FCC Test Report

Report No.:	RFBCKS-WTW-P25020718-1
FCC ID:	2AAAS-CP09
Test Model:	CP09
Received Date:	2025/2/27
Test Date:	2025/3/31 ~ 2025/4/2
Issued Date:	2025/4/10
Applicant:	Vivint, Inc.
Address:	3401 N. Ashton Blvd., Lehi, UT 84043 USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Testing Laboratory
2022

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Release Control Record

Issue No.	Description	Date Issued
RFBCKS-WTW-P25020718-1	Original release	2025/4/10

1 Certificate of Conformity

Product:	Security Hub
Brand:	Vivint
Test Model:	CP09
Sample Status:	Engineering sample
Applicant:	Vivint, Inc.
Test Date:	2025/3/31 ~ 2025/4/2
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 : _____ , **Date:** 2025/4/10

Claire Kuan / Specialist

Approved by : _____ , **Date:** 2025/4/10

Wen Yu / Assistant Manager

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 -9.10 dB at 0.37266 MHz MHz.
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is4.6 dB at 764.27 MHz.
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) (±)
RF Output Power	-	1.1 dB
Power Spectral Density	-	1.3 dB
6 dB Bandwidth	-	1050.00 Hz
Conducted Out of Band Emissions	9 kHz ~ 40 GHz	2.79 dB
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	1.9 dB
Radiated Emissions up to 1 GHz	30 MHz ~ 1 GHz	5.4 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	5.0 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Security Hub
Brand	Vivint
Test Model	CP09
Sample Status	Engineering sample
Power Supply Rating	12Vdc from adapter or 3.8Vdc from battery
Modulation Type	DSSS OQPSK
Operating Frequency	912 MHz, 920 MHz
Transfer Rate	100 kbps
Number of Channel	2
Output Power	54.325 mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	Refer to note
Cable Supplied	Refer to note

Note:

1. The EUT uses following accessories.

Item	Brand	Model	Specification	P/N
AC Adapter 1	ZB-Power	ZB-A120020A-09	AC Input : 100-240V, 50/60Hz, 0.6A DC Output : 12V, 2A DC Output Cable : 1.52m, unshielded,w/o core	-
Bettery	Shanghai BYD Co., Ltd.	BAT-600004-001	Power Rating : Norminal Voltage: 3.80V Min Capacity: 1630mAh 6.2Wh Typ Capacity: 1662mAh 6.3Wh Maximum Charge Voltage: 4.35V	17470852-00
RJ 45 Cable	-	-	Signal Line : 1m, unshielded, w/o core	-

2. The EUT contains certified LTE module (FCC ID: XMR2020BG95M1).

3. Simultaneously transmission condition.

Condition	Technology
1	WWAN + Z-wave
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.	

4. The antenna information is listed as below.

Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type
2.1	908 MHz	PIFA	NA
2.05	916 MHz	PIFA	NA

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

3.2 Description of Test Modes

2 channels are provided to this EUT:

Channel	Freq. (MHz)
1	912
3	920

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

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	Operating Frequency	Modulation Type
-	1	912 MHz	DSSS OQPSK
-	3	920 MHz	DSSS OQPSK

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
-	1	912 MHz	DSSS OQPSK
-	3	920 MHz	DSSS OQPSK

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
-	3	920 MHz	DSSS OQPSK

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.

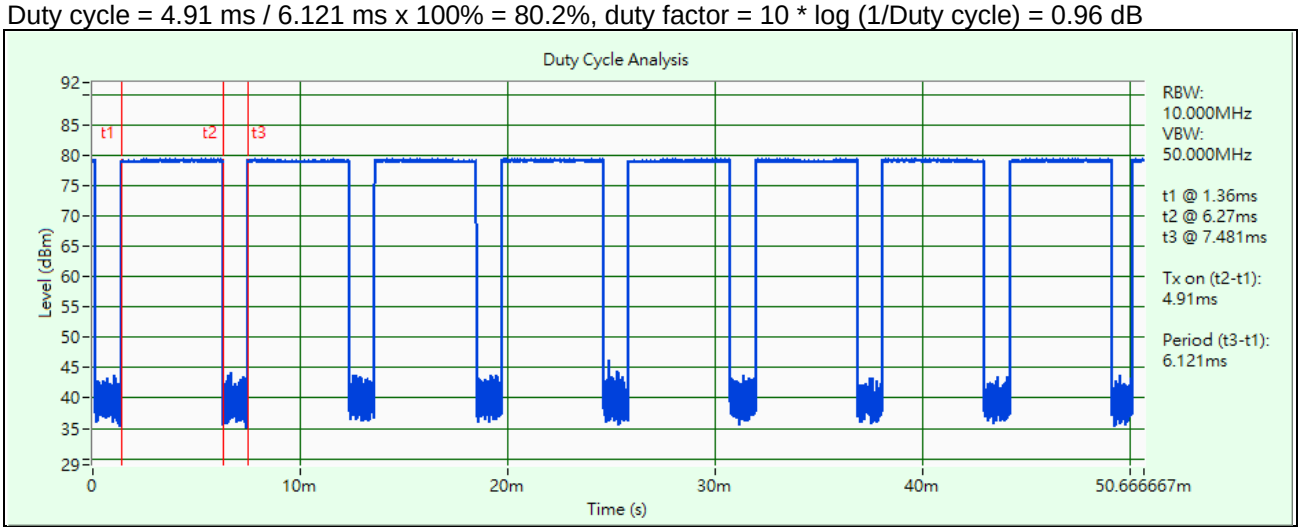
EUT Configure Mode	Available Channel	Tested Channel	Modulation Type
-	1	912 MHz	DSSS OQPSK
-	3	920 MHz	DSSS OQPSK

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	23 deg. C, 67% RH	120Vac, 60Hz	Louis Yang
RE<1G	24 deg. C, 71% RH	120Vac, 60Hz	Louis Yang
PLC	24 deg. C, 73% RH	120Vac, 60Hz	Louis Yang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Dolly Chung

3.3 Duty Cycle of Test Signal

Duty cycle = 4.91 ms / 6.121 ms x 100% = 80.2%, duty factor = 10 * log (1/Duty cycle) = 0.96 dB



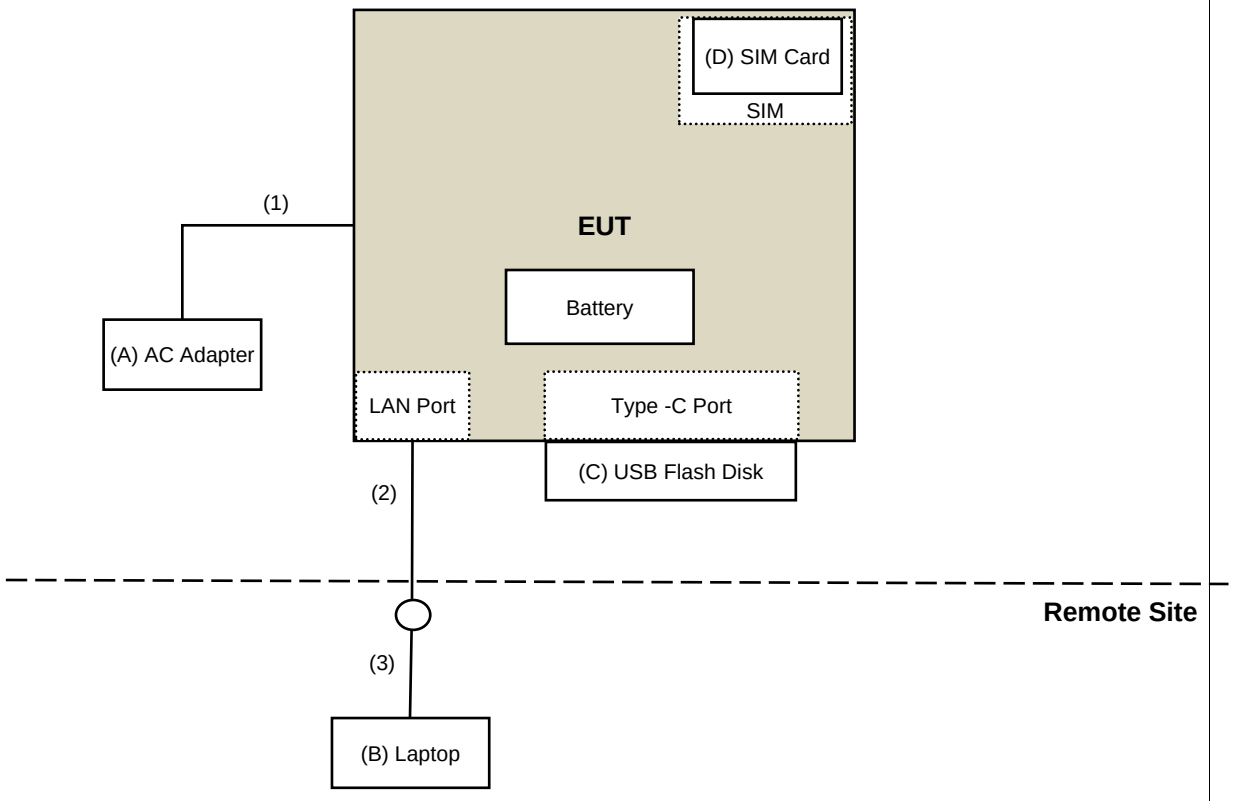
3.4 Description of Support Units

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	AC Adapter	ZB-Power	ZB-A120020A-09	NA	NA	Supplied by applicant
B	Laptop	Dell	P92G	BM6Q4P2	NA	Provided by Lab
C	USB Flash Disk	Sandisk	Ultra Go	NA	NA	Provided by Lab
D	SIM Card	R&S	CRT-Z3	NA	NA	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	1.52	No	0	Supplied by applicant
2	RJ-45 Cable	1	1	No	0	Supplied by applicant
3	RJ-45 Cable	1	10	No	0	Provided by Lab

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:

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

Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-361	2024/10/8	2025/10/7
Fix tool for Boresight antenna tower BV	FBA-01	FBA_SIP01	N/A	N/A
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	2025/2/8	2026/2/7
Loop Antenna TESEQ	HLA 6121	63620	2024/10/17	2025/10/16
MXE EMI Receiver Agilent	N9038A	MY50010156	2024/6/5	2025/6/4
Preamplifier EMCI	EMC330N	980852	2025/2/8	2026/2/7
	EMC001340	980142	2025/2/17	2026/2/16
RF Coaxial Cable PEWC	8D	001	2025/2/8	2026/2/7
		966-3-2	2025/2/8	2026/2/7
		966-3-3	2025/2/8	2026/2/7
Software	ADT_Radiated_V8.7.08	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 966 Chamber No. 3.
3. Tested Date: 2025/3/28 ~ 2025/4/2

Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	N/A	N/A
Fix tool for Boresight antenna tower BV	FBA-01	FBA_SIP01	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-406	2024/11/10	2025/11/9
MXE EMI Receiver Agilent	N9038A	MY50010156	2024/6/5	2025/6/4
Preamplifier EMCI	EMC12630SE	980384	2025/1/14	2026/1/13
RF Coaxial Cable EMCI	EMC104-SM-SM-1500	180504	2025/1/18	2026/1/17
	EMC104-SM-SM-2000	180601	2025/1/18	2026/1/17
	EMC104-SM-SM-6000	210201	2025/1/18	2026/1/17
Software	ADT_Radiated_V8.7.08	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 966 Chamber No. 3.
3. Tested Date: 2025/4/1

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:

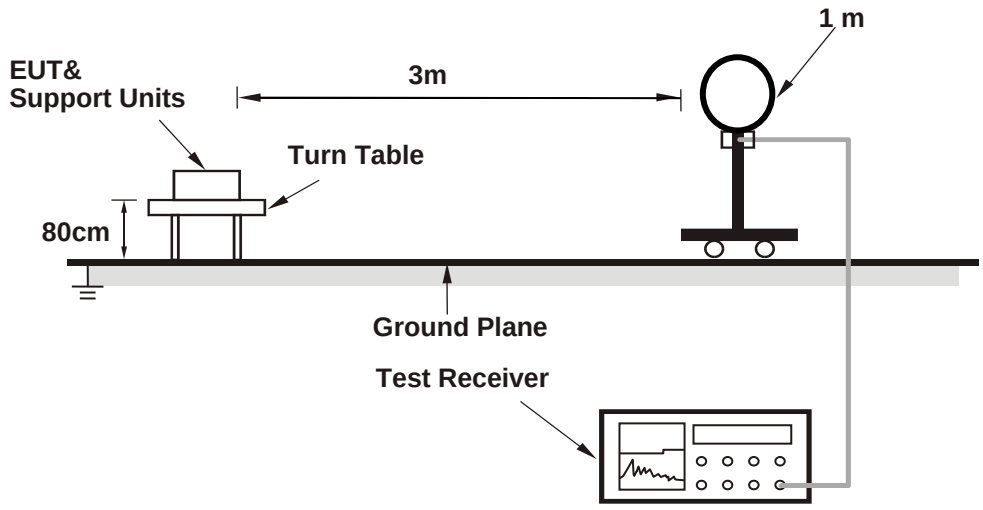
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz. (RBW = 1MHz, VBW = 1kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

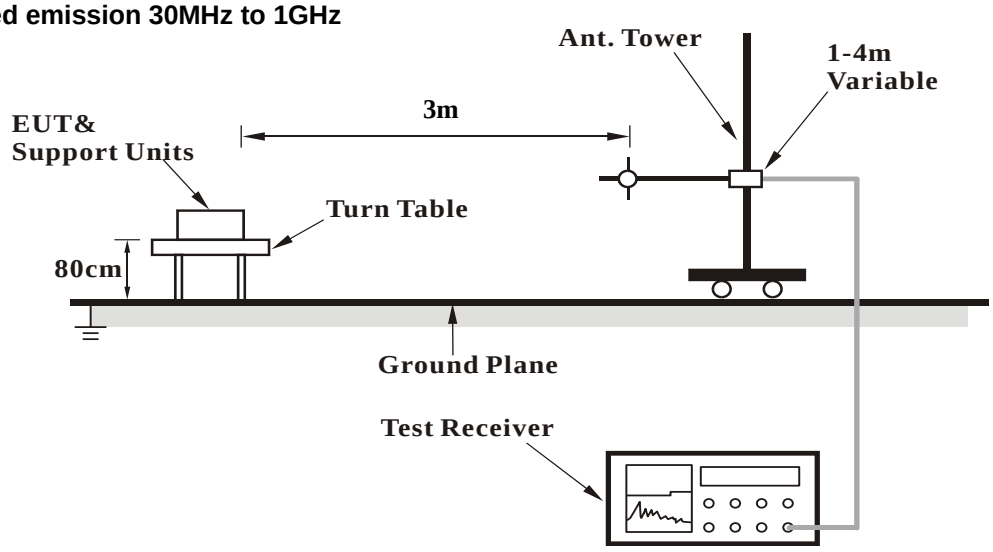
No deviation.

4.1.5 Test Setup

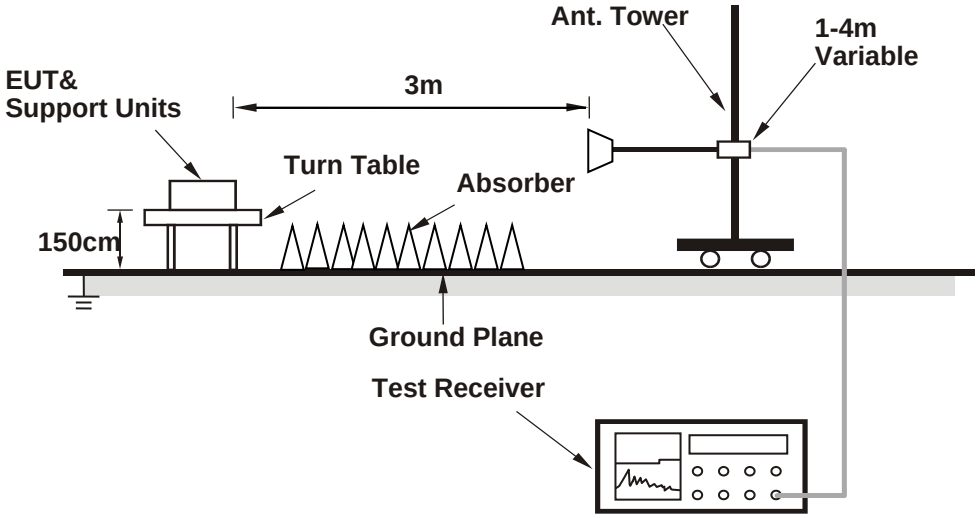
For Radiated emission below 30MHz



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.

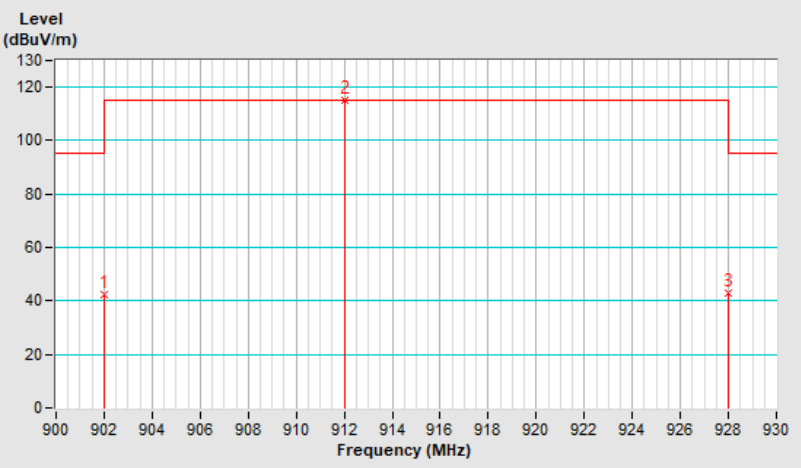
4.1.7 Test Results

RF Mode	Zwave	Channel	CH 1：912 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Environmental Conditions	23 °C, 72 % RH	Tested By	Louis Yang

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	42.6 QP	95.2	-52.6	1.00 H	355	11.3	31.3
2	*912.00	115.2 QP			1.00 H	355	83.3	31.9
3	928.00	42.8 QP	95.2	-52.4	1.00 H	355	10.9	31.9

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

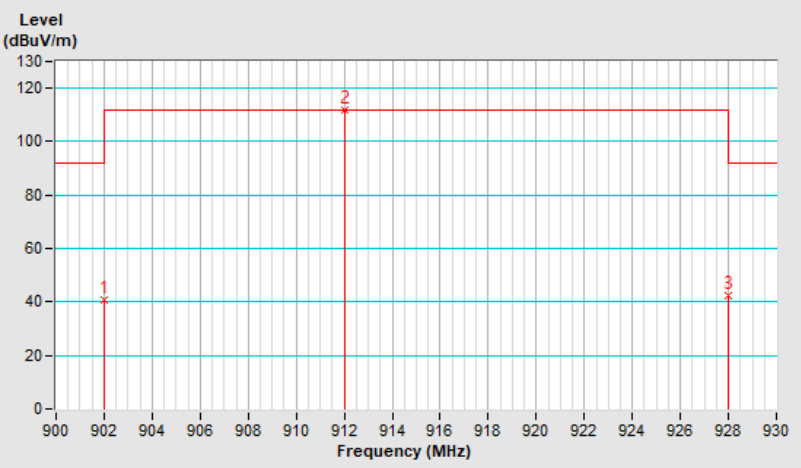


RF Mode	Zwave	Channel	CH 1：912 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Environmental Conditions	23 °C, 72 % RH	Tested By	Louis Yang

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	40.7 QP	91.8	-51.1	2.00 V	3	9.4	31.3
2	*912.00	111.8 QP			2.00 V	3	79.9	31.9
3	928.00	42.4 QP	91.8	-49.4	2.00 V	3	10.5	31.9

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

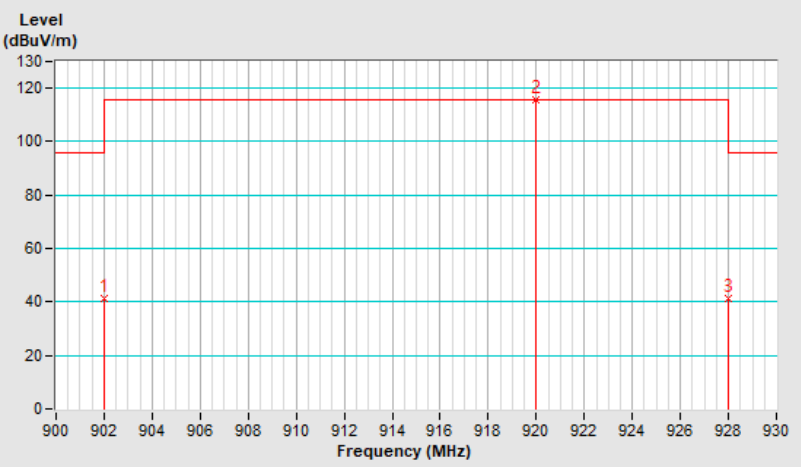


RF Mode	Zwave	Channel	CH 3：920 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Environmental Conditions	23 °C, 72 % RH	Tested By	Louis Yang

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	41.1 QP	95.9	-54.8	1.00 H	351	9.8	31.3
2	*920.00	115.9 QP			1.00 H	351	83.8	32.1
3	928.00	41.3 QP	95.9	-54.6	1.00 H	351	9.4	31.9

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.

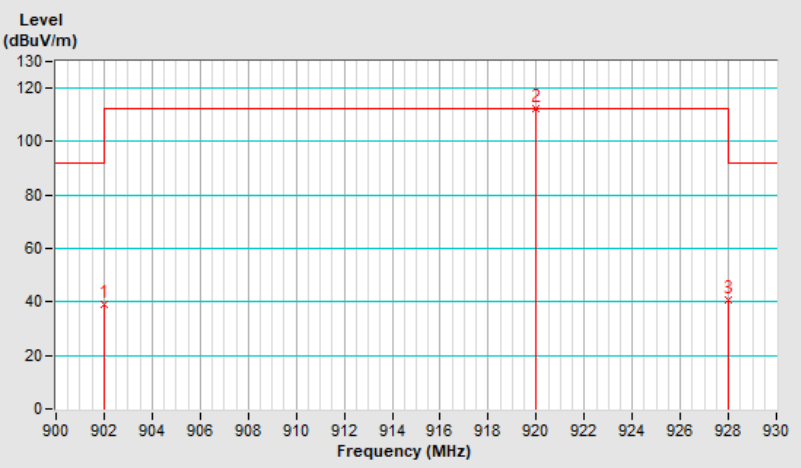


RF Mode	Zwave	**Channel**	CH 3：920 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	QP: RB=120kHz, DET=Quasi-Peak
Environmental Conditions	23 °C, 72 % RH	**Tested By**	Louis Yang

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	39.0 QP	92.2	-53.2	2.00 V	358	7.7	31.3
2	*920.00	112.2 QP			2.00 V	358	80.1	32.1
3	928.00	40.9 QP	92.2	-51.3	2.00 V	358	9.0	31.9

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.



Above 1 GHz Data:

RF Mode	Zwave	Channel	CH 1：912 MHz
Frequency Range	1 GHz ~ 10 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=300 Hz, DET=Peak
Environmental Conditions	23 °C, 67 % RH	Tested By	Louis Yang

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	2736.00	38.3 PK	74.0	-35.7	1.61 H	224	39.8	-1.5
2	2736.00	24.0 AV	54.0	-30.0	1.61 H	224	25.5	-1.5
3	3648.00	38.0 PK	74.0	-36.0	1.20 H	27	38.8	-0.8
4	3648.00	24.9 AV	54.0	-29.1	1.20 H	27	25.7	-0.8
5	4560.00	38.6 PK	74.0	-35.4	3.98 H	24	37.4	1.2
6	4560.00	26.4 AV	54.0	-27.6	3.98 H	24	25.2	1.2
7	7296.00	44.5 PK	74.0	-29.5	1.49 H	264	37.7	6.8
8	7296.00	31.4 AV	54.0	-22.6	1.49 H	264	24.6	6.8
9	8208.00	54.8 PK	74.0	-19.2	3.10 H	219	47.2	7.6
10	8208.00	41.4 AV	54.0	-12.6	3.10 H	219	33.8	7.6
11	9120.00	48.7 PK	74.0	-25.3	1.20 H	171	40.5	8.2
12	9120.00	39.1 AV	54.0	-14.9	1.20 H	171	30.9	8.2
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	2736.00	37.6 PK	74.0	-36.4	1.61 V	284	39.1	-1.5
2	2736.00	24.2 AV	54.0	-29.8	1.61 V	284	25.7	-1.5
3	3648.00	36.6 PK	74.0	-37.4	1.56 V	43	37.4	-0.8
4	3648.00	23.9 AV	54.0	-30.1	1.56 V	43	24.7	-0.8
5	4560.00	37.5 PK	74.0	-36.5	3.96 V	12	36.3	1.2
6	4560.00	25.9 AV	54.0	-28.1	3.96 V	12	24.7	1.2
7	7296.00	43.8 PK	74.0	-30.2	1.62 V	300	37.0	6.8
8	7296.00	31.2 AV	54.0	-22.8	1.62 V	300	24.4	6.8
9	8208.00	53.9 PK	74.0	-20.1	3.08 V	165	46.3	7.6
10	8208.00	42.1 AV	54.0	-11.9	3.08 V	165	34.5	7.6
11	9120.00	48.3 PK	74.0	-25.7	1.01 V	148	40.1	8.2
12	9120.00	39.8 AV	54.0	-14.2	1.01 V	148	31.6	8.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

RF Mode	Zwave	Channel	CH 3：920 MHz
Frequency Range	1 GHz ~ 10 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=300 Hz, DET=Peak
Environmental Conditions	23 °C, 67 % RH	Tested By	Louis Yang

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	2760.00	37.5 PK	74.0	-36.5	1.47 H	149	38.9	-1.4
2	2760.00	24.6 AV	54.0	-29.4	1.47 H	149	26.0	-1.4
3	3680.00	39.6 PK	74.0	-34.4	1.12 H	54	40.4	-0.8
4	3680.00	24.8 AV	54.0	-29.2	1.12 H	54	25.6	-0.8
5	4600.00	38.1 PK	74.0	-35.9	3.95 H	44	36.9	1.2
6	4600.00	26.3 AV	54.0	-27.7	3.95 H	44	25.1	1.2
7	7360.00	43.8 PK	74.0	-30.2	1.65 H	244	36.7	7.1
8	7360.00	31.2 AV	54.0	-22.8	1.65 H	244	24.1	7.1
9	8280.00	54.0 PK	74.0	-20.0	2.99 H	225	46.6	7.4
10	8280.00	41.5 AV	54.0	-12.5	2.99 H	225	34.1	7.4
11	9200.00	46.9 PK	74.0	-27.1	1.01 H	166	38.3	8.6
12	9200.00	39.3 AV	54.0	-14.7	1.01 H	166	30.7	8.6
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	2760.00	38.1 PK	74.0	-35.9	1.62 V	286	39.5	-1.4
2	2760.00	23.9 AV	54.0	-30.1	1.62 V	286	25.3	-1.4
3	3680.00	37.3 PK	74.0	-36.7	1.39 V	54	38.1	-0.8
4	3680.00	24.7 AV	54.0	-29.3	1.39 V	54	25.5	-0.8
5	4600.00	39.4 PK	74.0	-34.6	3.93 V	13	38.2	1.2
6	4600.00	25.9 AV	54.0	-28.1	3.93 V	13	24.7	1.2
7	7360.00	45.5 PK	74.0	-28.5	1.49 V	295	38.4	7.1
8	7360.00	30.8 AV	54.0	-23.2	1.49 V	295	23.7	7.1
9	8280.00	54.6 PK	74.0	-19.4	3.02 V	135	47.2	7.4
10	**8280.00**	**42.5 AV**	**54.0**	**-11.5**	**3.02 V**	**135**	**35.1**	**7.4**
11	9200.00	49.5 PK	74.0	-24.5	1.00 V	180	40.9	8.6
12	9200.00	39.7 AV	54.0	-14.3	1.00 V	180	31.1	8.6

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.

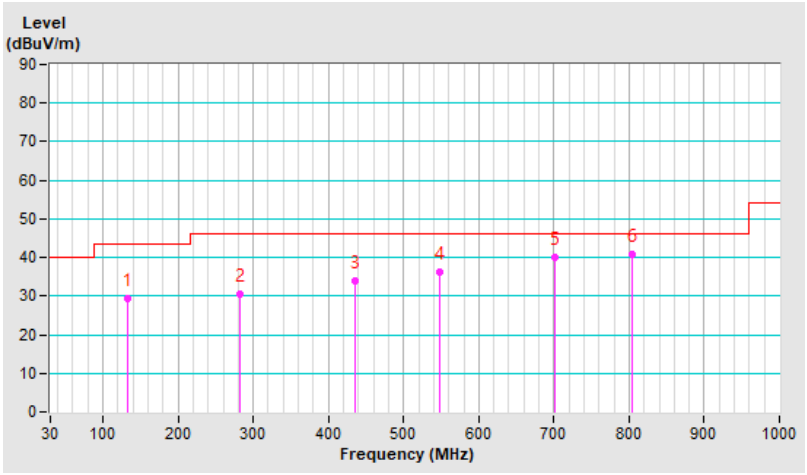
Below 1GHz data:

RF Mode	Zwave	Channel	CH 1：912 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Environmental Conditions	24 °C, 71 % RH	Tested By	Louis Yang

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	133.16	29.4 QP	43.5	-14.1	2.00 H	102	32.3	-2.9
2	282.20	30.6 QP	46.0	-15.4	1.00 H	198	32.7	-2.1
3	435.61	34.0 QP	46.0	-12.0	1.00 H	0	31.8	2.2
4	548.73	36.1 QP	46.0	-9.9	1.00 H	11	31.8	4.3
5	700.90	40.0 QP	46.0	-6.0	1.00 H	360	32.3	7.7
6	804.67	40.8 QP	46.0	-5.2	2.00 H	81	31.3	9.5

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. 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.

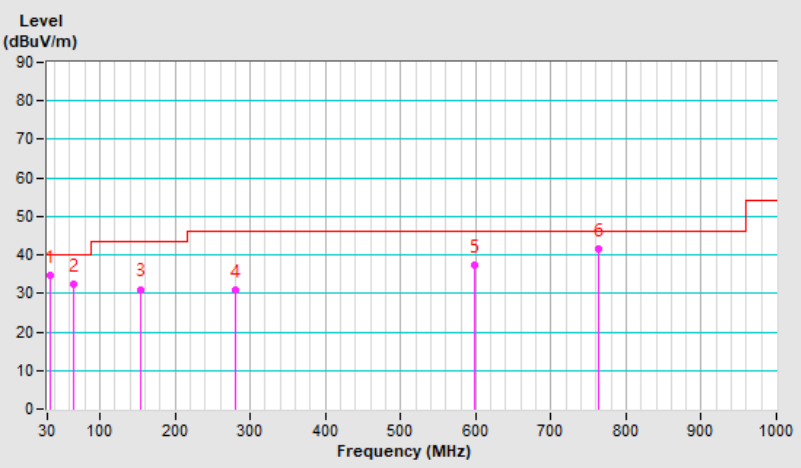


RF Mode	Zwave	Channel	CH 1：912 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Environmental Conditions	24 °C, 71 % RH	Tested By	Louis Yang

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	34.20	34.8 QP	40.0	-5.2	1.00 V	121	38.0	-3.2
2	65.84	32.3 QP	40.0	-7.7	1.00 V	60	36.4	-4.1
3	154.09	31.1 QP	43.5	-12.4	1.00 V	116	33.1	-2.0
4	280.33	30.9 QP	46.0	-15.1	2.00 V	4	33.1	-2.2
5	598.37	37.4 QP	46.0	-8.6	3.00 V	78	31.7	5.7
6	**764.27**	**41.4 QP**	**46.0**	**-4.6**	**1.00 V**	**103**	**32.1**	**9.3**

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.

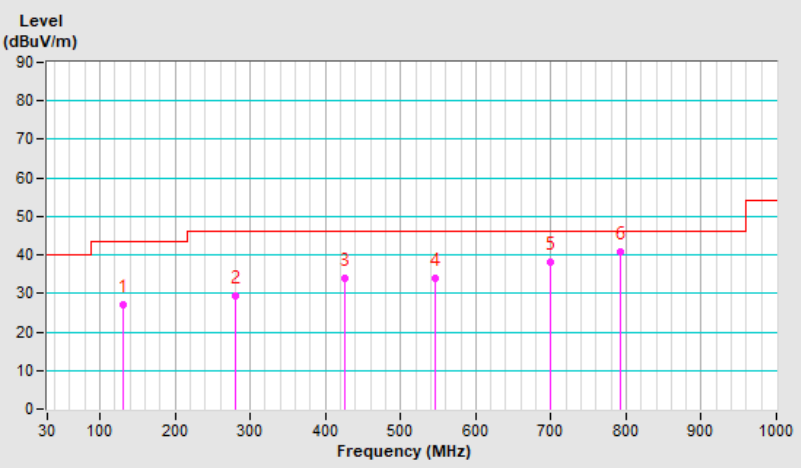


RF Mode	Zwave	Channel	CH 3：920 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Environmental Conditions	24 °C, 71 % RH	Tested By	Louis Yang

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	131.16	26.9 QP	43.5	-16.6	2.00 H	100	30.0	-3.1
2	279.70	29.2 QP	46.0	-16.8	1.00 H	196	31.4	-2.2
3	426.71	34.0 QP	46.0	-12.0	2.00 H	172	32.0	2.0
4	546.83	34.0 QP	46.0	-12.0	1.00 H	10	29.7	4.3
5	698.60	38.0 QP	46.0	-8.0	1.00 H	358	30.4	7.6
6	792.25	40.6 QP	46.0	-5.4	2.00 H	262	31.2	9.4

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. 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.

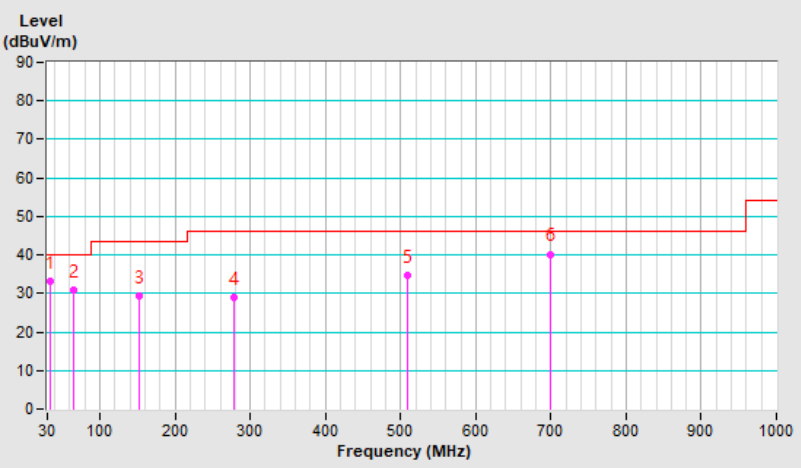


RF Mode	Zwave	Channel	CH 3：920 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Environmental Conditions	24 °C, 71 % RH	Tested By	Louis Yang

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	33.10	33.2 QP	40.0	-6.8	1.00 V	120	36.1	-2.9
2	64.14	30.9 QP	40.0	-9.1	1.00 V	59	34.5	-3.6
3	152.29	29.2 QP	43.5	-14.3	1.00 V	114	31.4	-2.2
4	278.03	29.1 QP	46.0	-16.9	2.00 V	3	31.3	-2.2
5	509.93	34.7 QP	46.0	-11.3	2.00 V	356	31.1	3.6
6	699.08	40.2 QP	46.0	-5.8	1.00 V	146	32.6	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. 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.	Calibrated Date	Calibrated Until
50 ohm terminal resistance Telegartner	50 ohm	3	2024/11/1	2025/10/31
EMI Test Receiver R&S	ESCS 30	100375	2024/5/20	2025/5/19
Fixed Attenuator STI	STI02-2200-10	005	2025/2/17	2026/2/16
LISN R&S	ESH3-Z5	835239/001	2025/3/27	2026/3/26
		848773/004	2024/10/7	2025/10/6
RF Coaxial Cable JYEBAO	5D-FB	COCCAB-001	2025/2/17	2026/2/16
Software BVADT	BVADT_Cond_V7.3.7.4	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 Conduction 1
3. Tested Date: 2025/4/1

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.

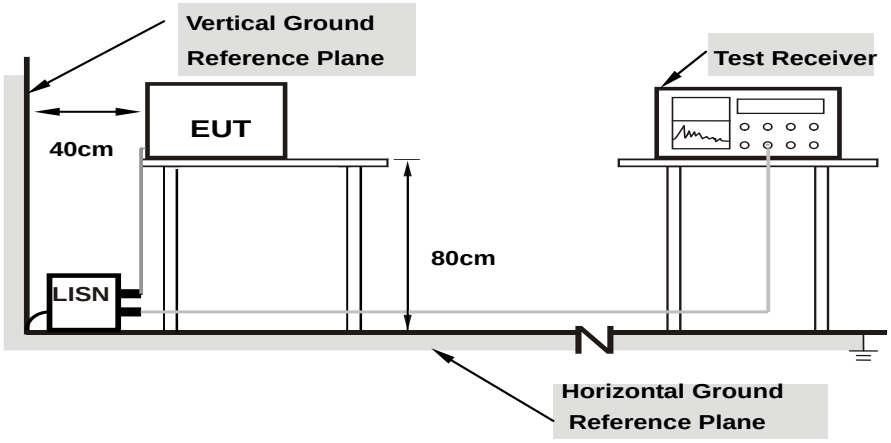
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

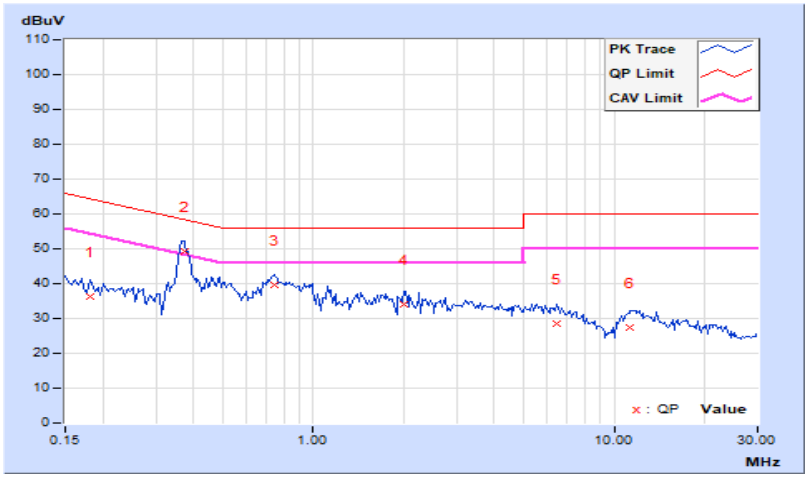
Worst-case data:

RF Mode	Zwave	**Channel**	CH 3：920 MHz
Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	**Environmental Conditions**	24 °C, 73 % RH
Tested By	Louis Yang		

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	0.18125	9.98	26.27	15.00	36.25	24.98	64.43	54.43	-28.18	-29.45
2	**0.37266**	**9.99**	**39.34**	**29.35**	**49.33**	**39.34**	**58.44**	**48.44**	**-9.11**	**-9.10**
3	0.74375	10.01	29.56	17.47	39.57	27.48	56.00	46.00	-16.43	-18.52
4	2.00000	10.09	24.12	14.83	34.21	24.92	56.00	46.00	-21.79	-21.08
5	6.43750	10.39	18.30	11.32	28.69	21.71	60.00	50.00	-31.31	-28.29
6	11.30078	10.69	16.83	11.31	27.52	22.00	60.00	50.00	-32.48	-28.00

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

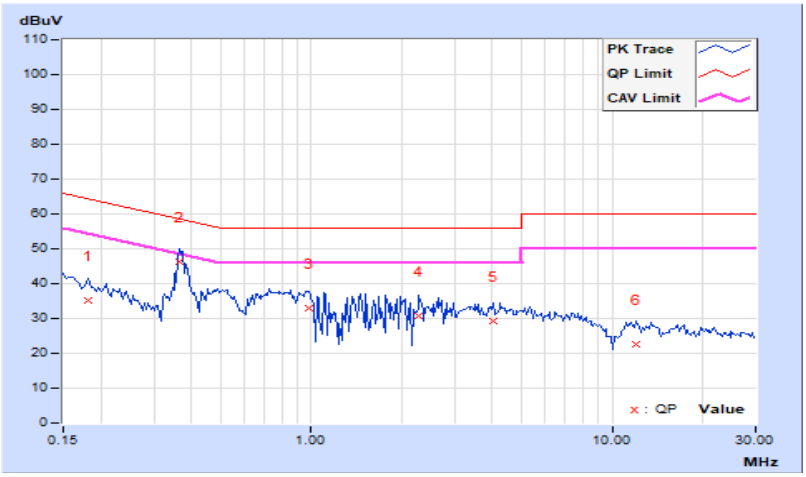


RF Mode	Zwave	Channel	CH 3：920 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	24 °C, 73 % RH
Tested By	Louis Yang		

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	0.18125	10.02	25.06	8.49	35.08	18.51	64.43	54.43	-29.35	-35.92
2	0.36484	10.01	36.38	24.29	46.39	34.30	58.62	48.62	-12.23	-14.32
3	0.97813	10.05	22.95	7.34	33.00	17.39	56.00	46.00	-23.00	-28.61
4	2.28125	10.11	20.64	7.52	30.75	17.63	56.00	46.00	-25.25	-28.37
5	4.04688	10.21	19.11	10.03	29.32	20.24	56.00	46.00	-26.68	-25.76
6	11.98828	10.66	11.97	6.26	22.63	16.92	60.00	50.00	-37.37	-33.08

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

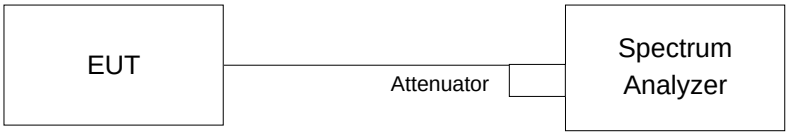


4.3 6dB Bandwidth Measurement

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.	Cal. Date	Cal. Due
PXA Signal Analyzer Keysight	N9030A	MY55410176	2024/6/12	2025/6/11
Software	ADT_RF Test Software V7.6.5.4	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 Oven room 2.
3. Tested Date: 2025/3/31

4.3.4 Test Procedure

a. Set resolution bandwidth (RBW) = 100kHz.

b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = peak.

c. Trace mode = max hold.

d. Sweep = auto couple.

e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

4.3.5 Deviation fromTest Standard

No deviation.

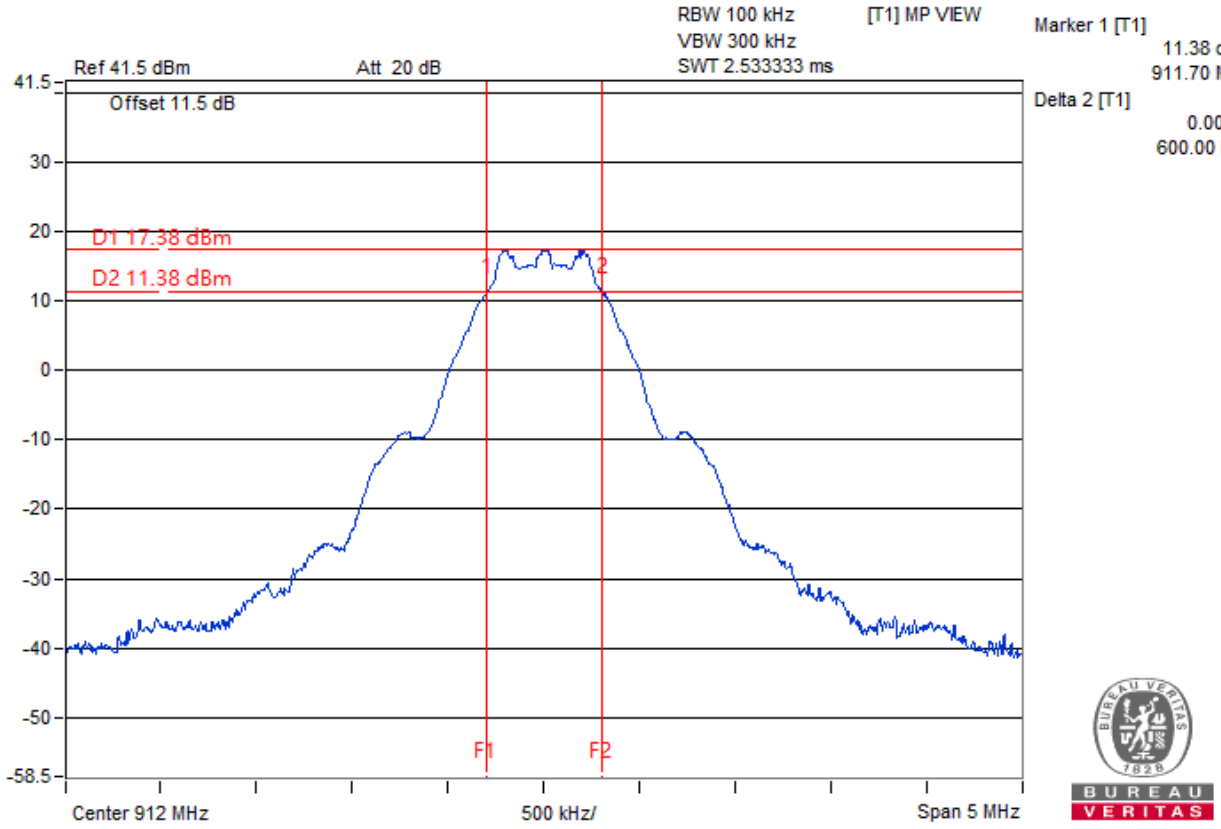
4.3.6 EUT Operating Conditions

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
1	912	0.6	0.5	Pass
3	920	0.6	0.5	Pass

Spectrum Plot of Worst Value

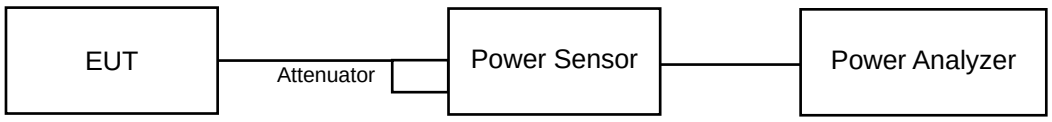


4.4 Conducted Output Power Measurement

4.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 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 Procedures

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.

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
RF Power Meter Anritsu	ML2495A	1529002	2024/6/7	2025/6/6
Pulse Power Sensor Anritsu	MA2411B	1726434	2024/6/7	2025/6/6

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 2.
3. Tested Date: 2025/3/31

4.4.7 Test Results

For Peak Power

Channel	Frequency (MHz)	Peak Power (mW)	Peak Power (dBm)	Limit (dBm)	Pass/Fail
1	912	52.723	17.22	30.00	Pass
3	920	54.325	17.35	30.00	Pass

For Average Power

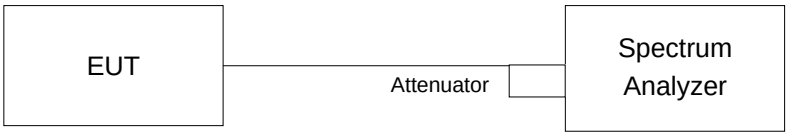
Channel	Frequency (MHz)	Average Power (mW)	Average Power (dBm)
1	912	52.481	17.20
3	920	53.703	17.30

4.5 Power Spectral Density Measurement

4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm per 3kHz.

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

a. Set analyzer center frequency to DTS channel center frequency.

b. Set the span to 1.5 times the DTS bandwidth.

c. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.

d. Set the VBW ≥ 3 × RBW.

e. Detector = peak.

f. Sweep time = auto couple.

g. Trace mode = max hold.

h. Allow trace to fully stabilize.

i. Use the peak marker function to determine the maximum amplitude level within the RBW.

4.5.5 Deviation from Test Standard

No deviation.

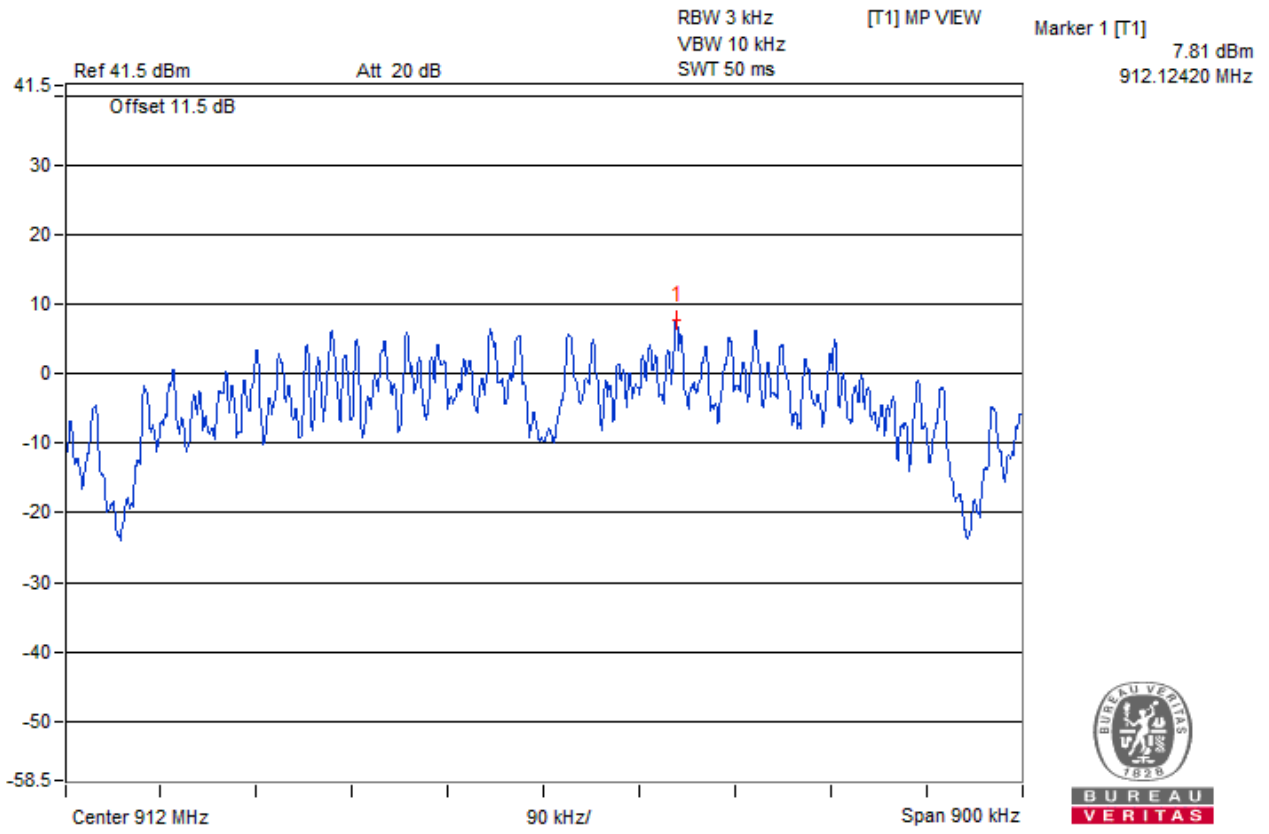
4.5.6 EUT Operating Condition

Same as item 4.3.6

4.5.7 Test Results

Channel	Freq. (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Pass / Fail
1	912	7.81	8.00	Pass
3	920	7.75	8.00	Pass

Spectrum Plot of Worst Value

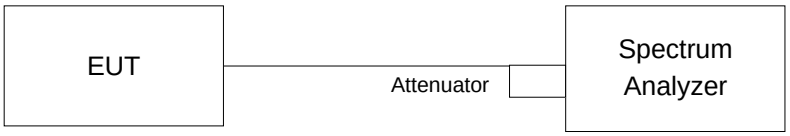


4.6 Conducted Out of Band Emission Measurement

4.6.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB 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

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep time = auto couple.
e. Trace mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = peak.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

4.6.5 Deviation from Test Standard

No deviation.

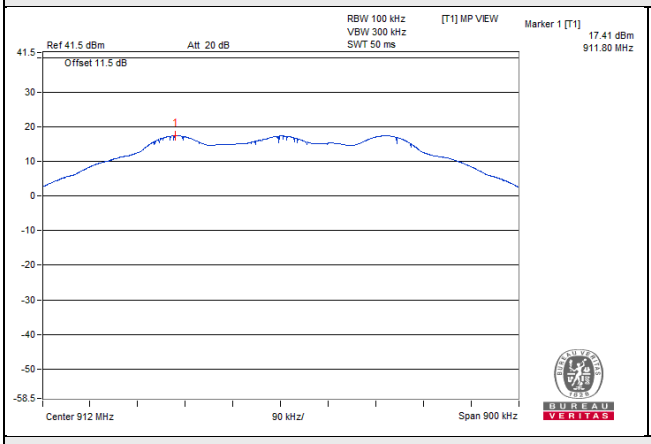
4.6.6 EUT Operating Condition

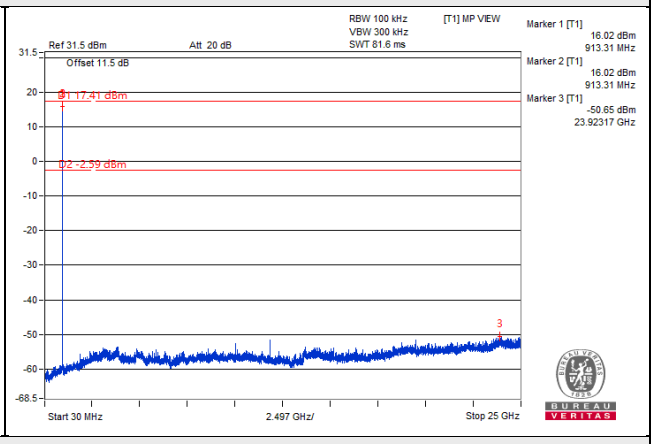
Same as item 4.3.6

4.6.7 Test Results

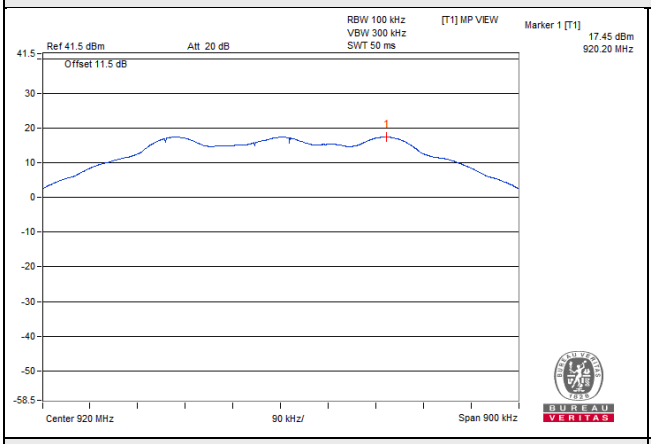
The conducted emission test is performed on each TX port of operating mode without summing or adding 10log (N) since the limit is relative emission limit.
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

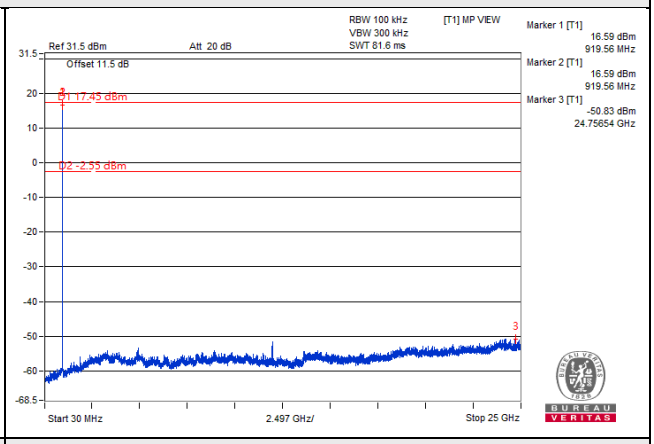
CH 1



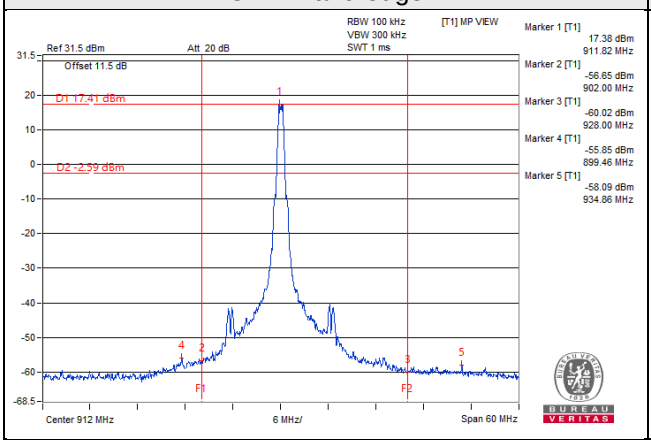


CH 3

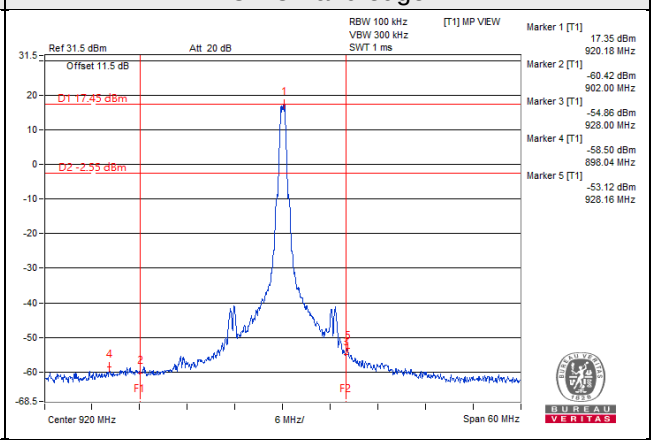




CH 1 Band edge



CH 3 Band edge



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.

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

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