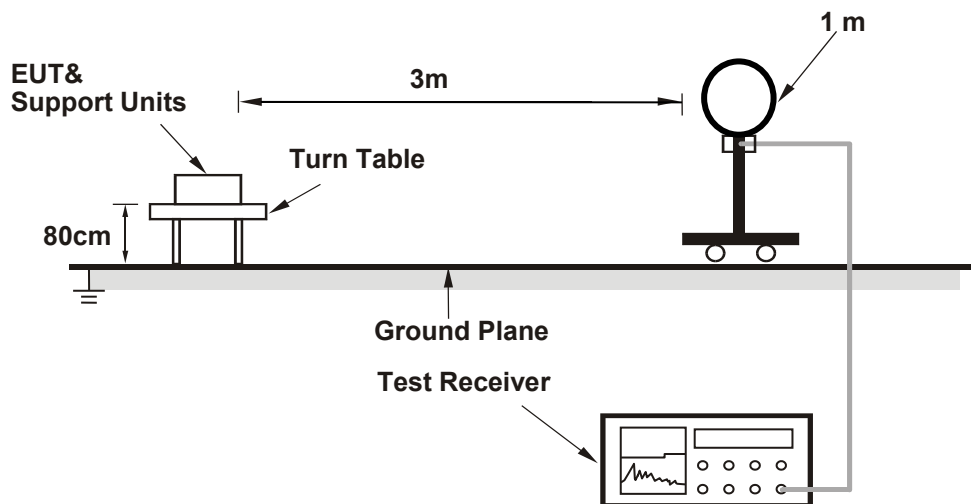
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequencies less than or equal to 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz, unless otherwise specified the following procedure (restricted-bands adjacent to the allocated band).
3. For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1 GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

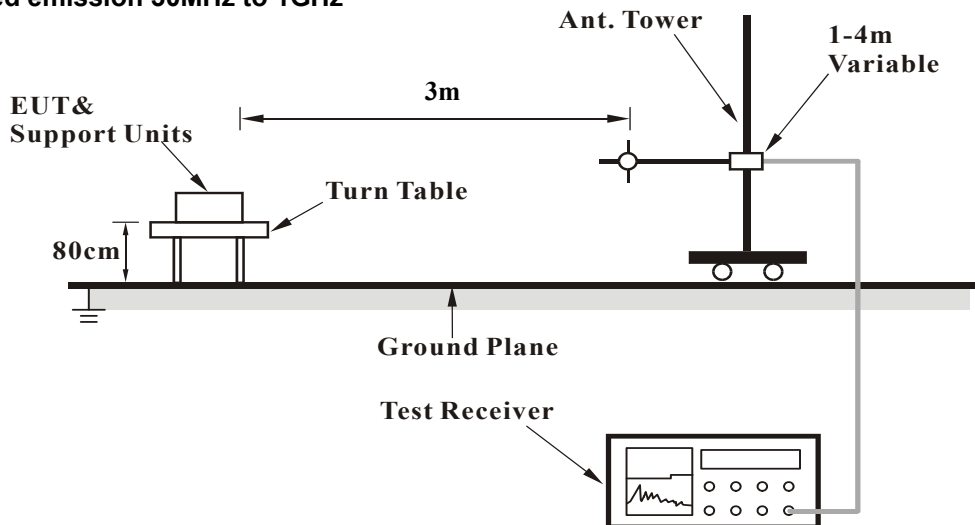
No deviation.

4.1.5 Test Setup

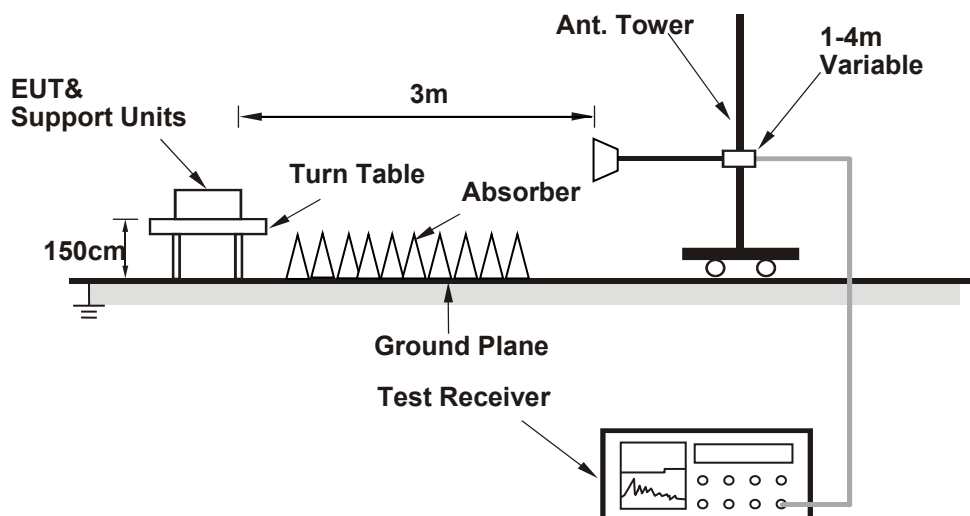
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

- a. Set the EUT under transmission condition continuously at specific channel frequency.

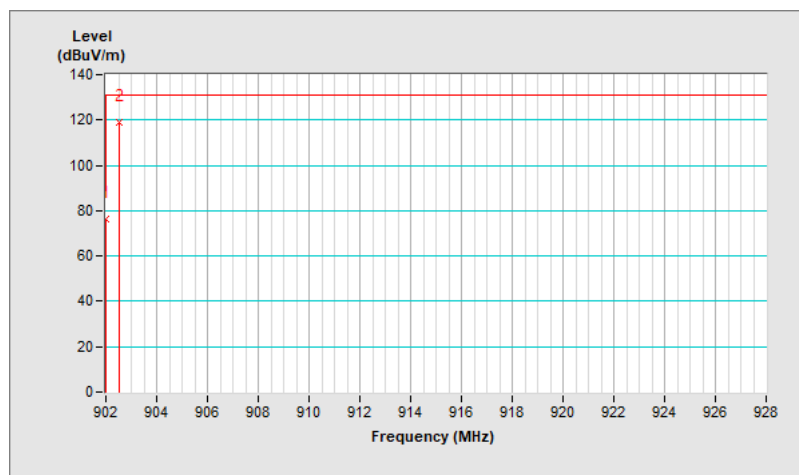
4.1.7 Test Results

Channel	TX Channel 0	Detector Function	Quasi-Peak (QP)
Frequency Range	902MHz ~ 928MHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	902.00	76.1 QP	89.1	-13.0	1.50 H	121	45.5	30.6
2	*902.50	119.1 QP			1.50 H	121	88.5	30.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value.
5. " * " : Fundamental frequency.

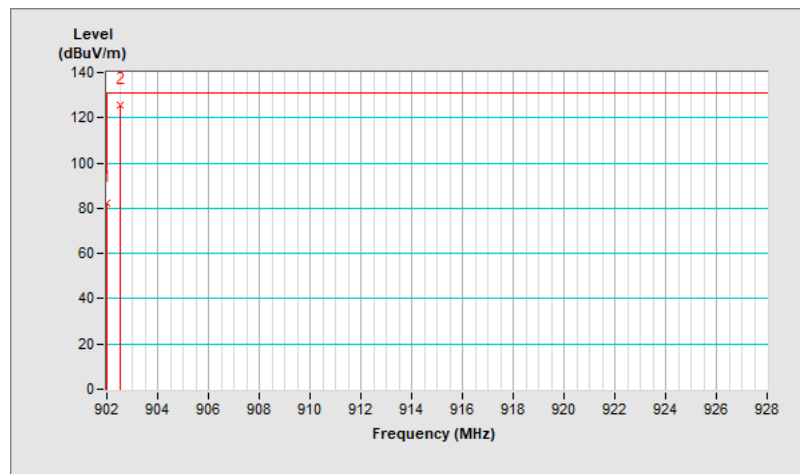


Channel	TX Channel 0	Detector Function	Quasi-Peak (QP)
Frequency Range	902MHz ~ 928MHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	902.00	82.6 QP	95.3	-12.7	1.24 V	118	52.0	30.6
2	*902.50	125.3 QP			1.24 V	118	94.7	30.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value.
5. " * ": Fundamental frequency.

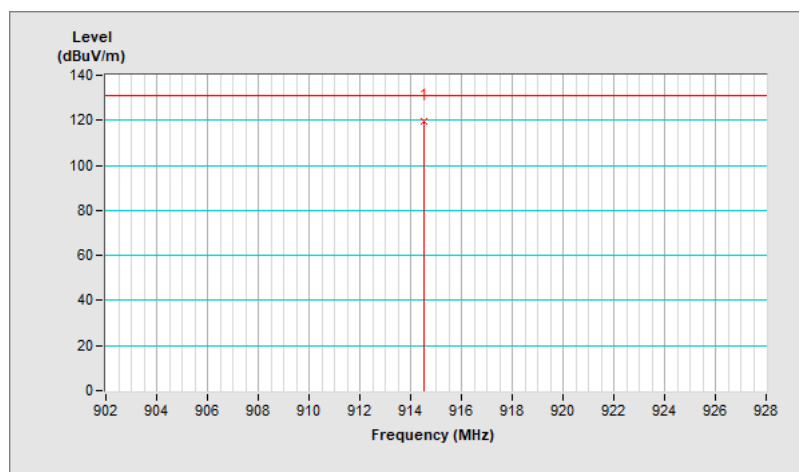


Channel	TX Channel 15	Detector Function	Quasi-Peak (QP)
Frequency Range	902MHz ~ 928MHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*914.50	119.7 QP			1.47 H	125	88.9	30.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value.
5. " * ": Fundamental frequency.

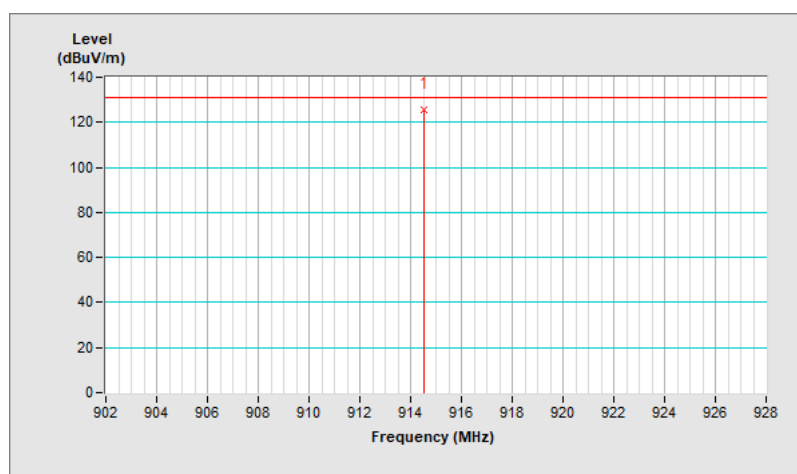


Channel	TX Channel 15	Detector Function	Quasi-Peak (QP)
Frequency Range	902MHz ~ 928MHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*914.50	125.8 QP			1.22 V	108	95.0	30.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value.
5. " * ": Fundamental frequency.

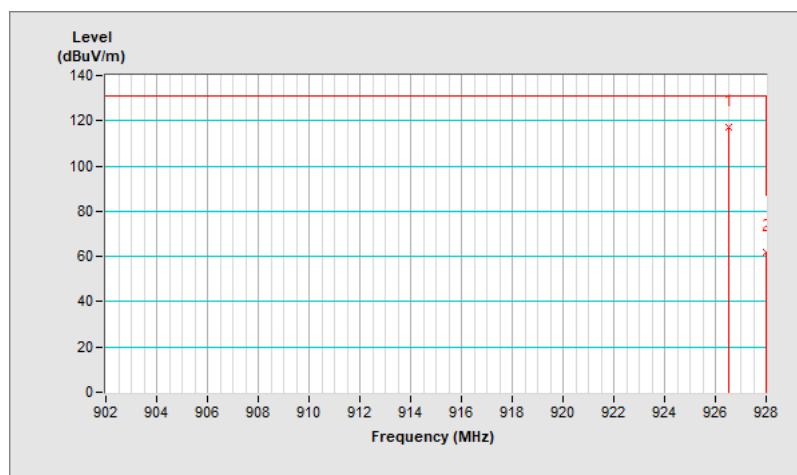


Channel	TX Channel 30	Detector Function	Quasi-Peak (QP)
Frequency Range	902MHz ~ 928MHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*926.50	117.2 QP			1.35 H	115	86.3	30.9
2	928.00	62.0 QP	87.2	-25.2	1.35 H	115	31.1	30.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value.
5. " * " : Fundamental frequency.

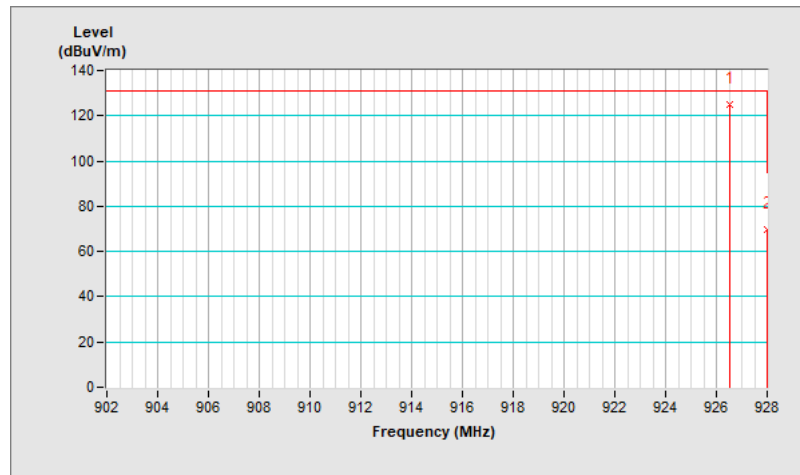


Channel	TX Channel 30	Detector Function	Quasi-Peak (QP)
Frequency Range	902MHz ~ 928MHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*926.50	125.1 QP			1.24 V	38	94.2	30.9
2	928.00	69.5 QP	95.1	-25.6	1.24 V	38	38.6	30.9

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value.
5. " * ": Fundamental frequency.



Above 1GHz Data:

Channel	TX Channel 0	Detector Function	Peak (PK)
Frequency Range	1GHz ~10GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2707.50	48.0 PK	74.0	-26.0	3.94 H	352	50.4	-2.4
2	2707.50	39.4 AV	54.0	-14.6	3.94 H	352	41.8	-2.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2707.50	48.4 PK	74.0	-25.6	4.00 V	19	50.8	-2.4
2	2707.50	40.1 AV	54.0	-13.9	4.00 V	19	42.5	-2.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value.

Channel	TX Channel 15	Detector Function	Peak (PK)
Frequency Range	1GHz ~10GHz		Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2743.50	49.2 PK	74.0	-24.8	3.91 H	355	51.4	-2.2
2	2743.50	41.9 AV	54.0	-12.1	3.91 H	355	44.1	-2.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2743.50	49.9 PK	74.0	-24.1	4.00 V	6	52.1	-2.2
2	2743.50	42.5 AV	54.0	-11.5	4.00 V	6	44.7	-2.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value.
5. The EUT was tested by a test tool (provided by manufacturer), please refer to section 3.3 for duty cycle spectrum plot.

Channel	TX Channel 30	Detector Function	Peak (PK)
Frequency Range	1GHz ~10GHz		Average (AV)

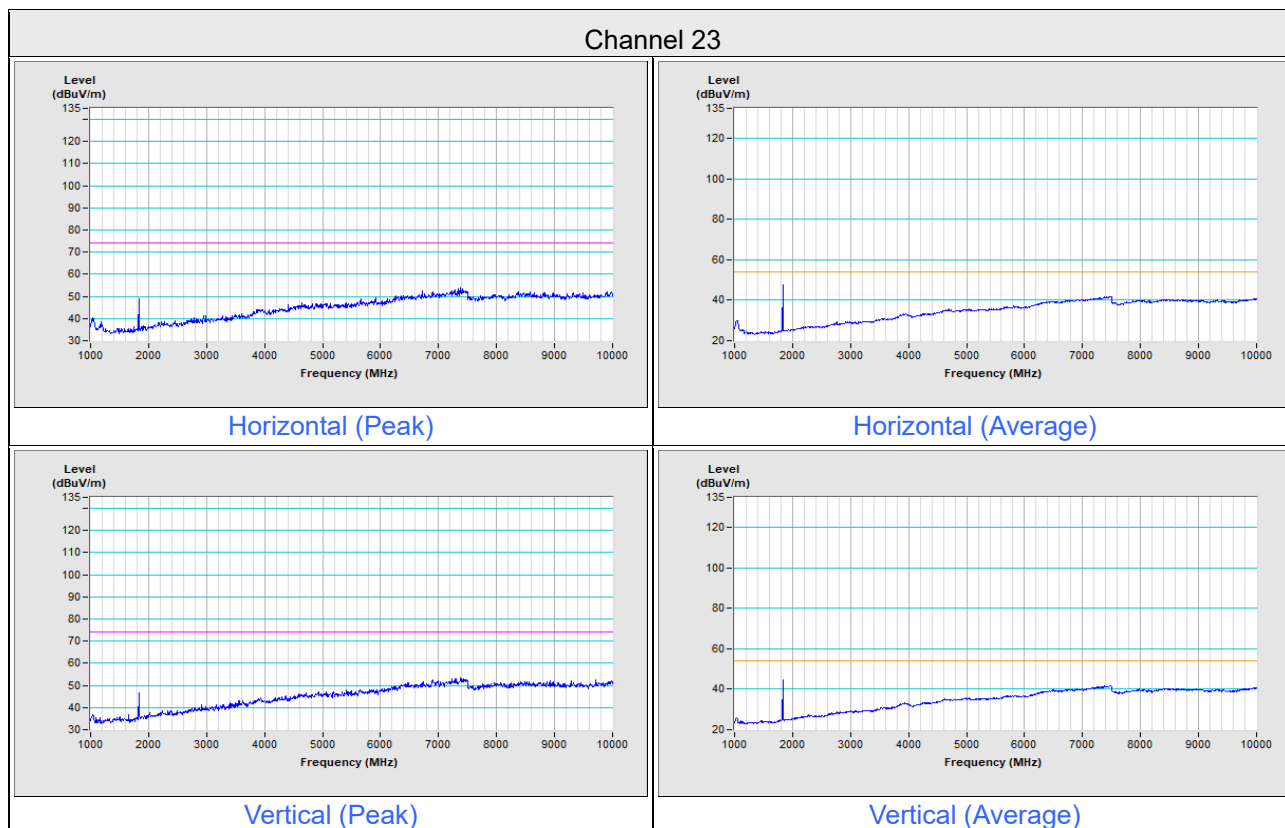
Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2779.50	50.4 PK	74.0	-23.6	3.94 H	351	52.5	-2.1
2	2779.50	43.8 AV	54.0	-10.2	3.94 H	351	45.9	-2.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2779.50	51.1 PK	74.0	-22.9	3.82 V	358	53.2	-2.1
2	2779.50	44.4 AV	54.0	-9.6	3.82 V	358	46.5	-2.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m).
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value.
5. The EUT was tested by a test tool (provided by manufacturer), please refer to section 3.3 for duty cycle spectrum plot.

Plot of other emissions:

Frequency Range	1 GHz ~ 10 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=20 Hz, DET=Peak
-----------------	----------------	-------------------------------	--



Notes:

1. For radiated emission test data, complete spectral plots shall be presented in the report only for the worst-case scenarios of each mode within each operating frequency band.
2. The frequency range 10 GHz ~ 18 GHz: After investigation, no any emissions were found to exist, therefore they are not recorded in this report.

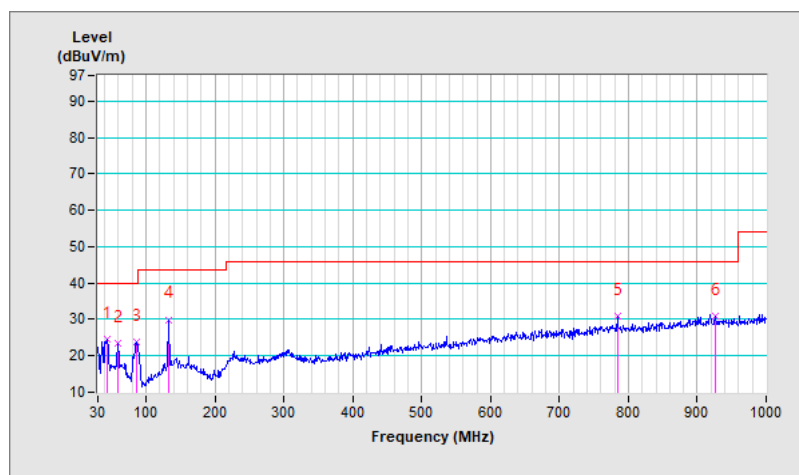
Below 1GHz Data:

Channel	TX Channel 0	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 1GHz		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	43.58	24.4 QP	40.0	-15.6	1.25 H	303	37.5	-13.1
2	59.10	23.5 QP	40.0	-16.5	1.25 H	13	37.0	-13.5
3	85.29	23.9 QP	40.0	-16.1	1.50 H	225	42.7	-18.8
4	132.82	30.0 QP	43.5	-13.5	1.00 H	256	43.8	-13.8
5	783.69	31.0 QP	46.0	-15.0	1.00 H	7	33.1	-2.1
6	926.28	31.0 QP	46.0	-15.0	1.50 H	133	31.3	-0.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

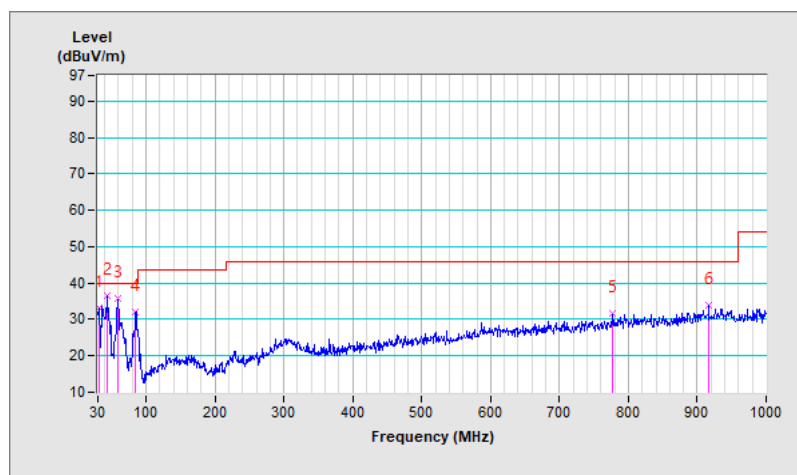


Channel	TX Channel 0	Detector Function	Quasi-Peak (QP)
Frequency Range	9kHz ~ 1GHz		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.97	33.3 QP	40.0	-6.7	1.25 V	204	47.7	-14.4
2	42.61	36.5 QP	40.0	-3.5	1.00 V	36	49.6	-13.1
3	59.10	35.7 QP	40.0	-4.3	1.25 V	294	49.2	-13.5
4	84.32	32.0 QP	40.0	-8.0	1.25 V	117	50.7	-18.7
5	776.90	31.5 QP	46.0	-14.5	1.50 V	67	33.7	-2.2
6	916.58	33.9 QP	46.0	-12.1	1.25 V	246	34.2	-0.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	2025/11/27	2026/11/26
RF signal cable Woken	5D-FB	Cable-cond1-01	2025/1/5	2026/1/4
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	2025/3/24	2026/3/23
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	2025/8/28	2026/8/27
Software ADT	BVADT_Cond_ V7.4.1.0	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1(Conduction 1).

4.2.3 Test Procedures

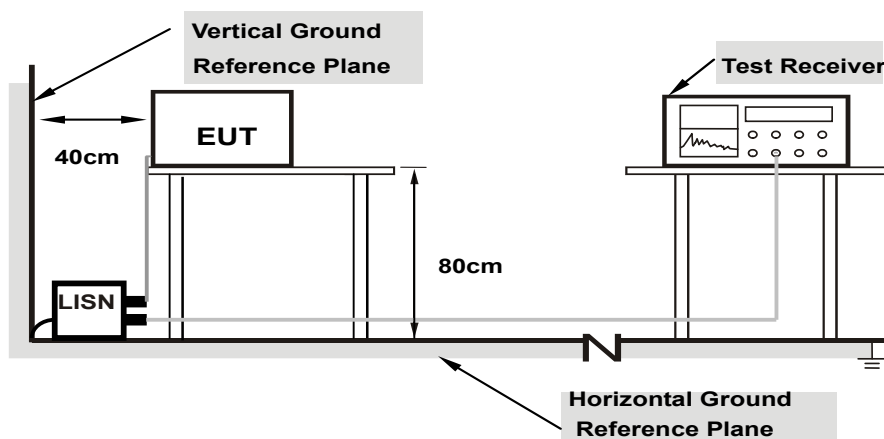
- Exploratory ac power-line conducted emission measurements: The EUT shall be operated on the mid channel and in the mode with highest output power unless the fundamental operates in the AC power-line emission test range then the EUT shall be operated in the range of typical modes of operation.
- The EUT was placed on a 0.8 meter to the top of table and placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Condition

Same as 4.1.6.

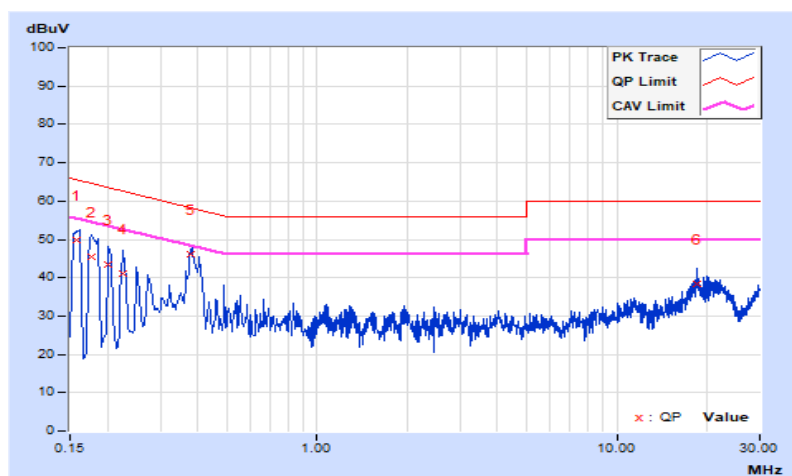
4.2.7 Test Results

Channel	TX Channel 0	Phase	Line (L)
Detector Function	Quasi-Peak (QP) / Average (AV)		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15728	9.68	39.99	16.57	49.67	26.25	65.61	55.61	-15.94	-29.36
2	0.17755	9.70	35.80	12.77	45.50	22.47	64.60	54.60	-19.10	-32.13
3	0.20200	9.71	33.80	10.94	43.51	20.65	63.53	53.53	-20.02	-32.88
4	0.22600	9.71	31.38	9.13	41.09	18.84	62.60	52.60	-21.51	-33.76
5	0.37818	9.72	36.36	24.65	46.08	34.37	58.32	48.32	-12.24	-13.95
6	18.53000	10.06	28.40	9.82	38.46	19.88	60.00	50.00	-21.54	-30.12

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

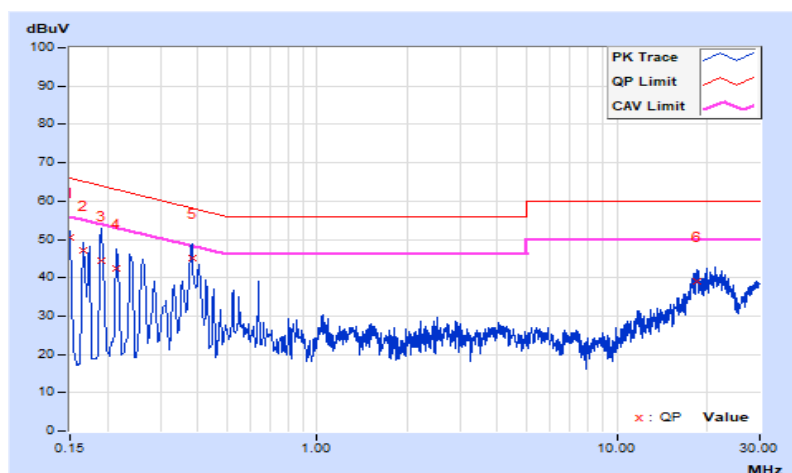


Channel	TX Channel 0	Phase	Neutral (N)
Detector Function	Quasi-Peak (QP) / Average (AV)		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.66	40.84	16.60	50.50	26.26	66.00	56.00	-15.50	-29.74
2	0.16600	9.66	37.35	13.38	47.01	23.04	65.16	55.16	-18.15	-32.12
3	0.19000	9.66	34.89	10.87	44.55	20.53	64.04	54.04	-19.49	-33.51
4	0.21400	9.66	32.81	8.98	42.47	18.64	63.05	53.05	-20.58	-34.41
5	0.38200	9.72	35.33	22.06	45.05	31.78	58.24	48.24	-13.19	-16.46
6	18.58200	10.25	28.77	9.83	39.02	20.08	60.00	50.00	-20.98	-29.92

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

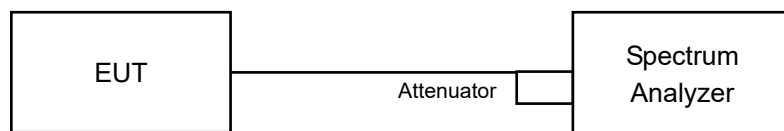


4.3 6dB Bandwidth Measurement

4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

4.3.2 Test Setup



4.3.3 Test Instruments

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Fixed Attenuator Woken	00800A1K01A-10	00800A1K01A-10-01	2025/5/23	2026/5/22
Signal & Spectrum Analyzer R&S	FSV3044	101504	2025/6/18	2026/6/17
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Oven room.

4.3.4 Test Procedure

- a. Set RBW = shall be in the range of 1% to 5% of the OBW but not less than 100 kHz.
- b. Set the VBW $\geq [3 \times \text{RBW}]$.
- c. Detector = peak.
- d. Trace mode = max-hold.
- e. Sweep = No faster than coupled (auto) time.
- f. Allow the trace to stabilize.
- g. Measure the maximum width of the emission by placing 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 “-6 dB down amplitude”. If a marker is below this “-6 dB down amplitude” value, then it shall be as close as possible to this value

4.3.5 Deviation from Test Standard

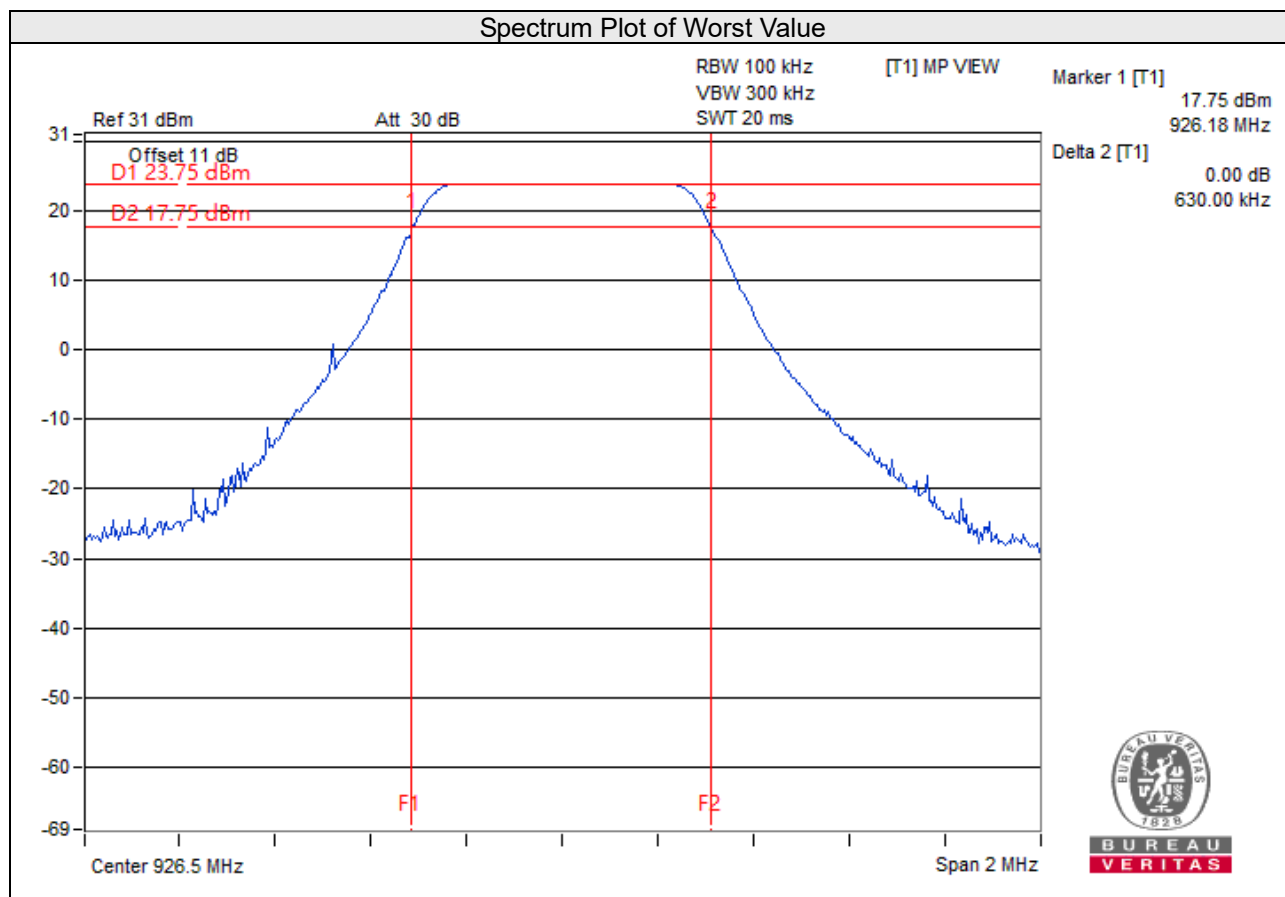
No deviation.

4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.3.7 Test Result

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
0	902.5	0.60	0.5	Pass
15	914.5	0.62	0.5	Pass
30	926.5	0.63	0.5	Pass

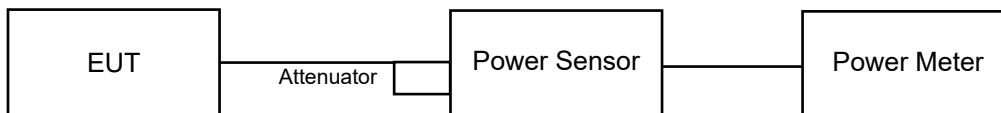


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 902-928 MHz bands: 1 Watt (30dBm)

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.3.3 to get information of above instrument.

4.4.4 Test Procedure

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.4.7 Test Results

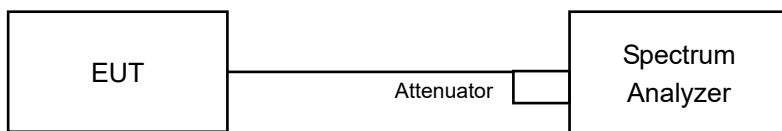
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Pass / Fail
0	902.5	308.319	24.89	30	Pass
15	914.5	296.483	24.72	30	Pass
30	926.5	289.734	24.62	30	Pass

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm in any 3 kHz band during any time interval of continuous transmission.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.3.3 to get information of above instrument.

4.5.4 Test Procedure

The following procedure is applicable when the EUT cannot be configured to transmit continuously (i.e., $D < 98\%$), when sweep triggering/signal gating cannot be used to measure only when the EUT is transmitting at its maximum power control level, and when the transmission duty cycle is constant (i.e., duty cycle variations are less than $\pm 2\%$):

- Measure the duty cycle (D) of the transmitter output signal.
- Set instrument center frequency to DTS channel center frequency.
- cSet span to > 1.5 times the OBW.
- Set RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- Set VBW $\geq [3 \times \text{RBW}]$.
- Detector = power averaging (rms) or sample detector (when rms not available).
- Ensure that the number of measurement points in the sweep $\geq [2 \times \text{span} / \text{RBW}]$.
- Sweep time = auto couple.
- Do not use sweep triggering; allow sweep to "free run."
- Employ trace averaging (rms) mode over a minimum of 100 traces.
- Use the peak marker function to determine the maximum amplitude level.
- Add $[10 \log (1 / D)]$, where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time.
- If measured value exceeds requirement specified by regulatory agency, then reduce RBW (but no less than 3 kHz) and repeat (note that this might require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

4.5.5 Deviation from Test Standard

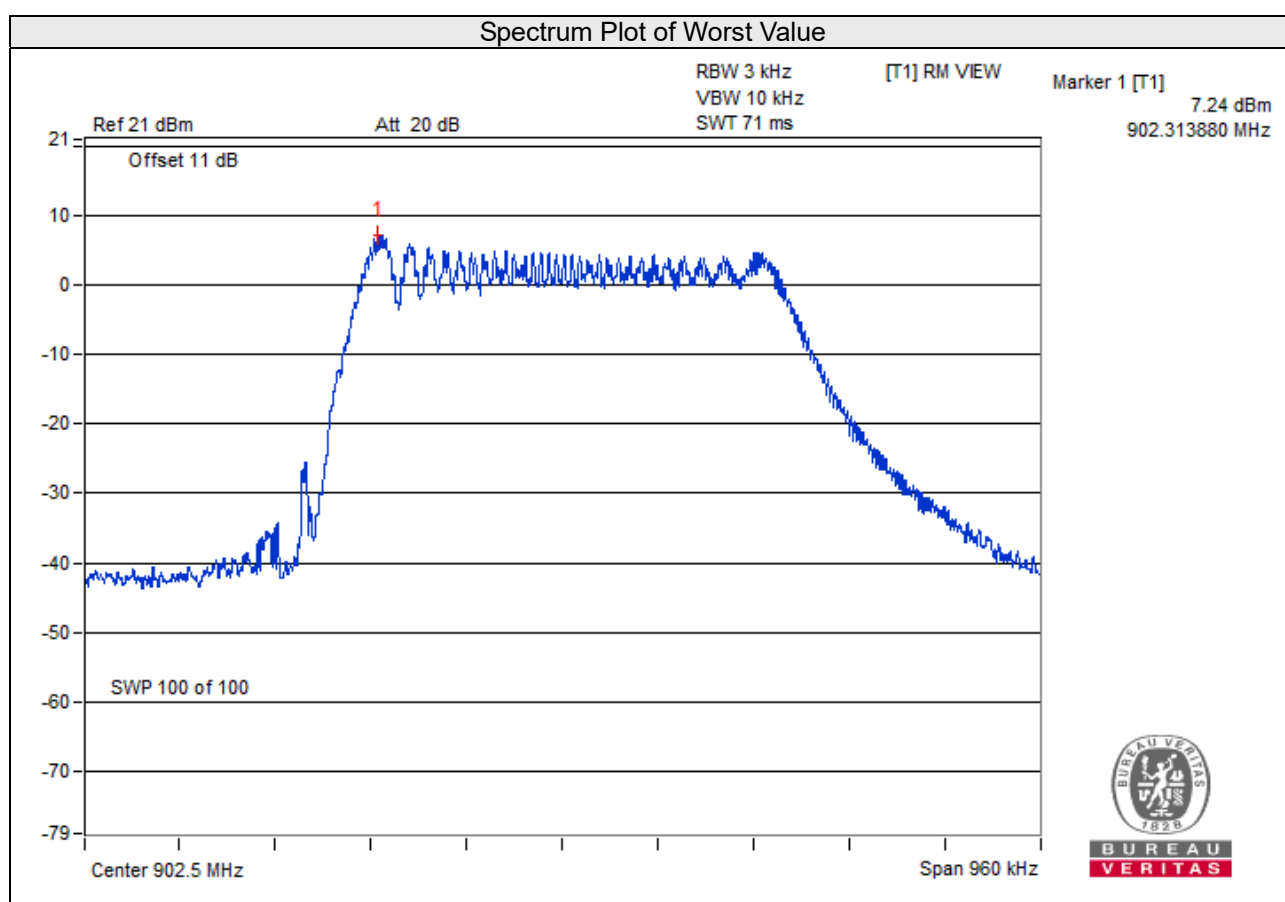
No deviation.

4.5.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.5.7 Test Results

Channel	Freq. (MHz)	PSD w/o Duty Factor (dBm/3kHz)	Duty Factor (dB)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
0	902.5	7.24	0.66	7.90	8	Pass
15	914.5	6.82	0.66	7.48	8	Pass
30	926.5	6.80	0.66	7.46	8	Pass

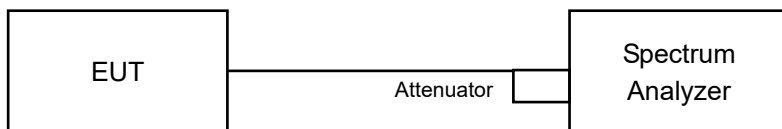


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out Of Band Emission Measurement

Below -30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.3.3 to get information of above instrument.

4.6.4 Test Procedure

Measurement Procedure REF

- Set instrument center frequency to DTS channel center frequency.
- Set the span to ≥ 1.5 times the DTS bandwidth.
- Set the RBW = 100 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 PSD level.

Note that the channel found to contain the maximum PSD level can be used to establish the reference level

Measurement Procedure OOBE

- 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
- Set the RBW = 100 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. 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.

4.6.5 Deviation from Test Standard

No deviation.

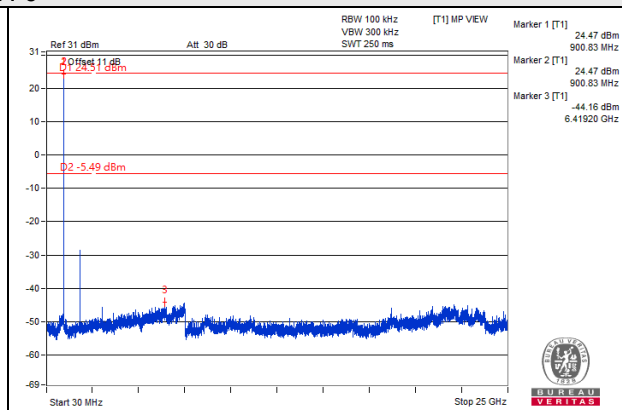
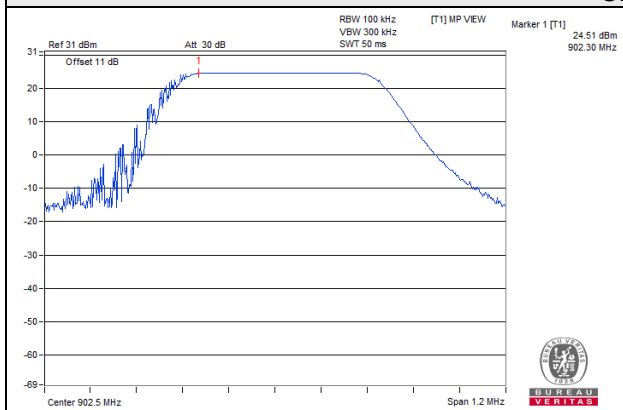
4.6.6 EUT Operating Condition

The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

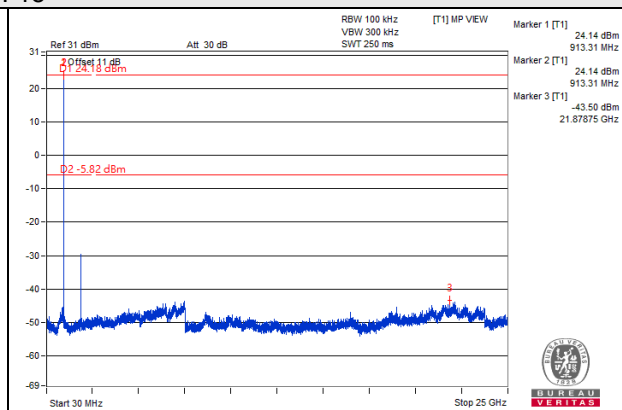
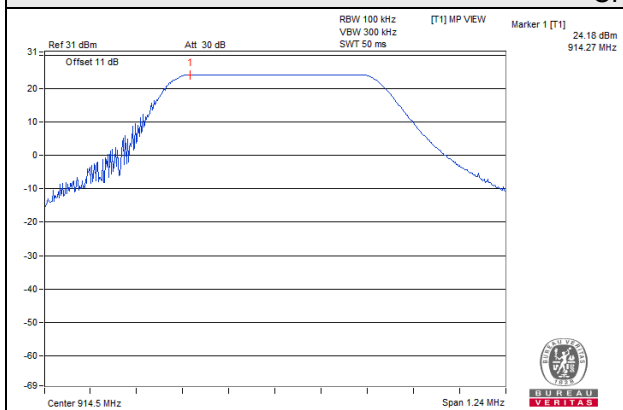
4.6.7 Test Results

The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

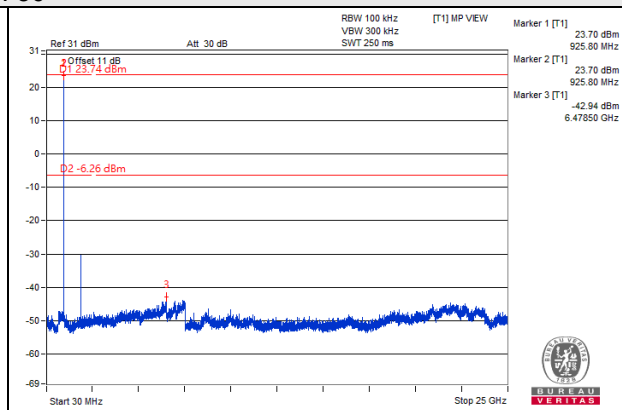
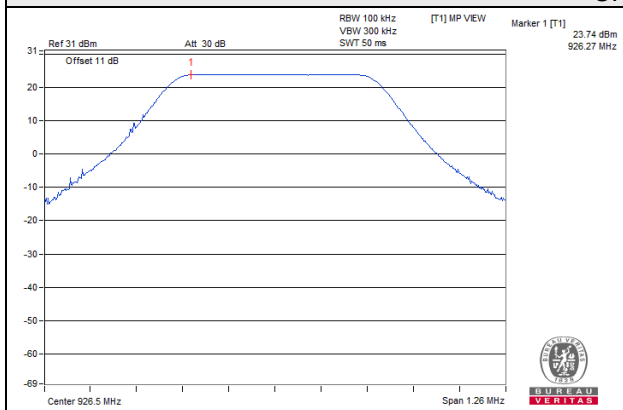
CH 0



CH 15



CH 30



5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

The address and road map of all our labs can be found in our web site also.

--- END ---