FCC Test Report

Report No.:	RFBDYS-WTW-P21091149 R1
FCC ID:	A8J-SP938BS
Test Model:	SP-938 BS
Series Model:	DuraFon Roam BU (refer to item 3.1 for more details)
Received Date:	Oct. 14, 2021
Test Date:	Oct. 28 ~ Nov. 10, 2021
Issued Date:	Jan. 20, 2022
Applicant:	EnGenius Technologies, Inc.
Address:	1580 Scenic Avenue, Costa Mesa, CA92626
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

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RFBDYS-WTW-P21091149	Original release	Dec. 27, 2021
RFBDYS-WTW-P21091149 R1	Revised channel spacing from 202kHz to 404kHz.	Jan. 20, 2022

1 Certificate of Conformity

Product:	Digital Long Range SIP Cordless Telephone
Brand:	EnGenius
Test Model:	SP-938 BS
Series Model:	DuraFon Roam BU (refer to item 3.1 for more details)
Sample Status:	Engineering sample
Applicant:	EnGenius Technologies, Inc.
Test Date:	Oct. 28 ~ Nov. 10, 2021
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10:2013

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 : Polly Chien , **Date:** Jan. 20, 2022

Polly Chien / Specialist

Approved by : Jeremy Lin , **Date:** Jan. 20, 2022

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 -3.76dB at 0.48190MHz.
15.247(a)(1) (i)	Number of Hopping Frequency Used	Pass	Meet the requirement of limit.
15.247(a)(1) (i)	Dwell Time on Each Channel	Pass	Meet the requirement of limit.
15.247(a)(1) (i)	1. Hopping Channel Separation 2. Spectrum Bandwidth of a Frequency Hopping Sequence Spread Spectrum System	Pass	Meet the requirement of limit.
15.247(b)(2)	Maximum Peak Output Power	Pass	Meet the requirement of limit.
15.205 & 209 & 15.247(d)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -9.1dB at 782.10 MHz.
15.247(d)	Antenna Port Emission	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is Reversed-thread TNC not a standard connector.

Note:

1. 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.
2. 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) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.79 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.00 dB
	30MHz ~ 200MHz	2.91 dB
	200MHz ~1000MHz	2.93 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	1.76 dB
	18GHz ~ 40GHz	1.77 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Digital Long Range SIP Cordless Telephone
Brand	EnGenius
Test Model	SP-938 BS
Series Model	DuraFon Roam BU
Model Difference	Refer to Note as below
Sample Status	Engineering sample
Power Supply Rating	12Vdc from adapter 54Vdc from PoE
Modulation Type	MSK
Channel Spacing	404 kHz
Operating Frequency	902.3839 ~ 927.4656 MHz
Number of Channel	50
Output Power	905.733mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Refer to Note
Cable Supplied	Refer to Note

Note:

1. All models are listed as below.

Brand	Model	Difference
EnGenius	SP-938 BS	All models are electrically identical, different model names are for marketing purpose.
	DuraFon Roam BU	

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
AC Adapter for Base	UMEC	UP0121D-12PA76	I/P: 100-240 Vac, 50-60 Hz, 0.4 A MAX O/P: 12 Vdc, 1 A DC Output Cable: 1.50 m cable w/o core attached on adapter
RJ45 LAN Cable for Base	WINKEY	CY-SZ-170611	50 cm

3. The EUT use following accessory devices. (Support unit)

Product	Brand	Model	Description
PoE	EnGenius	EPA5006GR	I/P: 100-240 Vac, 50-60 Hz, 0.8 A O/P: 54 Vdc, 0.6 A

4. The following antennas were provided to the EUT.

Antenna type	Connector	Brand	Model	Gain (dBi)
Dipole	Reversed-thread TNC	MASTER WAVE TECHNOLOGY CO., LTD.	98141ZTCX007	2

* The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.2 Description of Test Modes

50 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	902.383959	26	915.329342
2	902.788502	27	915.733885
3	903.193045	28	916.542971
4	903.597589	29	916.947514
5	904.406675	30	917.352058
6	904.811218	31	917.756601
7	905.215761	32	918.161144
8	905.620305	33	918.970231
9	906.024848	34	919.374774
10	906.833934	35	919.779317
11	907.238477	36	920.183860
12	907.643021	37	920.588403
13	908.047564	38	921.397490
14	908.452107	39	921.802033
15	909.261193	40	922.206576
16	909.665737	41	922.611119
17	910.070280	42	923.015663
18	910.474823	43	923.824749
19	910.879366	44	924.229292
20	911.688453	45	925.038379
21	912.092996	46	925.442922
22	912.497539	47	926.252008
23	912.902082	48	926.656551
24	914.115712	49	927.061095
25	914.924798	50	927.465638

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	EUT power from adpater
B	-	√	√	-	EUT power from PoE

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

Note:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane.**
2. Radiated emission test (below 1GHz) and power line conducted emission test items chosen the worst maximum power.
3. "-" means no effect.

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
A	1 to 50	1, 25, 50	MSK

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
A, B	1 to 50	1, 25, 50	MSK

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
A, B	1 to 50	1	MSK

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.

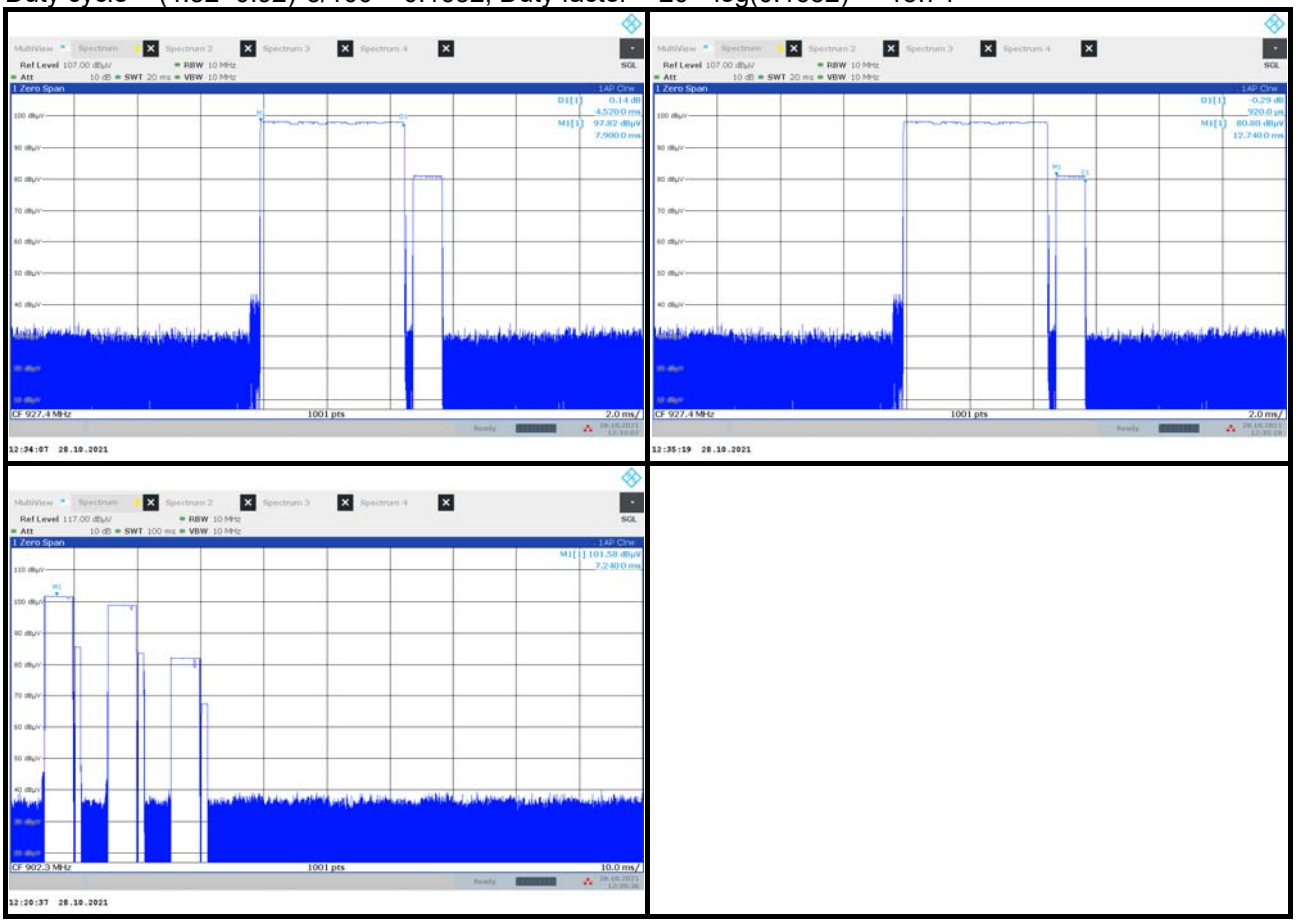
EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
A	1 to 50	1, 25, 50	MSK

Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	23 deg. C, 66% RH	120Vac, 60Hz	Titan Hsu
RE<1G	23 deg. C, 66% RH	120Vac, 60Hz	Titan Hsu
PLC	21 deg. C, 60% RH	120Vac, 60Hz	Tim Chen
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Gary Lin

3.3 Duty Cycle of Test Signal

Duty cycle = (4.52+0.92)*3/100 = 0.1632, Duty factor = 20 * log(0.1632) = -15.74



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.

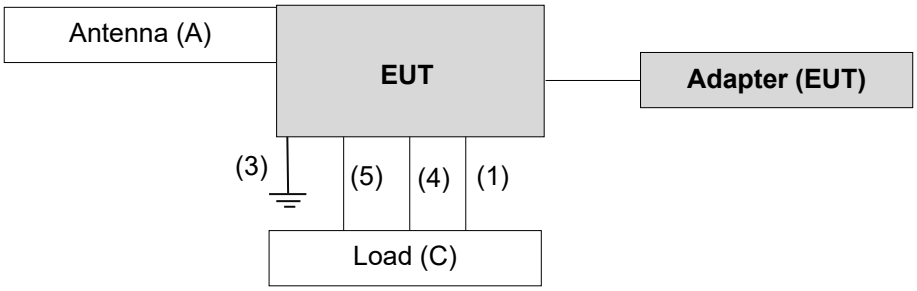
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Antenna	MASTER WAVE TECHNOLOGY CO., LTD.	98141ZTCX007	N/A	N/A	Provided by client
B.	PoE	EnGenius	EPA5006GR	N/A	N/A	Provided by client
C.	Load	N/A	N/A	N/A	N/A	-

Note: All power cords of the above support units are non-shielded (1.8m).

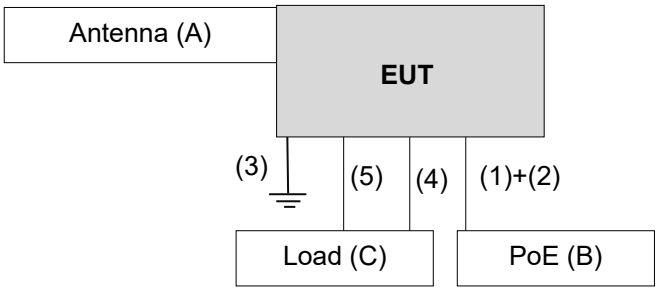
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN Cable	1	0.5	N	0	Accessory of the EUT
2.	LAN Cable	1	1.5	N	0	-
3.	GND Cable	1	1	N	0	Provided by client
4.	RJ11 Cable	1	1.83	N	0	Provided by client
5.	Console Cable	1	1.1	N	0	Provided by client

3.4.1 Configuration of System under Test

Mode A



Mode B



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:

Test standard:
FCC Part 15, Subpart C (15.247)
ANSI C63.10:2013

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 20dB 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
Test Receiver Rohde & Schwarz	N9038A	MY55420137	Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer KEYSIGHT	N9020B	MY60110440	Dec. 18, 2020	Dec. 17, 2021
BILOG Antenna SCHWARZBECK	VULB9168	1213	Nov. 04, 2020	Nov. 03, 2021
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	995	Nov. 22, 2020	Nov. 21, 2021
Loop Antenna TESEQ	HLA 6121	45745	Jul. 21, 2021	Jul. 20, 2022
Preamplifier EMCI	EMC330N	980782	Jan. 12, 2021	Jan. 11, 2022
Preamplifier EMCI	EMC118A45SE	980808	Jan. 12, 2021	Jan. 11, 2022
Preamplifier EMCI	EMC184045SE	980788	Jan. 12, 2021	Jan. 11, 2022
RF signal cable EMCI	EMC104-SM-SM-(9000+2000+1000)	201243+ 201231+ 210102	Jan. 12, 2021	Jan. 11, 2022
RF signal cable EMCI	EMCCFD400-NM-NM-(9000+300+500)	201236+ 201235+ 201233	Jan. 12, 2021	Jan. 11, 2022
RF signal cable EMCI	EMC101G-KM-KM-(5000+3000+2000)	201260+201257+201254	Jan. 12, 2021	Jan. 11, 2022
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower Max-Full	MFT-151SS-0.5T	NA	NA	NA
Turn Table Max-Full	MF-7802BS	NA	NA	NA
Turn Table Controller Max-Full	MF-7802BS	MF780208674	NA	NA
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	Jan. 19, 2021	Jan. 18, 2022
Wideband Power Sensor KEYSIGHT	N1923A	MY58020002	Jan. 11, 2021	Jan. 10, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSV40	100979	Mar. 29, 2021	Mar. 28, 2022

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 8.
3. Radiated emissions test date: Oct. 28, 2021.
4. Except for the radiated emissions test items, the test date of other items: Nov. 05, 2021.

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.

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 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

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 1GHz. For fundamental and harmonic signal measurement, according to ANSI C63.10 section 7.5, the average value = peak value + duty cycle correction factor. The duty cycle correction factor refer to Chapter 3.3 of this report.

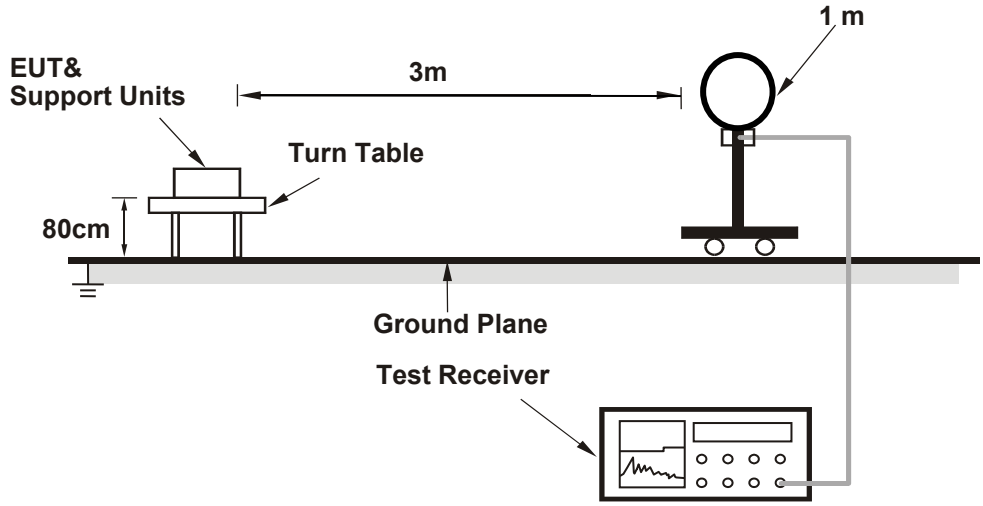
3. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

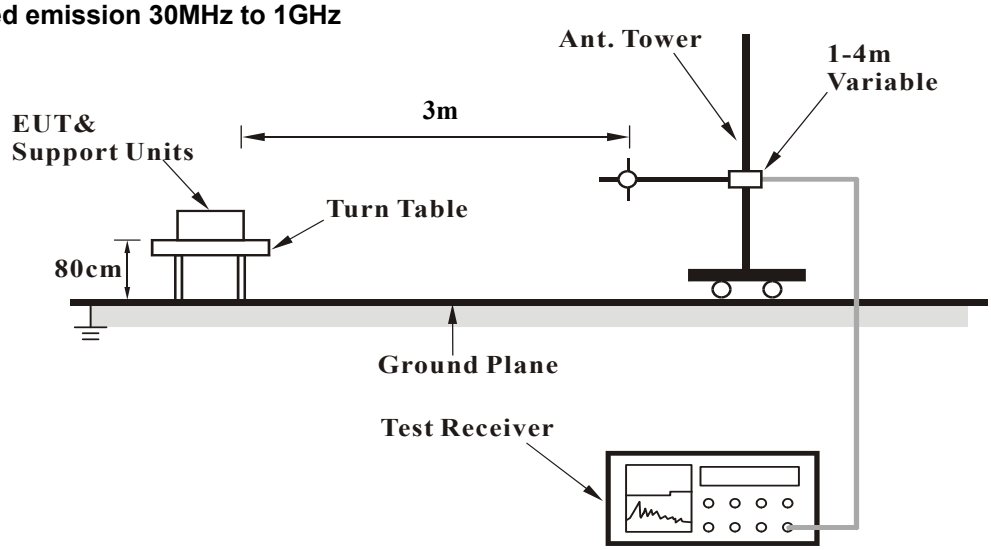
No deviation.

4.1.5 Test Setup

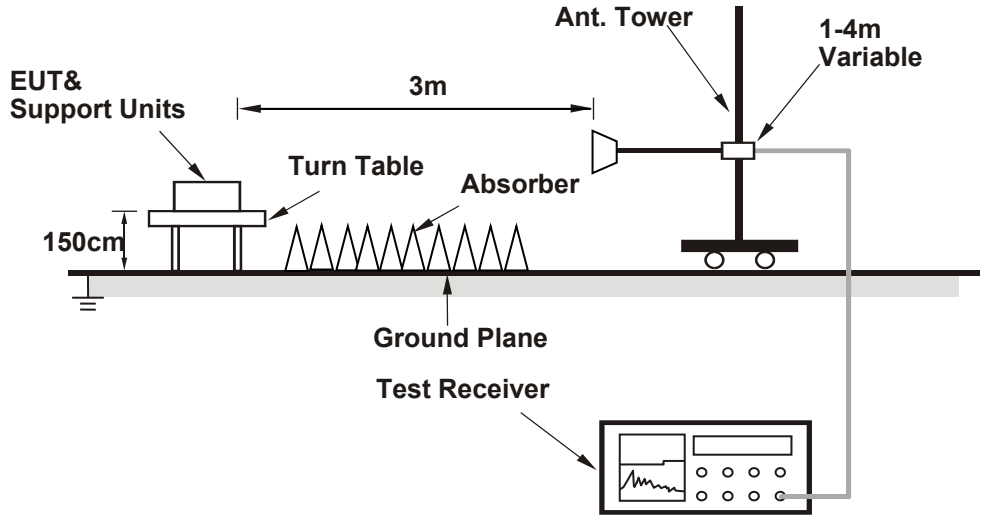
For Radiated emission below 30MHz



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

RF Mode	TX	Channel	CH 1：902.3839 MHz
Frequency Range	902MHz ~ 928MHz	Detector Function	Quasi-Peak (QP)

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	#902.0000	60.5 QP	91.4	-30.9	1.00	235	36.0	24.5
2	*902.3839	111.4 QP			1.00	235	86.9	24.5
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	#902.0000	72.3 QP	102.1	-29.8	1.14	162	47.8	24.5
2	*902.3839	122.1 QP			1.14	162	97.6	24.5

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX	Channel	CH 25：914.9247 MHz
Frequency Range	902MHz ~ 928MHz	Detector Function	Quasi-Peak (QP)

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	*914.9247	108.4 QP			1.00	236	83.5	24.9
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	*914.9247	121.4 QP			1.13	146	96.5	24.9

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX	Channel	CH 50：927.4656 MHz
Frequency Range	902MHz ~ 928MHz	Detector Function	Quasi-Peak (QP)

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	*927.4656	110.0 QP			1.00	238	84.9	25.1
2	#928.0000	43.0 QP	90.0	-47.0	1.00	238	17.9	25.1
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	*927.4656	121.2 QP			1.09	166	96.1	25.1
2	#928.0000	53.7 QP	101.2	-47.5	1.09	166	28.6	25.1

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. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Above 1GHz data:

RF Mode	TX	Channel	CH 1：902.3839 MHz
Frequency Range	1GHz ~ 10GHz	Detector Function	Peak (PK) 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	2707.1520	45.0 PK	74.0	-29.0	2.39 H	324	48.6	-3.6
2	2707.1520	29.3 AV	54.0	-24.7	2.39 H	324	32.9	-3.6
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	2707.1520	43.9 PK	74.0	-30.1	1.13 V	99	47.5	-3.6
2	2707.1520	28.2 AV	54.0	-25.8	1.13 V	99	31.8	-3.6

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. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX	Channel	CH 25：914.9247 MHz
Frequency Range	1GHz ~ 10GHz	Detector Function	Peak (PK) 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	2744.7741	43.7 PK	74.0	-30.3	1.61 H	308	47.1	-3.4
2	2744.7741	28.0 AV	54.0	-26.0	1.61 H	308	31.4	-3.4
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	2744.7741	44.1 PK	74.0	-29.9	1.02 V	121	47.5	-3.4
2	2744.7741	28.4 AV	54.0	-25.6	1.02 V	121	31.8	-3.4

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.
5. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX	Channel	CH 50：927.4656 MHz
Frequency Range	1GHz ~ 10GHz	Detector Function	Peak (PK) 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	2782.3968	43.7 PK	74.0	-30.3	2.27 H	318	46.9	-3.2
2	2782.3968	28.0 AV	54.0	-26.0	2.27 H	318	31.2	-3.2
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	2782.3968	44.4 PK	74.0	-29.6	1.00 V	124	47.6	-3.2
2	2782.3968	28.7 AV	54.0	-25.3	1.00 V	124	31.9	-3.2

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 radiated frequency is out of the restricted band.

Below 1GHz worst-case data:

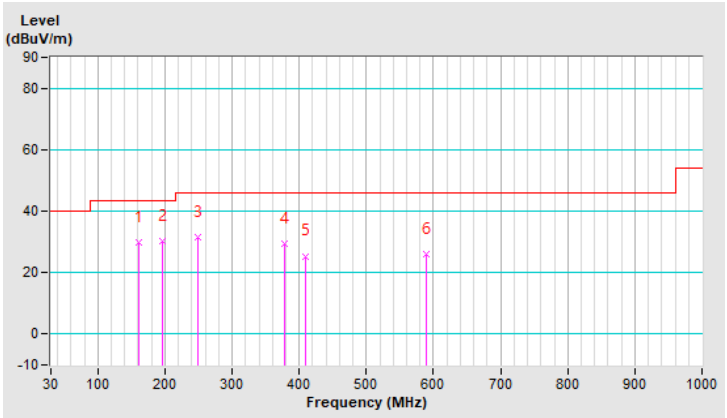
Mode A

RF Mode	TX	Channel	CH 1：902.3839 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	160.74	29.9 QP	43.5	-13.6	2.00 H	106	48.0	-18.1
2	195.88	30.3 QP	43.5	-13.2	1.51 H	244	52.0	-21.7
3	249.30	31.7 QP	46.0	-14.3	1.01 H	18	51.2	-19.5
4	377.23	29.6 QP	46.0	-16.4	1.01 H	66	45.3	-15.7
5	409.57	25.4 QP	46.0	-20.6	1.01 H	237	40.4	-15.0
6	589.51	26.0 QP	46.0	-20.0	1.01 H	18	36.7	-10.7

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

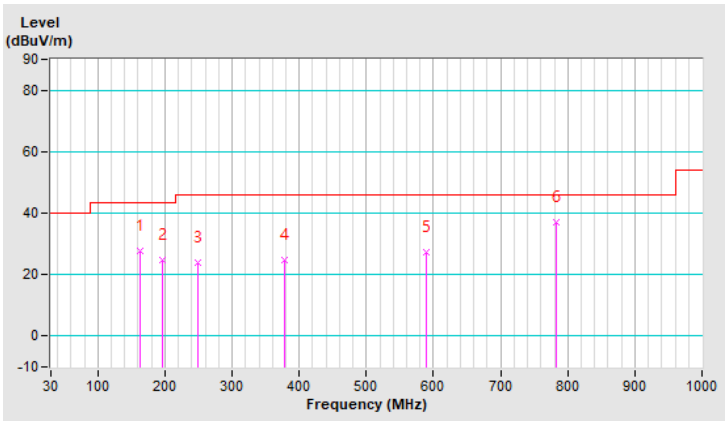


RF Mode	TX	Channel	CH 1：902.3839 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	163.55	27.7 QP	43.5	-15.8	1.01 V	48	45.9	-18.2
2	195.88	24.7 QP	43.5	-18.8	1.01 V	88	46.4	-21.7
3	249.30	23.7 QP	46.0	-22.3	1.49 V	275	43.2	-19.5
4	377.23	24.9 QP	46.0	-21.1	1.49 V	158	40.6	-15.7
5	589.51	27.5 QP	46.0	-18.5	1.01 V	104	38.2	-10.7
6	**782.10**	**36.9 QP**	**46.0**	**-9.1**	**1.01 V**	**355**	**44.6**	**-7.7**

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

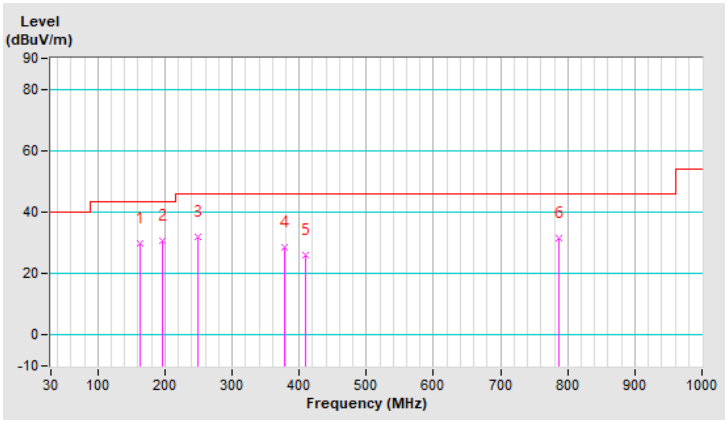


RF Mode	TX	Channel	CH 25：914.9247 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	163.55	29.9 QP	43.5	-13.6	1.99 H	136	48.1	-18.2
2	195.88	30.8 QP	43.5	-12.7	1.49 H	272	52.5	-21.7
3	249.30	31.9 QP	46.0	-14.1	1.00 H	8	51.4	-19.5
4	377.23	28.5 QP	46.0	-17.5	1.00 H	194	44.2	-15.7
5	409.57	26.0 QP	46.0	-20.0	1.00 H	248	41.0	-15.0
6	786.32	31.6 QP	46.0	-14.4	1.00 H	301	39.2	-7.6

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

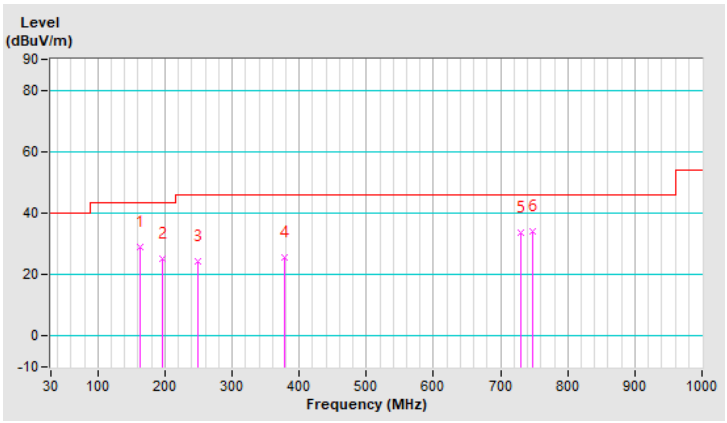


RF Mode	TX	Channel	CH 25：914.9247 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	163.55	28.9 QP	43.5	-14.6	1.01 V	17	47.1	-18.2
2	195.88	25.1 QP	43.5	-18.4	1.01 V	104	46.8	-21.7
3	249.30	24.2 QP	46.0	-21.8	1.51 V	276	43.7	-19.5
4	377.23	25.4 QP	46.0	-20.6	1.51 V	161	41.1	-15.7
5	730.09	33.5 QP	46.0	-12.5	2.00 V	18	41.9	-8.4
6	746.96	33.9 QP	46.0	-12.1	2.00 V	18	42.0	-8.1

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

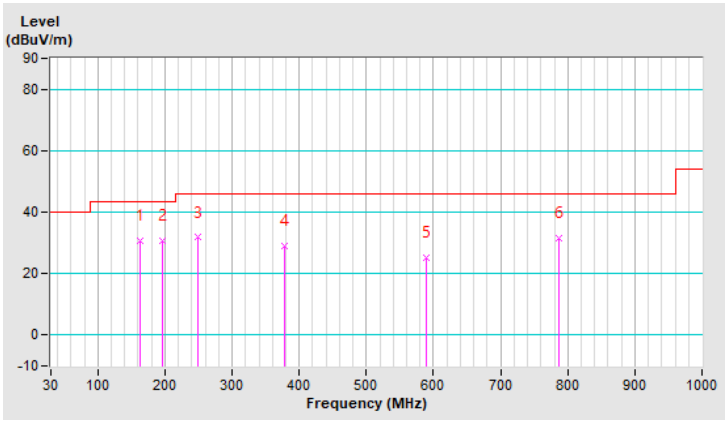


RF Mode	TX	Channel	CH 50：927.4656 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	163.55	30.8 QP	43.5	-12.7	1.51 H	136	49.0	-18.2
2	195.88	30.8 QP	43.5	-12.7	1.51 H	278	52.5	-21.7
3	249.30	31.7 QP	46.0	-14.3	1.01 H	9	51.2	-19.5
4	377.23	28.9 QP	46.0	-17.1	1.01 H	73	44.6	-15.7
5	589.51	25.3 QP	46.0	-20.7	1.51 H	2	36.0	-10.7
6	786.32	31.6 QP	46.0	-14.4	1.01 H	301	39.2	-7.6

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

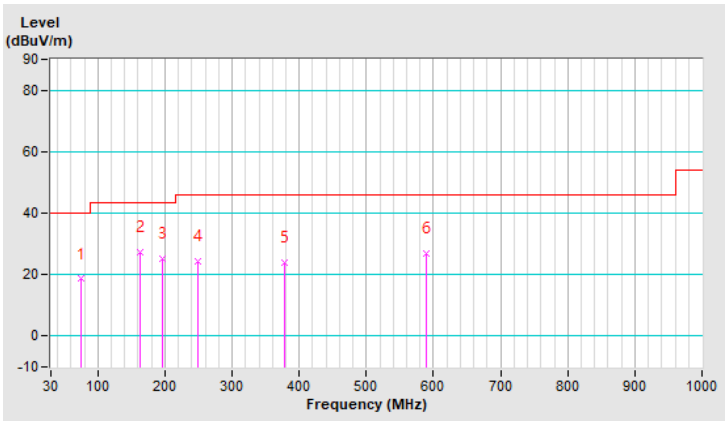


RF Mode	TX	Channel	CH 50：927.4656 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	74.99	18.6 QP	40.0	-21.4	1.00 V	293	40.4	-21.8
2	163.55	27.5 QP	43.5	-16.0	1.50 V	187	45.7	-18.2
3	195.88	25.2 QP	43.5	-18.3	1.00 V	80	46.9	-21.7
4	249.30	24.2 QP	46.0	-21.8	1.99 V	261	43.7	-19.5
5	377.23	24.1 QP	46.0	-21.9	1.00 V	165	39.8	-15.7
6	589.51	26.7 QP	46.0	-19.3	1.00 V	98	37.4	-10.7

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



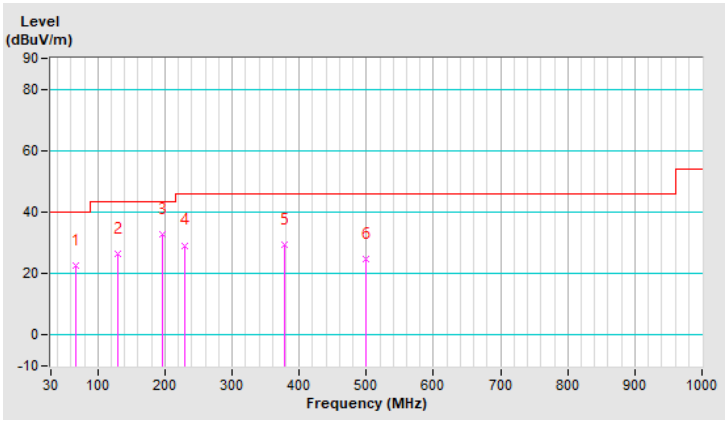
Mode B

RF Mode	TX	Channel	CH 1：902.3839 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	67.96	22.8 QP	40.0	-17.2	2.00 H	139	42.9	-20.1
2	129.81	26.6 QP	43.5	-16.9	1.51 H	89	46.1	-19.5
3	195.88	32.9 QP	43.5	-10.6	1.51 H	169	54.6	-21.7
4	229.62	29.2 QP	46.0	-16.8	1.51 H	172	50.0	-20.8
5	377.23	29.5 QP	46.0	-16.5	1.00 H	71	45.2	-15.7
6	499.54	24.8 QP	46.0	-21.2	2.00 H	191	37.7	-12.9

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

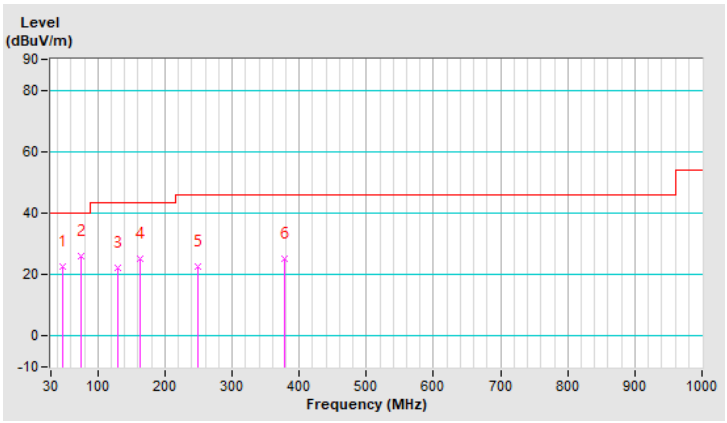


RF Mode	TX	Channel	CH 1：902.3839 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	48.28	22.6 QP	40.0	-17.4	1.49 V	43	40.7	-18.1
2	74.99	25.9 QP	40.0	-14.1	1.00 V	228	47.7	-21.8
3	129.81	22.1 QP	43.5	-21.4	1.00 V	254	41.6	-19.5
4	163.55	25.0 QP	43.5	-18.5	1.00 V	184	43.2	-18.2
5	249.30	22.5 QP	46.0	-23.5	1.49 V	307	42.0	-19.5
6	377.23	25.2 QP	46.0	-20.8	1.00 V	190	40.9	-15.7

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

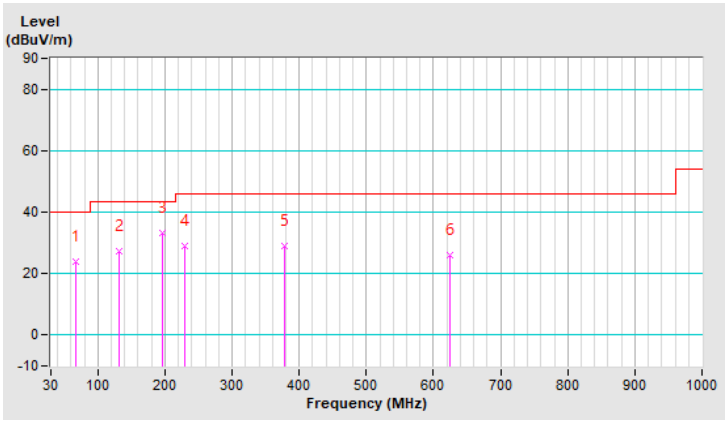


RF Mode	TX	Channel	CH 25：914.9247 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	67.96	24.1 QP	40.0	-15.9	1.49 H	139	44.2	-20.1
2	131.22	27.1 QP	43.5	-16.4	1.49 H	93	46.5	-19.4
3	195.88	33.1 QP	43.5	-10.4	1.49 H	153	54.8	-21.7
4	229.62	29.0 QP	46.0	-17.0	1.49 H	176	49.8	-20.8
5	377.23	28.9 QP	46.0	-17.1	1.00 H	50	44.6	-15.7
6	624.65	25.9 QP	46.0	-20.1	1.49 H	280	36.0	-10.1

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

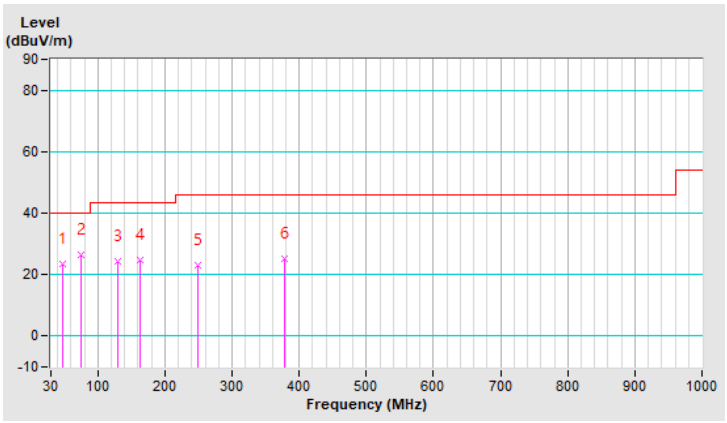


RF Mode	TX	Channel	CH 25：914.9247 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	48.28	23.4 QP	40.0	-16.6	1.01 V	359	41.5	-18.1
2	74.99	26.6 QP	40.0	-13.4	1.01 V	10	48.4	-21.8
3	129.81	24.2 QP	43.5	-19.3	1.01 V	203	43.7	-19.5
4	163.55	24.6 QP	43.5	-18.9	1.01 V	192	42.8	-18.2
5	249.30	23.0 QP	46.0	-23.0	1.51 V	315	42.5	-19.5
6	377.23	25.1 QP	46.0	-20.9	1.01 V	179	40.8	-15.7

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

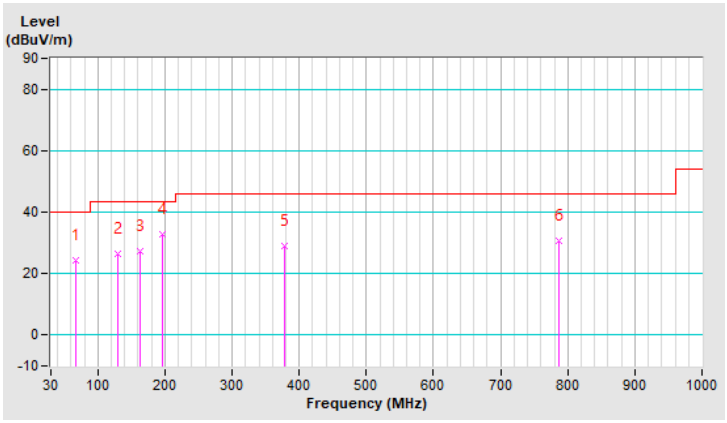


RF Mode	TX	Channel	CH 50：927.4656 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	67.96	24.4 QP	40.0	-15.6	1.99 H	157	44.5	-20.1
2	129.81	26.6 QP	43.5	-16.9	1.99 H	91	46.1	-19.5
3	163.55	27.5 QP	43.5	-16.0	1.99 H	102	45.7	-18.2
4	195.88	32.9 QP	43.5	-10.6	1.49 H	158	54.6	-21.7
5	377.23	29.1 QP	46.0	-16.9	1.00 H	61	44.8	-15.7
6	786.32	30.6 QP	46.0	-15.4	1.00 H	296	38.2	-7.6

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

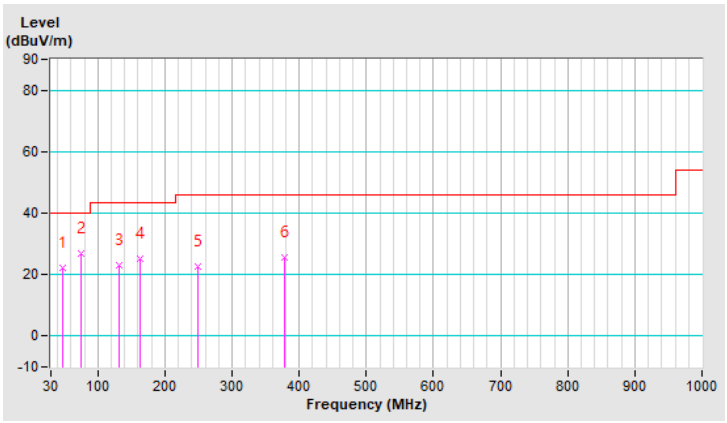


RF Mode	TX	Channel	CH 50：927.4656 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	48.28	22.3 QP	40.0	-17.7	1.01 V	18	40.4	-18.1
2	74.99	26.9 QP	40.0	-13.1	1.01 V	18	48.7	-21.8
3	131.22	23.2 QP	43.5	-20.3	1.01 V	230	42.6	-19.4
4	163.55	25.2 QP	43.5	-18.3	1.01 V	164	43.4	-18.2
5	249.30	22.7 QP	46.0	-23.3	1.51 V	313	42.2	-19.5
6	377.23	25.6 QP	46.0	-20.4	1.01 V	182	41.3	-15.7

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 of frequency range 30MHz ~ 1000MHz.
4. Margin value = Emission Level – Limit value.
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be 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	ESR3	102783	Dec. 21, 2020	Dec. 20, 2021
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2021	Sep. 03, 2022
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 28, 2021	Jan. 27, 2022
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ENV216	101196	Apr. 26, 2021	Apr. 25, 2022
Software ADT	BV ADT_Cond_ V7.3.7.4	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 2 (Conduction 2).
3. The VCCI Site Registration No. is C-20407.
4. Test Date: Nov. 10, 2021.

4.2.3 Test Procedures

a. The EUT was 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/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

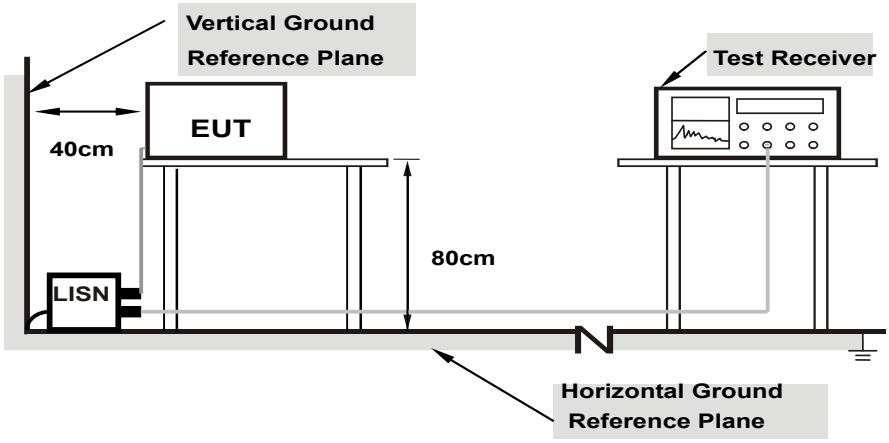
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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 Conditions

Same as 4.1.6.

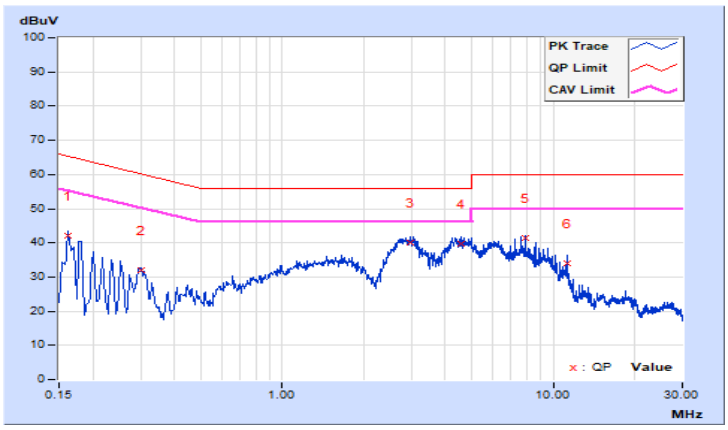
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	CH 1：902.3839 MHz	Mode	A

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16190	10.13	32.03	15.65	42.16	25.78	65.37	55.37	-23.21	-29.59
2	0.29992	10.18	21.82	15.49	32.00	25.67	60.25	50.25	-28.25	-24.58
3	2.95400	10.37	29.72	21.65	40.09	32.02	56.00	46.00	-15.91	-13.98
4	4.56200	10.40	29.30	20.95	39.70	31.35	56.00	46.00	-16.30	-14.65
5	7.92200	10.46	30.91	27.86	41.37	38.32	60.00	50.00	-18.63	-11.68
6	11.22600	10.52	23.55	20.04	34.07	30.56	60.00	50.00	-25.93	-19.44

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.

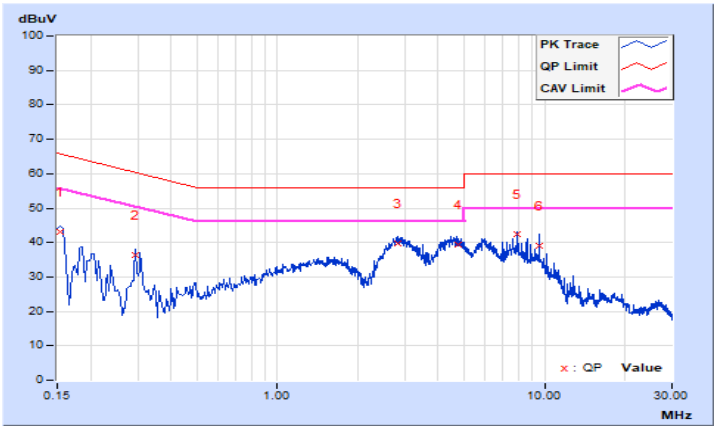


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	CH 1：902.3839 MHz	Mode	A

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	10.14	33.03	17.82	43.17	27.96	65.78	55.78	-22.61	-27.82
2	0.29400	10.20	26.02	14.88	36.22	25.08	60.41	50.41	-24.19	-25.33
3	2.81000	10.37	29.26	22.10	39.63	32.47	56.00	46.00	-16.37	-13.53
4	4.73000	10.43	29.01	20.75	39.44	31.18	56.00	46.00	-16.56	-14.82
5	7.92200	10.52	31.85	29.14	42.37	39.66	60.00	50.00	-17.63	-10.34
6	9.57800	10.57	28.51	21.19	39.08	31.76	60.00	50.00	-20.92	-18.24

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.

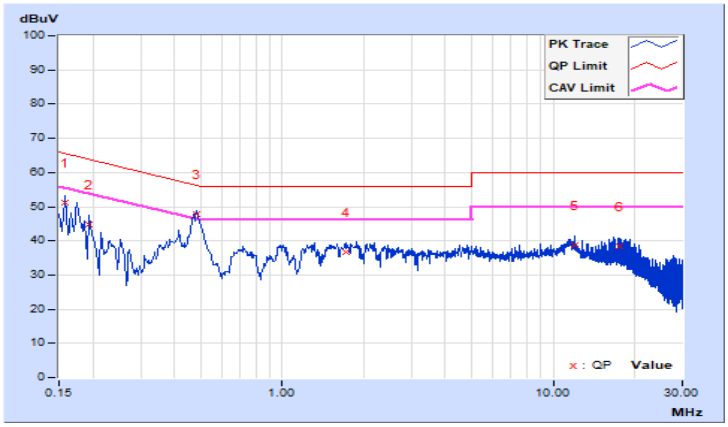


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	CH 1：902.3839 MHz	Mode	B

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15800	10.12	40.99	27.42	51.11	37.54	65.57	55.57	-14.46	-18.03
2	0.19400	10.15	34.49	20.27	44.64	30.42	63.86	53.86	-19.22	-23.44
3	**0.48190**	**10.23**	**37.61**	**32.32**	**47.84**	**42.55**	**56.31**	**46.31**	**-8.47**	**-3.76**
4	1.71122	10.34	26.21	21.65	36.55	31.99	56.00	46.00	-19.45	-14.01
5	12.03000	10.53	28.17	23.19	38.70	33.72	60.00	50.00	-21.30	-16.28
6	17.54600	10.64	27.77	24.34	38.41	34.98	60.00	50.00	-21.59	-15.02

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.

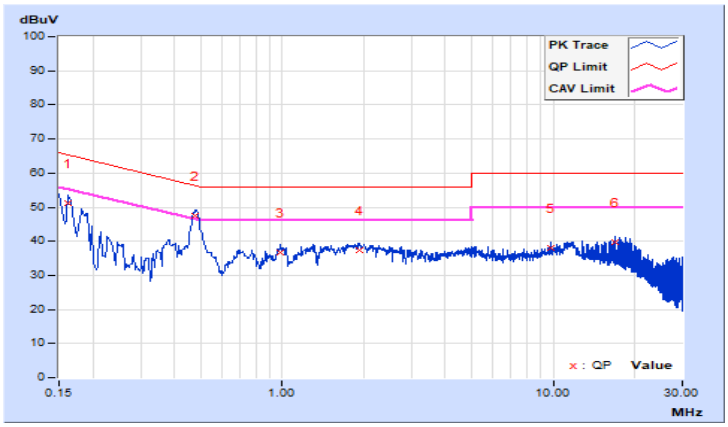


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Channel	CH 1：902.3839 MHz	Mode	B

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16148	10.15	40.90	26.23	51.05	36.38	65.39	55.39	-14.34	-19.01
2	0.47810	10.25	37.33	30.99	47.58	41.24	56.37	46.37	-8.79	-5.13
3	0.98600	10.29	26.48	22.10	36.77	32.39	56.00	46.00	-19.23	-13.61
4	1.93000	10.35	26.88	19.21	37.23	29.56	56.00	46.00	-18.77	-16.44
5	9.77800	10.57	27.46	20.04	38.03	30.61	60.00	50.00	-21.97	-19.39
6	17.04200	10.78	28.94	26.52	39.72	37.30	60.00	50.00	-20.28	-12.70

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 Number of Hopping Frequency Used

4.3.1 Limits of Hopping Frequency Used Measurement

The 20 dB bandwidth of the hopping channel is less than 250 kHz, at least 50 channels frequencies, and should be equally spaced.

4.3.2 Test Setup

4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.

b. Turn on the EUT and connect its antenna terminal to measurement 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.

c. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.

d. Set the SA on View mode and then plot the result on SA screen.

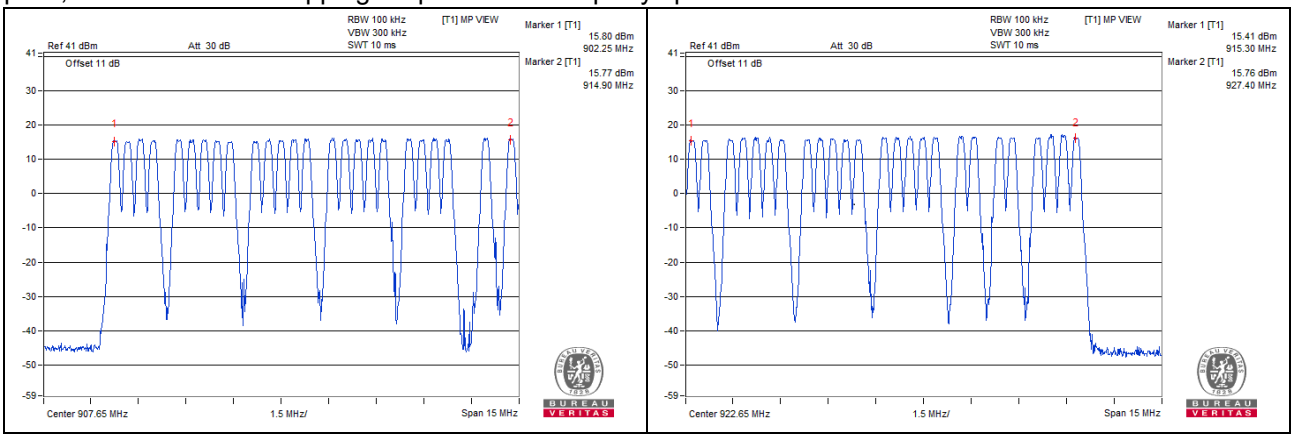
e. Repeat above procedures until all frequencies measured were complete.

4.3.5 Deviation fromTest Standard

No deviation.

4.3.6 Test Results

There are 50 hopping frequencies in the hopping mode. Please refer to next page for the test result. On the plots, it shows that the hopping frequencies are equally spaced.



4.4 Dwell Time on Each Channel

4.4.1 Limits of Dwell Time on Each Channel Measurement

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 less than 250 kHz)

4.4.2 Test Setup

4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedures

a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement 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.
c. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
d. Measure the time duration of one transmission on the measured frequency. And then plot the result with ime difference of this time duration.
e. Repeat above procedures until all different time-slot modes have been completed.

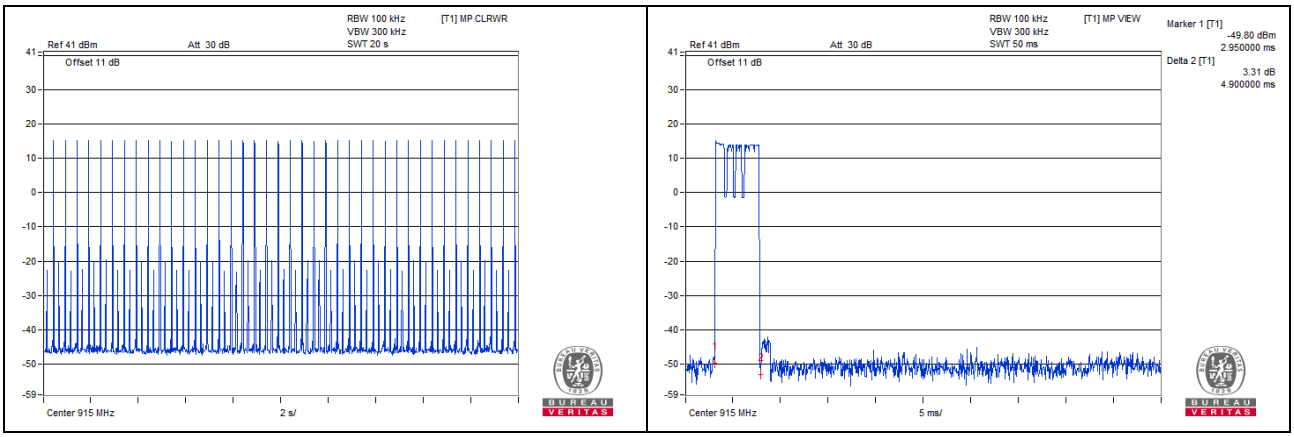
4.4.5 Deviation from Test Standard

No deviation.

4.4.6 Test Results

Number of transmission in a period	Length of transmission time (msec)	Result (msec)	Limit (msec)
40 time	4.90	196.00	400

Note: Test plots of the transmitting time slot are shown as below.



4.5 Channel Bandwidth

4.5.1 Limits of Channel Bandwidth Measurement

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

4.5.2 Test Setup

4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
d. Repeat above procedures until all frequencies measured were complete.

4.5.5 Deviation from Test Standard

No deviation.

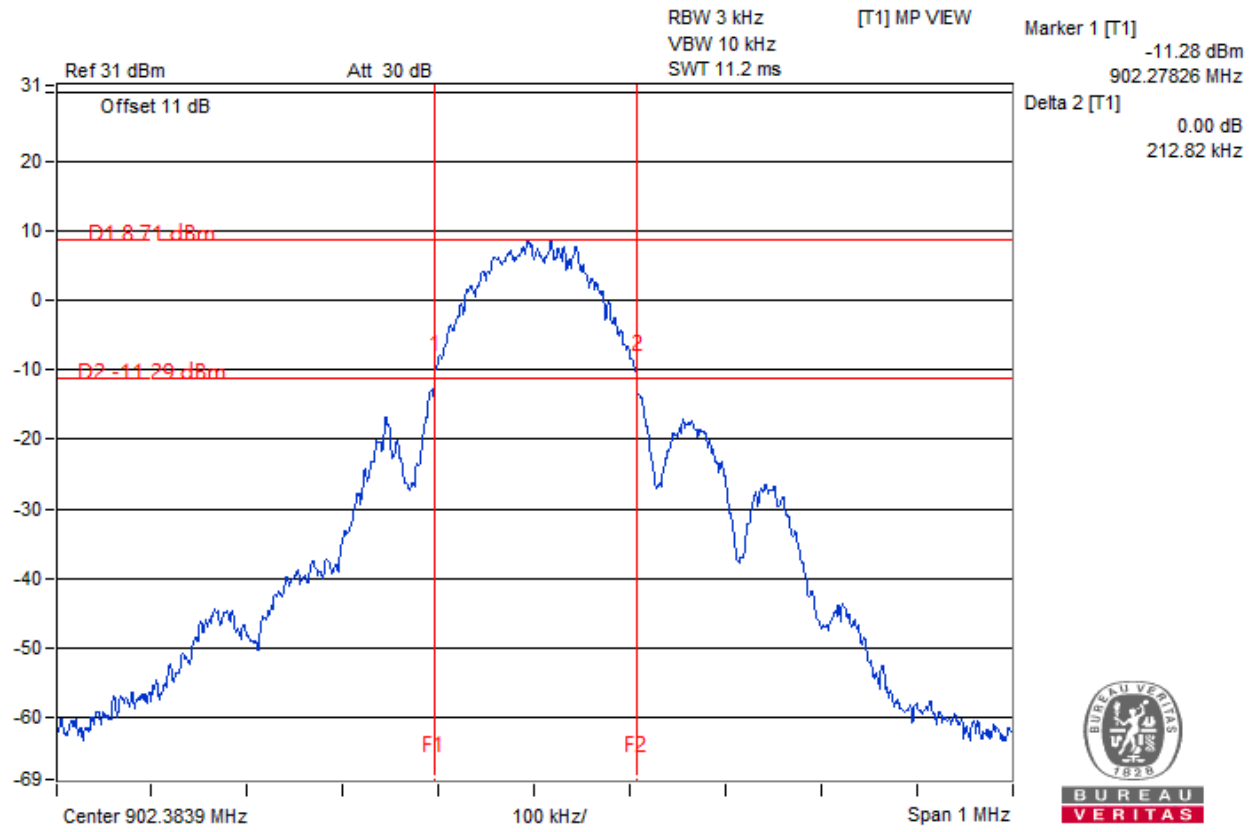
4.5.6 EUT Operating Condition

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	Frequency (MHz)	20dB Bandwidth (MHz)	Limit (MHz)
1	902.3839	0.21282	0.50
25	914.9247	0.20938	0.50
50	927.4656	0.21281	0.50

Spectrum Plot of Worst Value



4.6 Hopping Channel Separation

4.6.1 Limits of Hopping Channel Separation Measurement

At least 25kHz or 20dB hopping channel bandwidth (whichever is greater).

4.6.2 Test Setup

4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

Measurement Procedure REF

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
c. By using the MaxHold function record the separation of two adjacent channels.
d. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
e. Repeat above procedures until all frequencies measured were complete.

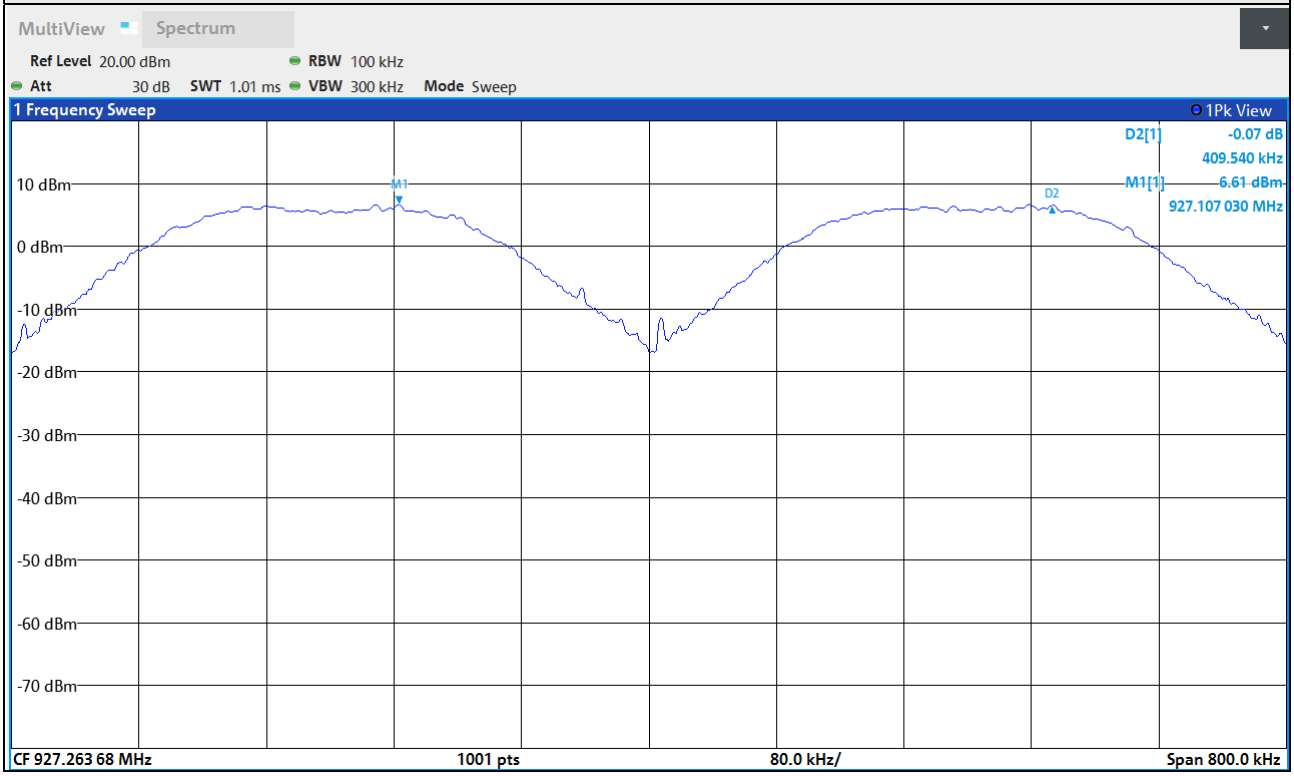
4.6.5 Deviation from Test Standard

No deviation.

4.6.6 Test Results

Channel	Frequency (MHz)	Adjacent Channel Separation (MHz)	Minimum Limit (MHz)	Pass / Fail
1	902.3839	0.40999	0.21282	Pass
25	914.9247	0.40759	0.20938	Pass
50	927.4656	0.40954	0.21281	Pass

Spectrum Plot of Worst Value

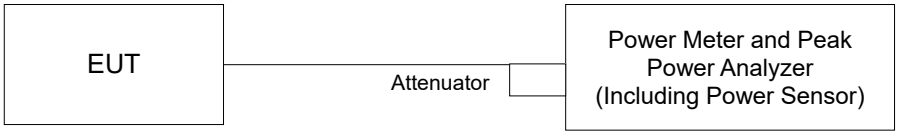


4.7 Maximum Output Power

4.7.1 Limits of Maximum Output Power Measurement

For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

For Peak Power
A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

For Average Power
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.

4.7.5 Deviation fromTest Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

For Peak Power

Channel	Frequency (MHz)	Output Power (mW)	Output Power (dBm)	Power Limit (dBm)	Pass / Fail
1	902.3839	**905.733**	29.57	30.00	Pass
25	914.9247	827.942	29.18	30.00	Pass
50	927.4656	783.430	28.94	30.00	Pass

For Average Power

Channel	Frequency (MHz)	Output Power (mW)	Output Power (dBm)
1	902.3839	857.038	29.33
25	914.9247	785.236	28.95
50	927.4656	744.732	28.72

4.8 Conducted Out of Band Emission Measurement

4.8.1 Limits Of Conducted Out Of Band Emission Measurement

Below –20dB of the highest emission level of operating band (in 100kHz RBW).

4.8.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.8.3 Test Procedure

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

4.8.4 Deviation from Test Standard

No deviation.

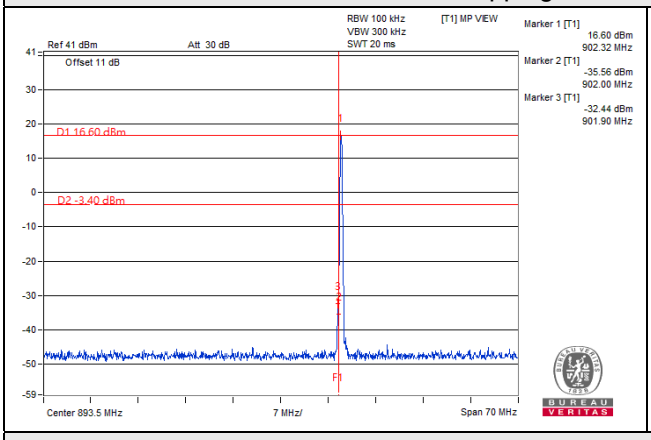
4.8.5 EUT Operating Condition

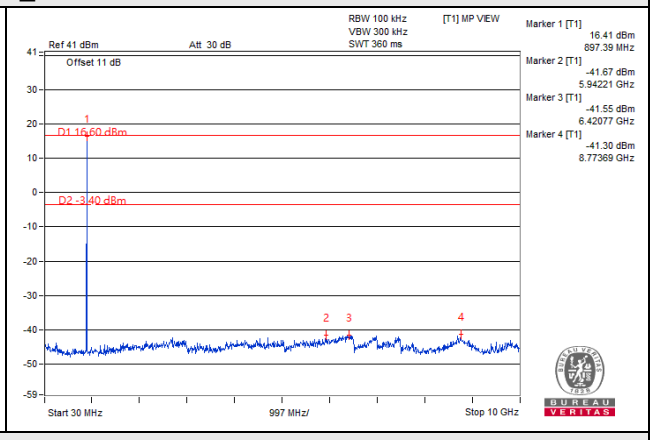
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.8.6 Test Results

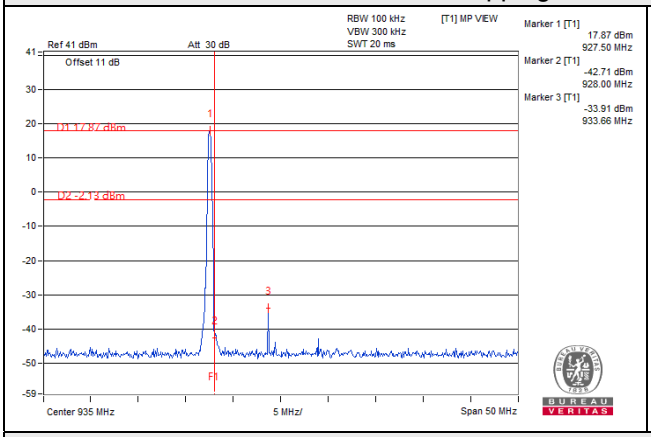
The spectrum plots are attached on the following images. D1 line indicates the highest level, D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

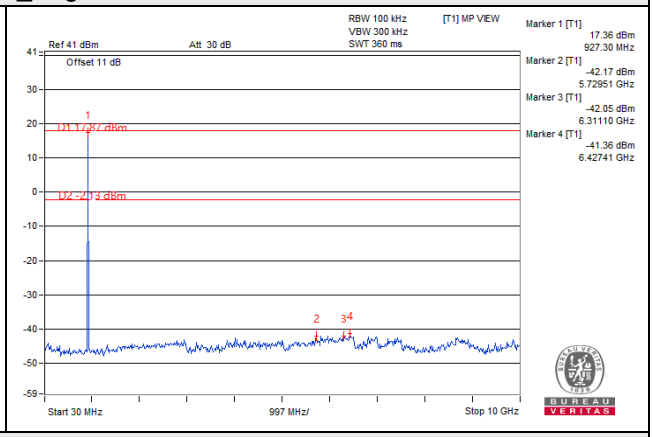
Hopping disabled_ Low Channel



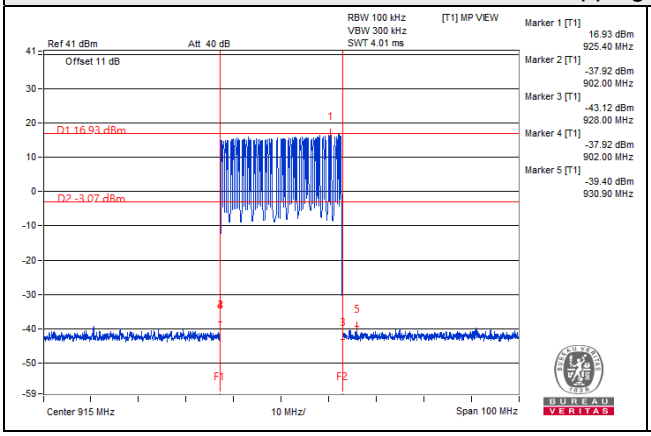


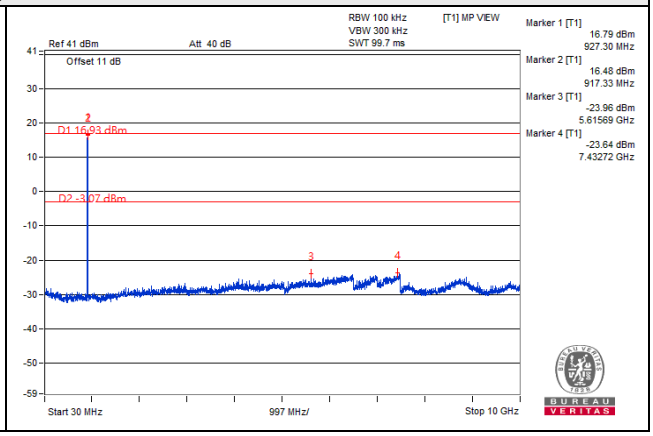
Hopping disabled_ High Channel





Hopping enabled





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:

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Web Site: www.bureauveritas-adt.com

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

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