

FCC Radio Test Report

FCC ID: 2BDWL2417321

Report No. : BTL-FCCP-9-2303E003
Equipment : TELUS SmartHome+ Hub
Brand Name : TELUS
Test Model : HUF
Series Model : N/A
Applicant : TELUS Communications Inc.
Address : 7th Floor, 510 West Georgia Street, Vancouver, BC, V6B0M3 Canada

Radio Function : Z-wave

FCC Rule Part(s) : FCC CFR Title 47, Part 15, Subpart C (15.247)
Measurement Procedure(s) : ANSI C63.10-2013

Date of Receipt : 2024/3/5
Date of Test : 2024/4/15 ~ 2024/11/08
Issued Date : 2025/1/23

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

Poken Huang

Prepared by : _____
Poken Huang, Engineer

Approved by : _____
Peter Chen, Supervisor

**BTL Inc.**

No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan

Tel: +886-2-2657-3299 Fax: +886-2-2657-3331 Web: www.newbtl.com Service mail: btl_qa@newbtl.com

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** assumes no responsibility for the data provided by the Customer, any statements, inferences or generalizations drawn by the customer or others from the reports issued by **BTL**.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

CONTENTS

REVISION HISTORY	5
1 SUMMARY OF TEST RESULTS	6
1.1 TEST FACILITY	7
1.2 MEASUREMENT UNCERTAINTY	7
1.3 TEST ENVIRONMENT CONDITIONS	7
2 GENERAL INFORMATION	8
2.1 DESCRIPTION OF EUT	8
2.2 TEST MODES	9
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	10
2.4 SUPPORT UNITS	10
3 AC POWER LINE CONDUCTED EMISSIONS TEST	11
3.1 LIMIT	11
3.2 TEST PROCEDURE	11
3.3 DEVIATION FROM TEST STANDARD	11
3.4 TEST SETUP	12
3.5 TEST RESULT	12
4 RADIATED EMISSIONS TEST	13
4.1 LIMIT	13
4.2 TEST PROCEDURE	14
4.3 DEVIATION FROM TEST STANDARD	14
4.4 TEST SETUP	14
4.5 EUT OPERATING CONDITIONS	16
4.6 TEST RESULT – BELOW 30 MHZ	16
4.7 TEST RESULT – 30 MHZ TO 1 GHZ	16
4.8 TEST RESULT – ABOVE 1 GHZ	16
5 BANDWIDTH TEST	17
5.1 APPLIED PROCEDURES / LIMIT	17
5.2 TEST PROCEDURE	17
5.3 DEVIATION FROM STANDARD	17
5.4 TEST SETUP	17
5.5 EUT OPERATION CONDITIONS	17
5.6 TEST RESULTS	17
6 OUTPUT POWER TEST	18
6.1 APPLIED PROCEDURES / LIMIT	18
6.2 TEST PROCEDURE	18
6.3 DEVIATION FROM STANDARD	18
6.4 TEST SETUP	18
6.5 EUT OPERATION CONDITIONS	18
6.6 TEST RESULTS	18
7 POWER SPECTRAL DENSITY TEST	19
7.1 APPLIED PROCEDURES / LIMIT	19
7.2 TEST PROCEDURE	19
7.3 DEVIATION FROM STANDARD	19
7.4 TEST SETUP	19
7.5 EUT OPERATION CONDITIONS	19
7.6 TEST RESULTS	19
8 ANTENNA CONDUCTED SPURIOUS EMISSION	20

8.1	APPLIED PROCEDURES / LIMIT	20
8.2	TEST PROCEDURE	20
8.3	DEVIATION FROM STANDARD	20
8.4	TEST SETUP	20
8.5	EUT OPERATION CONDITIONS	20
8.6	TEST RESULTS	20
9	LIST OF MEASURING EQUIPMENTS	21
10	EUT TEST PHOTO	23
11	EUT PHOTOS	23
APPENDIX A	AC POWER LINE CONDUCTED EMISSIONS	24
APPENDIX B	RADIATED EMISSIONS - 9 KHZ TO 30 MHZ	27
APPENDIX C	RADIATED EMISSIONS - 30 MHZ TO 1 GHZ	30
APPENDIX D	RADIATED EMISSIONS - ABOVE 1 GHZ	33
APPENDIX E	BANDWIDTH	40
APPENDIX F	OUTPUT POWER	42
APPENDIX G	POWER SPECTRAL DENSITY TEST	44
APPENDIX H	ANTENNA CONDUCTED SPURIOUS EMISSION	46

REVISION HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-9-2303E003	R00	Original Report.	2025/1/23	Valid

1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

Standard(s) Section	Description	Test Result	Judgement	Remark
15.207	AC Power Line Conducted Emissions	APPENDIX A	Pass	-----
15.205 15.209 15.247(d)	Radiated Emissions	APPENDIX B APPENDIX C APPENDIX D	Pass	-----
15.247(a)(2)	Bandwidth	APPENDIX E	Pass	-----
15.247(b)(3)	Output Power	APPENDIX F	Pass	-----
15.247(e)	Power Spectral Density	APPENDIX G	Pass	-----
15.247(d)	Antenna conducted Spurious Emission	APPENDIX H	Pass	-----
15.203	Antenna Requirement	-----	Pass	-----

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report.

1.1 TEST FACILITY

The test locations stated below are under the TAF Accreditation Number 0659.

The test location(s) used to collect the test data in this report are:

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
(FCC DN: TW0659)

☒ CB20 ☒ C01

1.2 MEASUREMENT UNCERTAINTY

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

The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{CISPR} requirement.

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U (dB)
C01	CISPR	150 kHz ~ 30MHz	2.4498

B. Radiated emissions test :

Test Site	Measurement Frequency Range (GHz)	U (dB)
CB20 (3m)	0.03~0.2	4.01
	0.02~1	4.64
	1 ~ 6	5.91
	6 ~ 18	6.24
	18 ~ 26	3.93
	26 ~ 40	4.06

C. Conducted test :

Test Item	U (dB)
Occupied Bandwidth	0.53
Output power	0.37
Power Spectral Density	0.66
Conducted Spurious emissions	0.54
Conducted Band edges	0.53

NOTE:

Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Test Voltage	Tested by
AC Power Line Conducted Emissions	25 °C, 45 %	DC 5V	Benny Cao
Radiated emissions below 1 GHz	Refer to data	AC 120V	Benny Cao
Radiated emissions above 1 GHz	Refer to data	AC 120V	Benny Cao
Bandwidth	23 °C, 50 %	DC 5V	Cheng Tsai
Output Power	23 °C, 50 %	DC 5V	Cheng Tsai
Power Spectral Density	23 °C, 50 %	DC 5V	Cheng Tsai
Antenna conducted Spurious Emission	23 °C, 50 %	DC 5V	Cheng Tsai

2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	TELUS SmartHome+ Hub
Brand Name	TELUS
Test Model	HUF
Series Model	N/A
Model Difference(s)	N/A
Software Version	v0.8.13
Hardware Version	DVT
Power Source	DC Voltage supplied from AC adapter. Model: DSA-12PF11-05 FUS 050200
Power Rating	I/P:100-240V ~ 50/60Hz 0.5A O/P:+5.0V --- 2.0A
Operation Frequency	912 MHz ~ 920 MHz
Modulation Type	GFSK
Output Power Max.	12.74 dBm (0.0188 W)

NOTE:

(1) The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

(2) Channel List:

Channel	Frequency (MHz)	Data rate(kbit/s)
US11, CH3	912	100
US12, CH3	920	100

(3) Table for Filed Antenna:

Antenna	Brand	Model name	Type	Connector	Gain (dBi)
1		N/A	PIFA	N/A	2.74

Note:

The above Antenna information are derived from the antenna data sheet provided by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2.2 TEST MODES

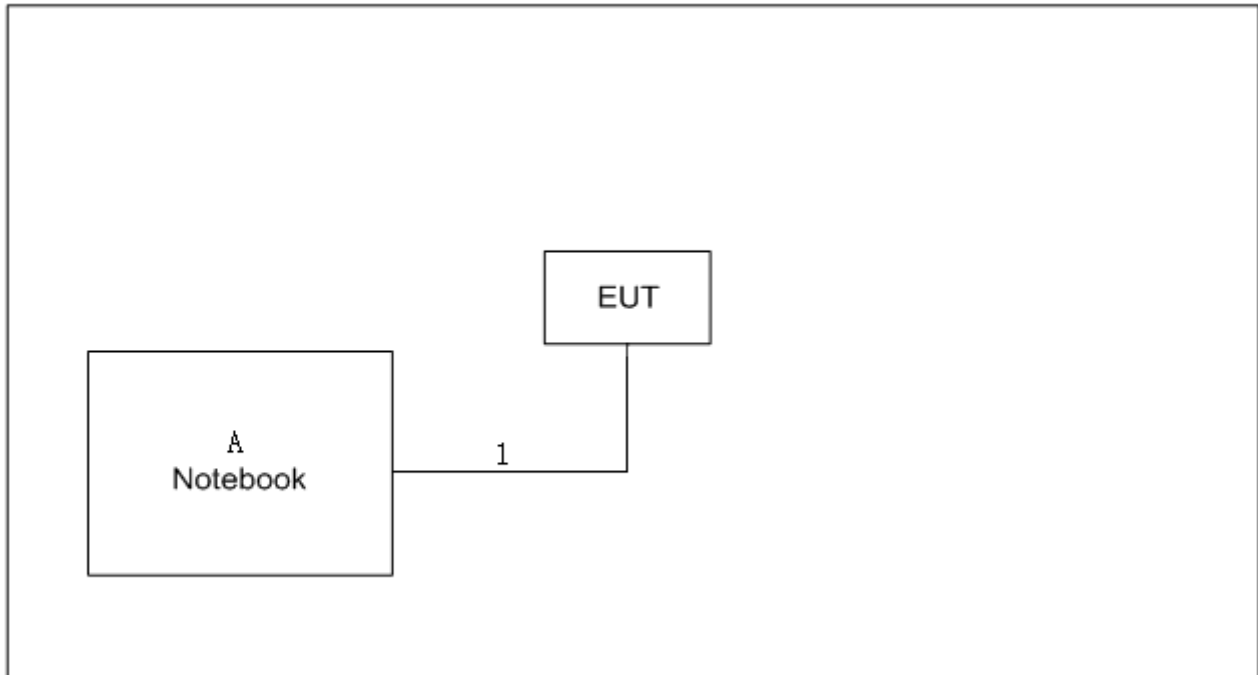
Test Items	Test mode	Channel	Note
AC power line conducted emissions	Normal	-	-
Transmitter Radiated Emissions (below 1GHz)	TX Mode	US11, CH3	-
Transmitter Radiated Emissions (above 1GHz)	TX Mode	US11, CH3 US12, CH3	Bandedge
	TX Mode	US11, CH3 US12, CH3	Harmonic
Bandwidth	TX Mode	US11, CH3 US12, CH3	-
Output Power	TX Mode	US11, CH3 US12, CH3	-
Power Spectral Density	TX Mode	US11, CH3 US12, CH3	-
Antenna conducted Spurious Emission	TX Mode	US11, CH3 US12, CH3	-

NOTE:

- (1) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Vertical) is recorded.
- (2) For radiated emissions below 1 GHz test, the channel US11, CH3 is found to be the worst case and recorded.
- (3) The test sample with two adapters, only the cable is different. For radiated spurious emissions below 1 GHz test, two adapters had been pre-tested and in this report only recorded the worst case.

2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.4.



2.4 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Remarks
A	Notebook	tinkpad	ThinkBook16+	Furnished by test lab.

Item	Cable Type	Ferrite Core	Length	Shielded	Remarks
1	USB Cable	NO	1m	NO	Furnished by test lab.

3 AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

Frequency (MHz)	Limit (dBμV)	
	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 tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
- (3) The test result calculated as following:
 Measurement Value = Reading Level + Correct Factor
 Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
 Margin Level = Measurement Value – Limit Value
 Calculation example:

Reading Level		Correct Factor		Measurement Value
38.22	+	3.45	=	41.67

Measurement Value		Limit Value		Margin Level
41.67	-	60	=	-18.33

The following table is the setting of the receiver.

Receiver Parameter	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.2 TEST PROCEDURE

- a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
 All other support equipment were powered from an additional LISN(s).
 The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
- c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center.
 The end of the cable will be terminated, using the correct terminating impedance.
 The overall length shall not exceed 1 m.
- d. The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
- e. For the actual test configuration, please refer to the related Item – EUT TEST PHOTO.

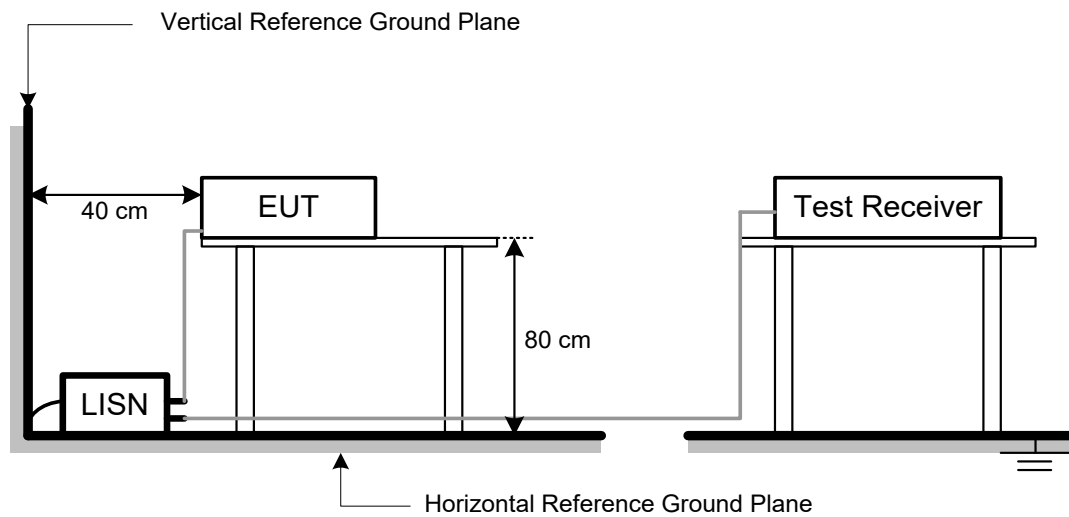
NOTE:

- (1) In the results, each reading is marked as Peak, QP or AVG per the detector used.
 BW=9 kHz (6 dB Bandwidth)
- (2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP



3.5 TEST RESULT

Please refer to the APPENDIX A.

4 RADIATED EMISSIONS TEST

4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205, then the 15.209 limit in the table below has to be followed.

LIMITS OF RADIATED EMISSIONS MEASUREMENT (9 kHz to 1000 MHz)

Frequency (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
960~1000	500	3

LIMITS OF RADIATED EMISSIONS MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	Radiated Emissions (dBuV/m)		Measurement Distance (meters)
	Peak	Average	
Above 1000	74	54	3

NOTE:

- (1) The limit for radiated test was performed according to FCC CFR Title 47, Part 15, Subpart C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:

Measurement Value = Reading Level + Correct Factor

Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)

Margin Level = Measurement Value - Limit Value

Calculation example:

Reading Level		Correct Factor		Measurement Value
41.91	+	-8.36	=	33.55

Measurement Value		Limit Value		Margin Level
33.55	-	43.50	=	-9.95

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average

Mode	VBW(Hz)
SRD	300

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz for PK/AVG detector
Start ~ Stop Frequency	90KHz~110KHz for QP detector
Start ~ Stop Frequency	110KHz~490KHz for PK/AVG detector
Start ~ Stop Frequency	490KHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

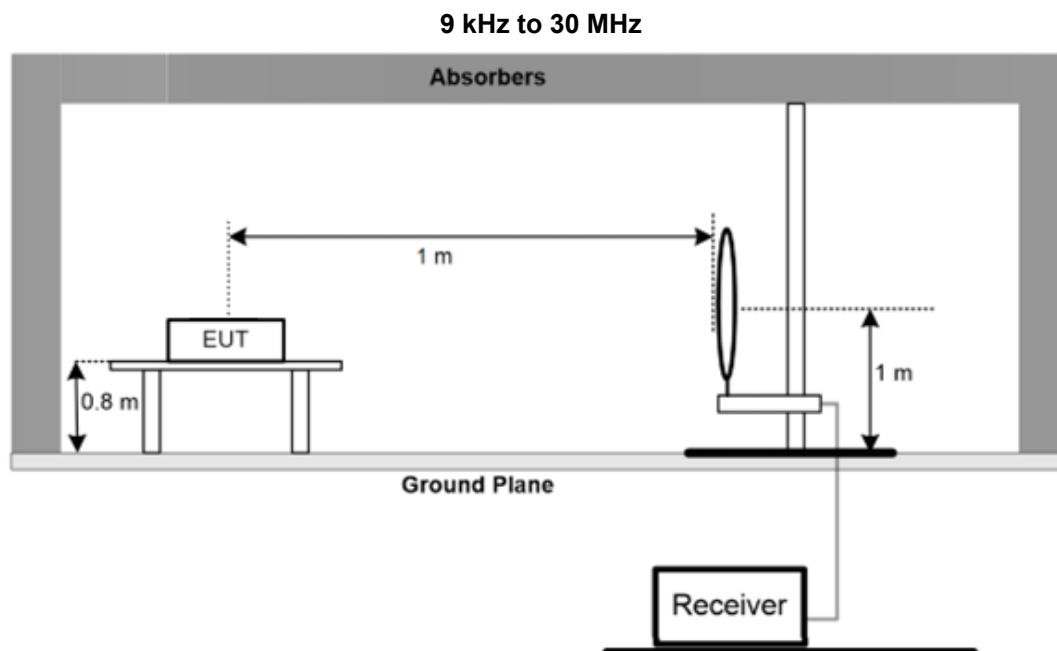
4.2 TEST PROCEDURE

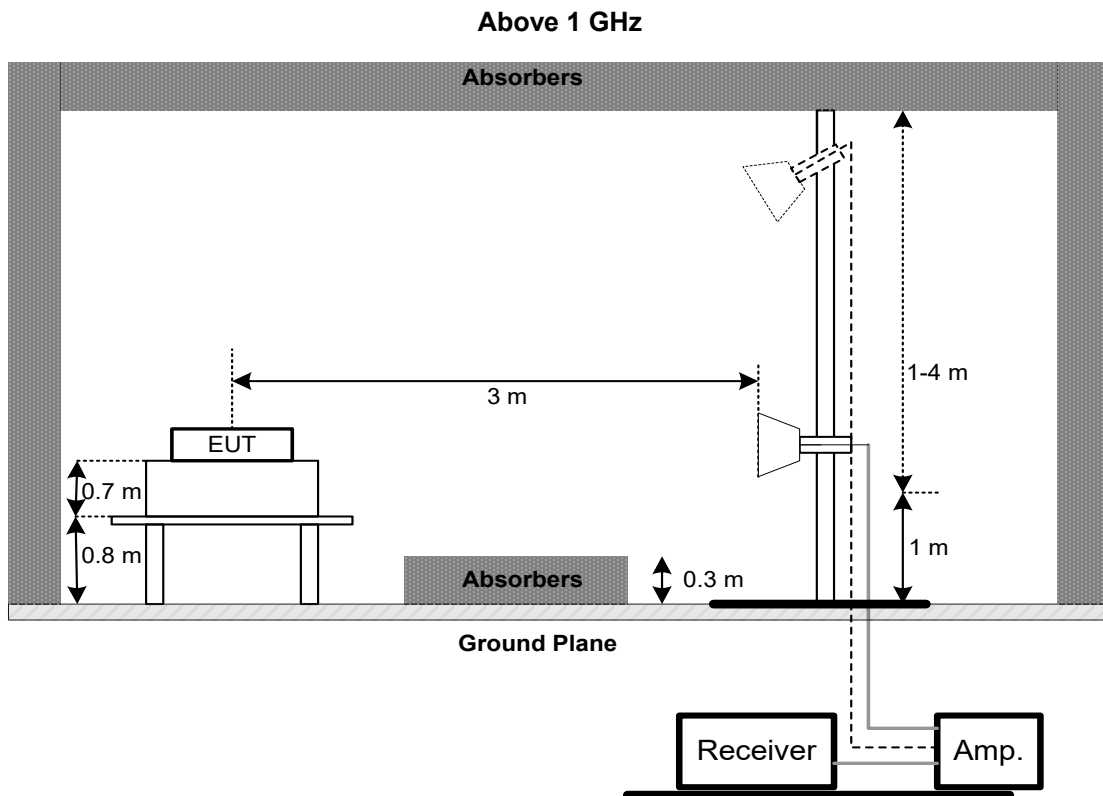
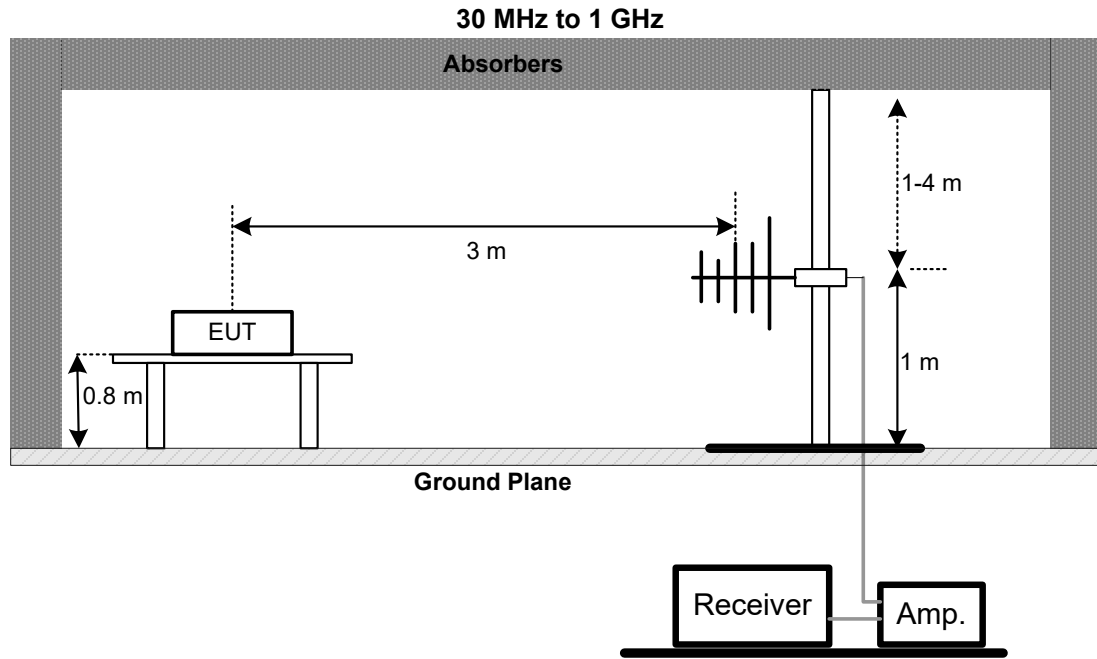
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- For the actual test configuration, please refer to the related Item – EUT TEST PHOTO.

4.3 DEVIATION FROM TEST STANDARD

No deviation.

4.4 TEST SETUP





4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT – BELOW 30 MHZ

Please refer to the APPENDIX B.

4.7 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the APPENDIX C.

4.8 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX D.

NOTE:

- (1) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

5 BANDWIDTH TEST

5.1 APPLIED PROCEDURES / LIMIT

Section	Test Item	Limit
15.247(a)(2)	Bandwidth	$\geq 500\text{KHz}$ (6dB bandwidth)

5.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

5.6 TEST RESULTS

Please refer to the APPENDIX E.

6 OUTPUT POWER TEST

6.1 APPLIED PROCEDURES / LIMIT

Section	Test Item	Limit
15.247(b)(3)	Maximum Output Power	1 watt or 30dBm

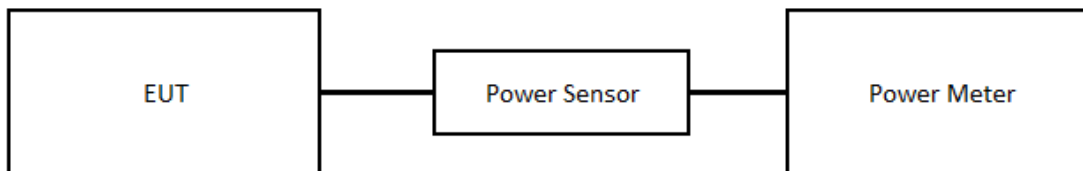
6.2 TEST PROCEDURE

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- The maximum peak conducted output power was performed in accordance with FCC KDB 558074 D01 15.247 Meas Guidance.

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

6.6 TEST RESULTS

Please refer to the APPENDIX F.

7 POWER SPECTRAL DENSITY TEST

7.1 APPLIED PROCEDURES / LIMIT

Section	Test Item	Limit
15.247(e)	Power Spectral Density	8 dBm (in any 3KHz)

7.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW=3KHz, VBW=10 KHz, Sweep time = auto.

7.3 DEVIATION FROM STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

7.6 TEST RESULTS

Please refer to the APPENDIX G.

8 ANTENNA CONDUCTED SPURIOUS EMISSION

8.1 APPLIED PROCEDURES / LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits.

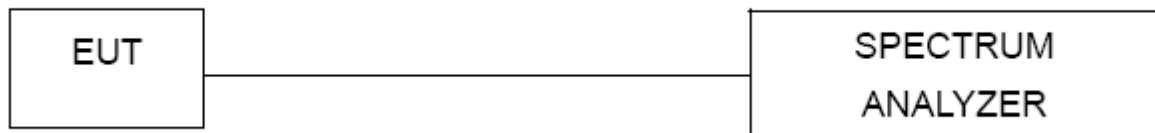
8.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = 10 ms.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP



8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

Please refer to the APPENDIX H.

9 LIST OF MEASURING EQUIPMENTS

AC Power Line Conducted Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Two-Line V-Network	R&S	ENV216	101051	2024/6/26	2025/6/25
2	Test Cable	EMCI	EMCRG58-BM-B M-9000	210501	2023/12/11	2024/12/10
3	EMC Receiver	Keysight	N9038A	MY54130009	2024/6/27	2025/6/26
4	Measurement Software	Farad	EZ_EMC (Ver. NB-03A1-01)	N/A	N/A	N/A

Radiated Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Loop Ant.	Electro-Metrics	EMCI-LPA600	274	2024/7/5	2025/7/4
2	EMC Receiver	Keysight	N9038A	MY54130009	2024/6/27	2025/6/26
3	Pre-Amplifier	EMCI	EMC001340	980555	2023/12/1	2024/11/30
4	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	01207	2023/12/18	2024/12/17
5	EMC Receiver	Keysight	N9038A	MY54130009	2024/6/27	2025/6/26
6	Pre-Amplifier	EMCI	EMC001330-202 01222	980807	2023/12/11	2024/12/10
7	Test Cable	EMCI	EMC-8D-NM-NM -5000	150106	2023/12/11	2024/12/10
8	Test Cable	EMCI	EMC-CFD-400-N M-NM-8000	200348	2023/12/11	2024/12/10
9	Test Cable	EMCI	EMC-CFD-400-N M-NM-3300	200343	2023/12/11	2024/12/10
10	Broad-Band Horn Antenna	RFSPIN	DRH18-E	210109A18E	2024/1/10	2025/1/9
11	Pre-Amplifier	EMCI	EMC051845SE	980779	2023/12/11	2024/12/10
12	Test Cable	EMCI	EMC105-SM-SM-1000	210119	2023/12/11	2024/12/10
13	Test Cable	EMCI	EMC105-SM-SM-3000	210118	2023/12/11	2024/12/10
14	Test Cable	EMCI	EMC105-SM-SM-7000	210117	2023/12/11	2024/12/10
15	EXA Spectrum Analyzer	keysight	N9020B	MY59050137	2023/11/24	2024/11/23
16	Measurement Software	Farad	EZ_EMC (Ver. NB-03A1-01)	N/A	N/A	N/A

Bandwidth						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP 30	100854	2024/6/27	2025/6/26
2	10dbAttenuator	INMET	AHC-10dB	1	N/A	N/A

Output Power						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	USB Peak Power Sensor	Anritsu	MA24408A	12589	2024/10/25	2025/10/24
2	20dbAttenuator	INMET	AHC-20dB	1	N/A	N/A
3	Measurement Software	Anritsu	MA2440A Peak Power analyzer(Ver1.1.0.0)	N/A	N/A	N/A

Power Spectral Density						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP 30	100854	2024/6/27	2025/6/26
2	10dbAttenuator	INMET	AHC-10dB	1	N/A	N/A

Antenna conducted Spurious Emission						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP 30	100854	2024/6/27	2025/6/26
2	10dbAttenuator	INMET	AHC-10dB	1	N/A	N/A

Remark: "N/A" denotes no model name, no serial no. or no calibration specified.
All calibration period of equipment list is one year.

10 EUT TEST PHOTO

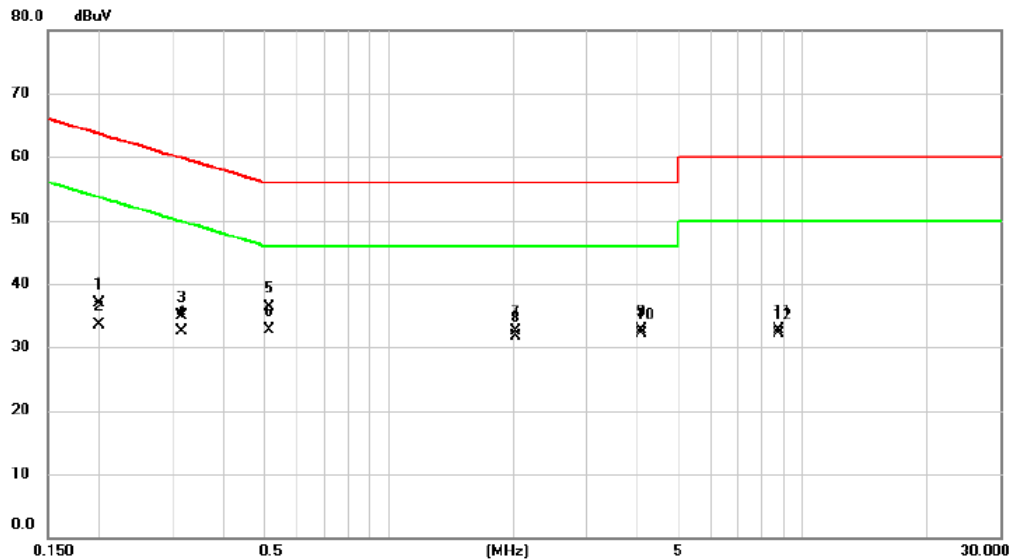
Please refer to document Appendix No.: TP-2303E003-1 (APPENDIX-EUT PHOTOS).

11 EUT PHOTOS

Please refer to document Appendix No.: EP-2303E003-1 (APPENDIX-EUT PHOTOS).

APPENDIX A AC POWER LINE CONDUCTED EMISSIONS

Test Mode	Normal	Tested Date	2024/11/7
Test Frequency	-	Phase	Line

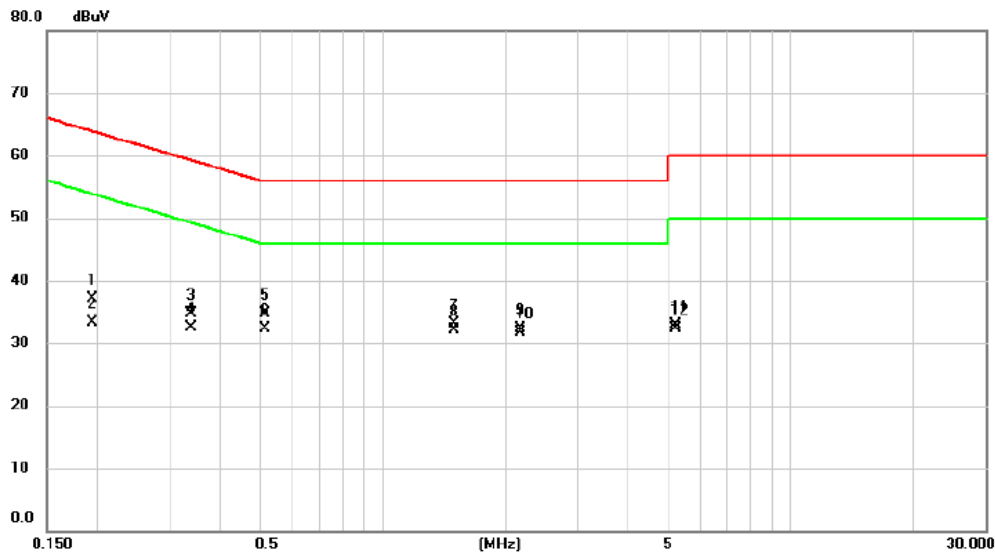


No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1	0.2000	27.20	9.64	36.84	63.61	-26.77	QP	
2	0.2000	23.78	9.64	33.42	53.61	-20.19	AVG	
3	0.3160	25.19	9.65	34.84	59.81	-24.97	QP	
4	0.3160	22.93	9.65	32.58	49.81	-17.23	AVG	
5	0.5135	26.71	9.66	36.37	56.00	-19.63	QP	
6 *	0.5135	23.11	9.66	32.77	46.00	-13.23	AVG	
7	2.0210	22.63	9.79	32.42	56.00	-23.58	QP	
8	2.0210	21.96	9.79	31.75	46.00	-14.25	AVG	
9	4.0685	22.80	9.87	32.67	56.00	-23.33	QP	
10	4.0685	22.15	9.87	32.02	46.00	-13.98	AVG	
11	8.7500	22.67	9.99	32.66	60.00	-27.34	QP	
12	8.7500	22.06	9.99	32.05	50.00	-17.95	AVG	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode	Normal	Tested Date	2024/11/7
Test Frequency	-	Phase	Neutral



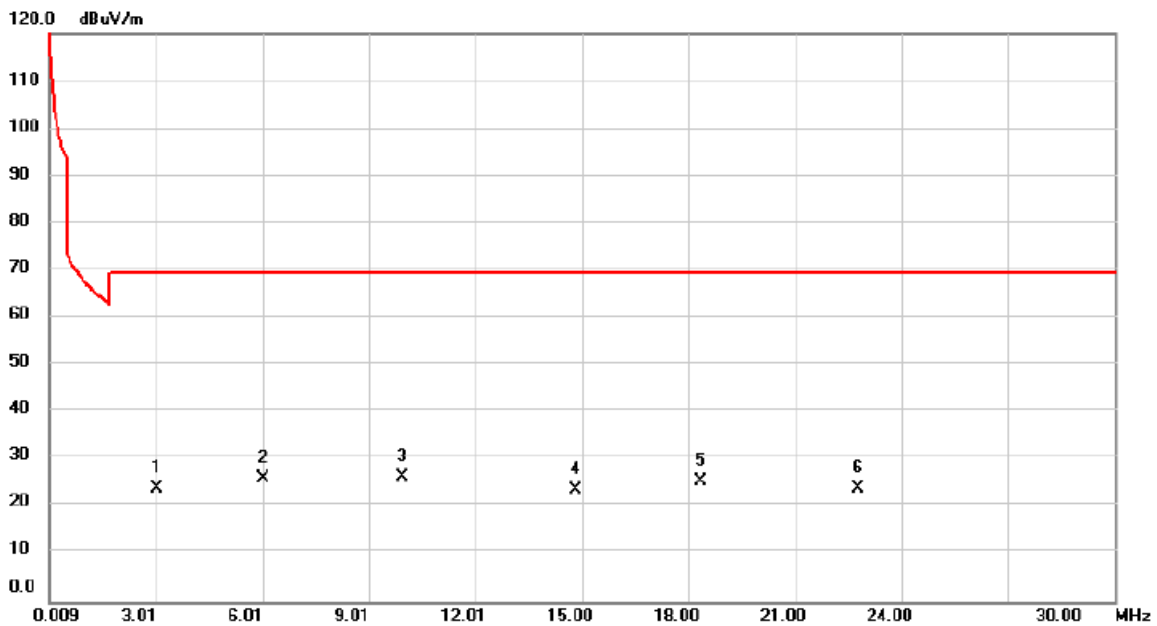
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Margin dB	Detector	Comment
1		0.1944	27.39	9.63	37.02	63.85	-26.83	QP	
2		0.1944	23.75	9.63	33.38	53.85	-20.47	AVG	
3		0.3394	24.99	9.63	34.62	59.22	-24.60	QP	
4		0.3394	22.85	9.63	32.48	49.22	-16.74	AVG	
5		0.5135	25.16	9.64	34.80	56.00	-21.20	QP	
6	*	0.5135	22.72	9.64	32.36	46.00	-13.64	AVG	
7		1.4945	23.44	9.73	33.17	56.00	-22.83	QP	
8		1.4945	22.39	9.73	32.12	46.00	-13.88	AVG	
9		2.1695	22.53	9.78	32.31	56.00	-23.69	QP	
10		2.1695	21.83	9.78	31.61	46.00	-14.39	AVG	
11		5.2250	23.02	9.89	32.91	60.00	-27.09	QP	
12		5.2250	22.36	9.89	32.25	50.00	-17.75	AVG	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

APPENDIX B RADIATED EMISSIONS - 9 KHZ TO 30 MHZ

Test Mode	TX Mode	Test Date	2024/11/1
Test Frequency	912MHz	Polarization	Vertical
Temp	25°C	Hum.	65%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		3.0081	28.36	-4.63	23.73	69.54	-45.81	QP		
2		6.0371	30.41	-4.44	25.97	69.54	-43.57	QP		
3	*	9.9360	30.21	-3.84	26.37	69.54	-43.17	QP		
4		14.8245	28.17	-4.66	23.51	69.54	-46.03	QP		
5		18.3335	29.82	-4.60	25.22	69.54	-44.32	QP		
6		22.8021	29.98	-6.16	23.82	69.54	-45.72	QP		

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX Mode	Test Date	2024/11/1
Test Frequency	912MHz	Polarization	Horizontal
Temp	25°C	Hum.	65%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		3.1880	28.28	-4.72	23.56	69.54	-45.98	QP		
2	*	8.3463	30.74	-3.90	26.84	69.54	-42.70	QP		
3		14.4646	28.02	-4.67	23.35	69.54	-46.19	QP		
4		16.9240	30.35	-4.45	25.90	69.54	-43.64	QP		
5		20.5528	30.92	-5.11	25.81	69.54	-43.73	QP		
6		22.8021	29.44	-6.16	23.28	69.54	-46.26	QP		

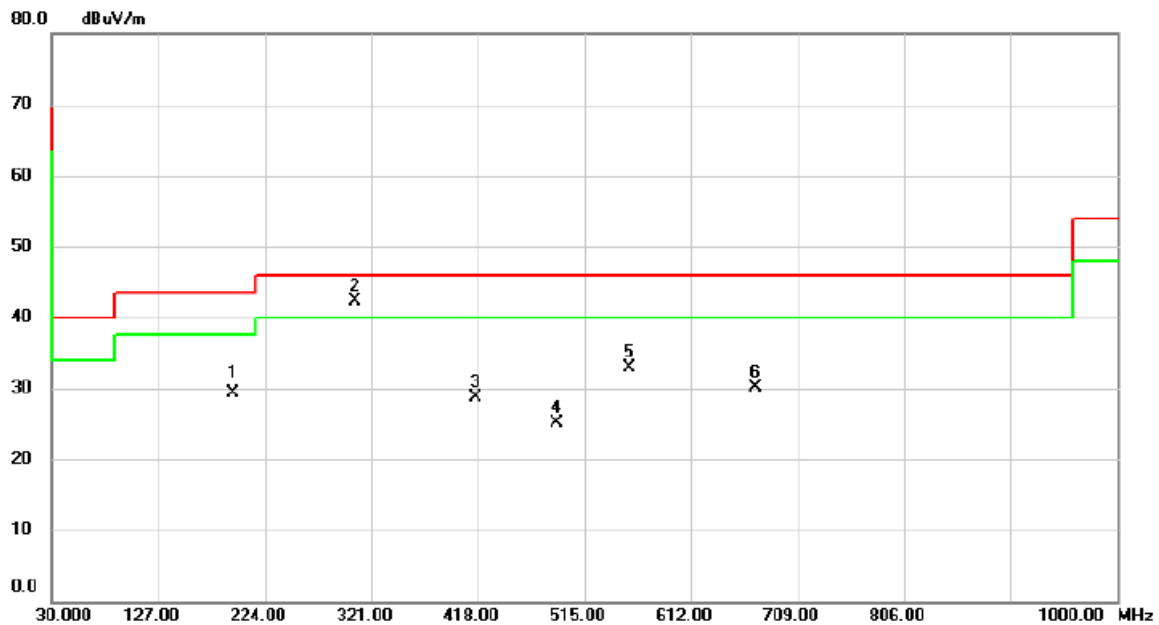
REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

APPENDIX C RADIATED EMISSIONS - 30 MHZ TO 1 GHZ

Test Mode	TX Mode	Test Date	2024/11/1
Test Frequency	912MHz	Polarization	Vertical
Temp	25°C	Hum.	65%

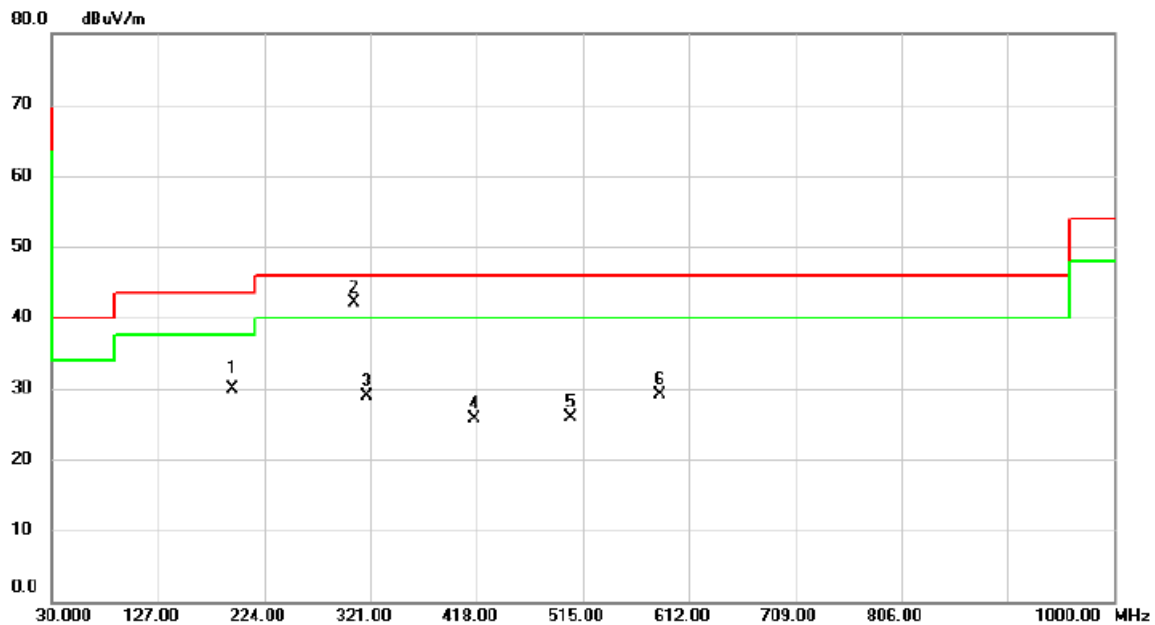


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		194.9000	43.29	-13.99	29.30	43.50	-14.20	QP			
2	*	305.4800	52.33	-10.11	42.22	46.00	-3.78	peak			
3		416.0600	35.78	-7.01	28.77	46.00	-17.23	peak			
4		489.7800	30.41	-5.39	25.02	46.00	-20.98	peak			
5		555.7400	36.94	-4.02	32.92	46.00	-13.08	peak			
6		670.2000	31.39	-1.29	30.10	46.00	-15.90	peak			

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX Mode	Test Date	2024/11/1
Test Frequency	912MHz	Polarization	Horizontal
Temp	25°C	Hum.	65%



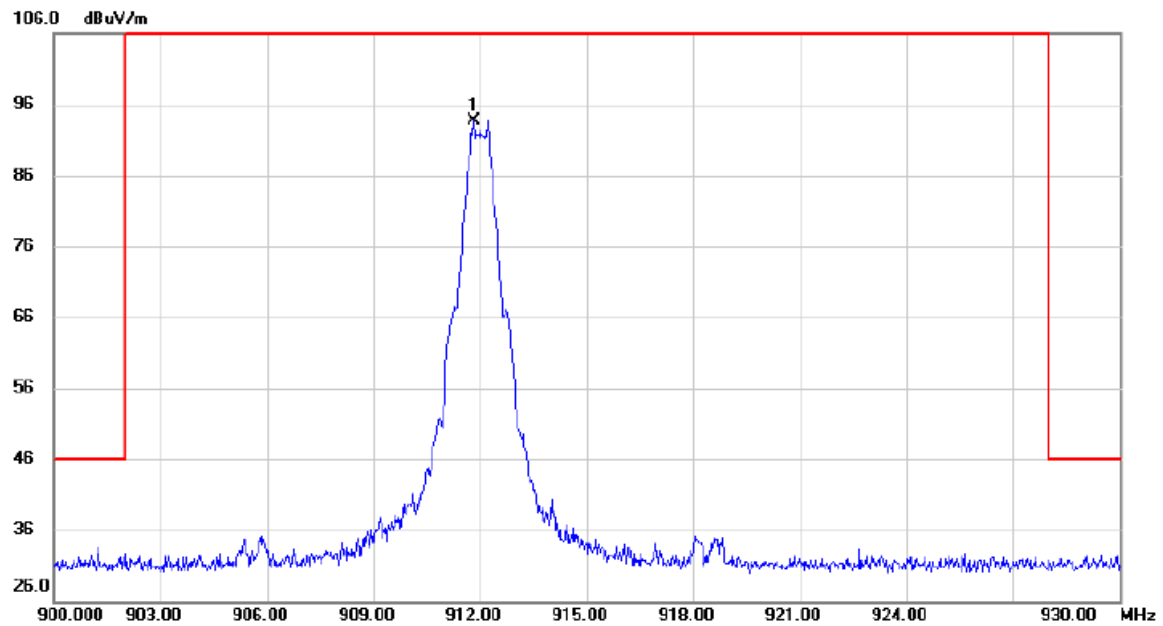
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Margin dB	Antenna Height cm	Table Degree degree	Comment
1		194.9000	43.88	-13.99	29.89	43.50	-13.61	QP		
2	*	306.4500	52.27	-10.07	42.20	46.00	-3.80	peak		
3		318.0900	38.67	-9.78	28.89	46.00	-17.11	peak		
4		416.0600	32.67	-7.01	25.66	46.00	-20.34	peak		
5		504.3300	31.09	-5.15	25.94	46.00	-20.06	peak		
6		584.8400	32.28	-3.08	29.20	46.00	-16.80	peak		

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

APPENDIX D RADIATED EMISSIONS - ABOVE 1 GHZ

Test Mode	TX Mode	Test Date	2024/11/5
Test Frequency	912MHz	Polarization	Vertical
Temp	25°C	Hum.	65%

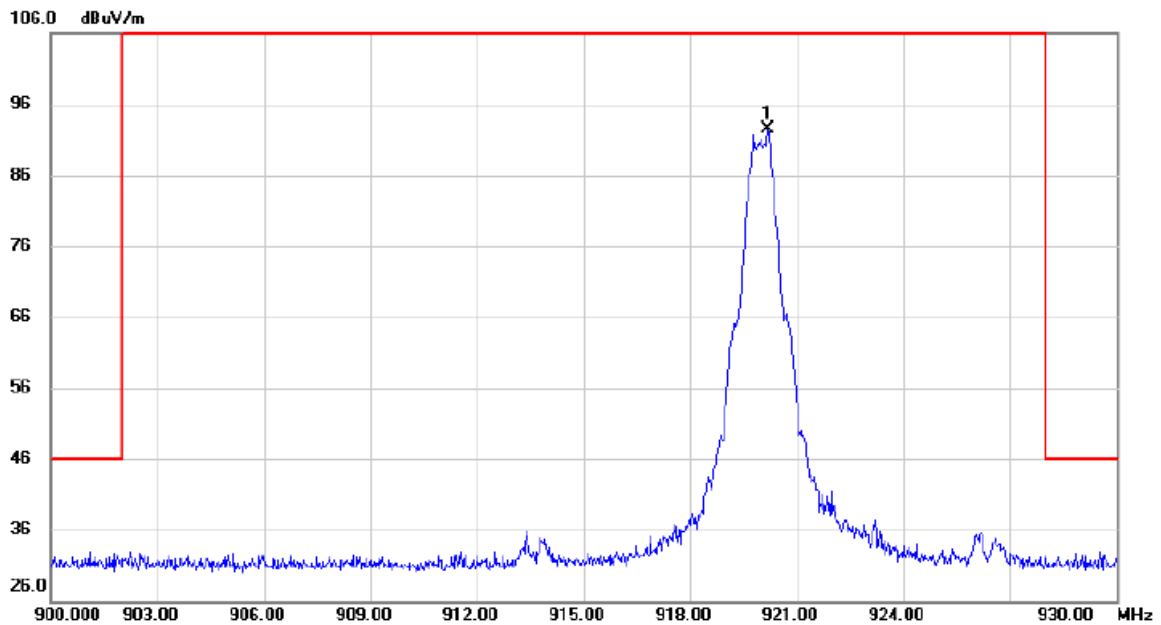


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1	*	911.8200	91.87	1.87	93.74	140.00	-46.26	peak	

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX Mode	Test Date	2024/11/5
Test Frequency	920MHz	Polarization	Vertical
Temp	25°C	Hum.	65%

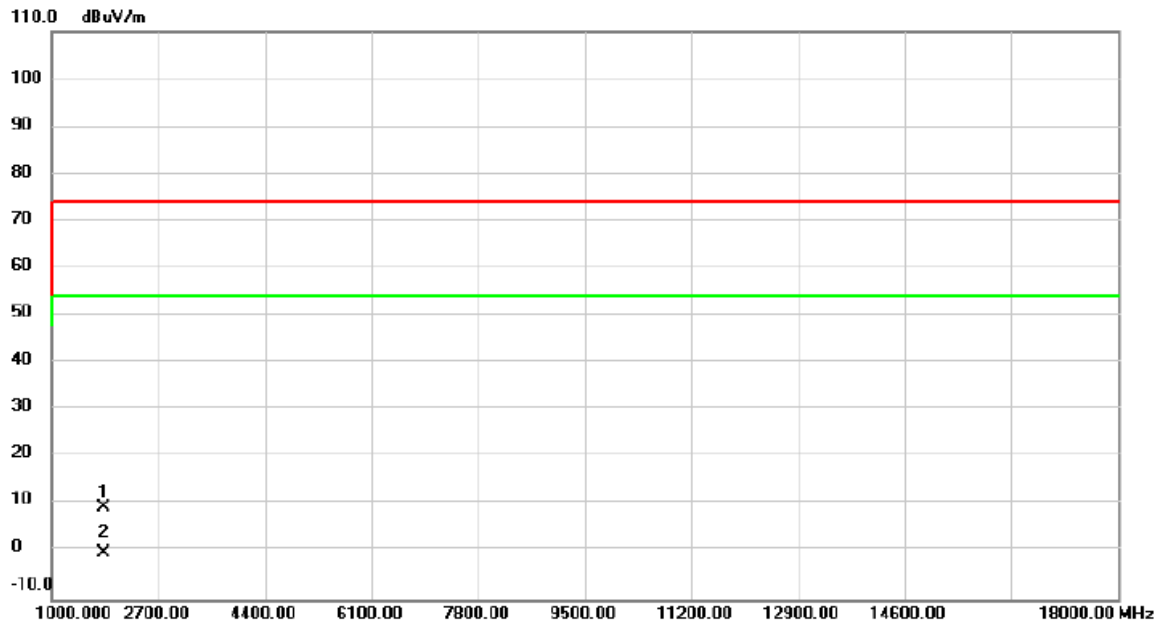


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	920.1900	90.50	1.95	92.45	140.00	-47.55	peak		

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX Mode	Test Date	2024/11/1
Test Frequency	912MHz	Polarization	Vertical
Temp	25°C	Hum.	65%

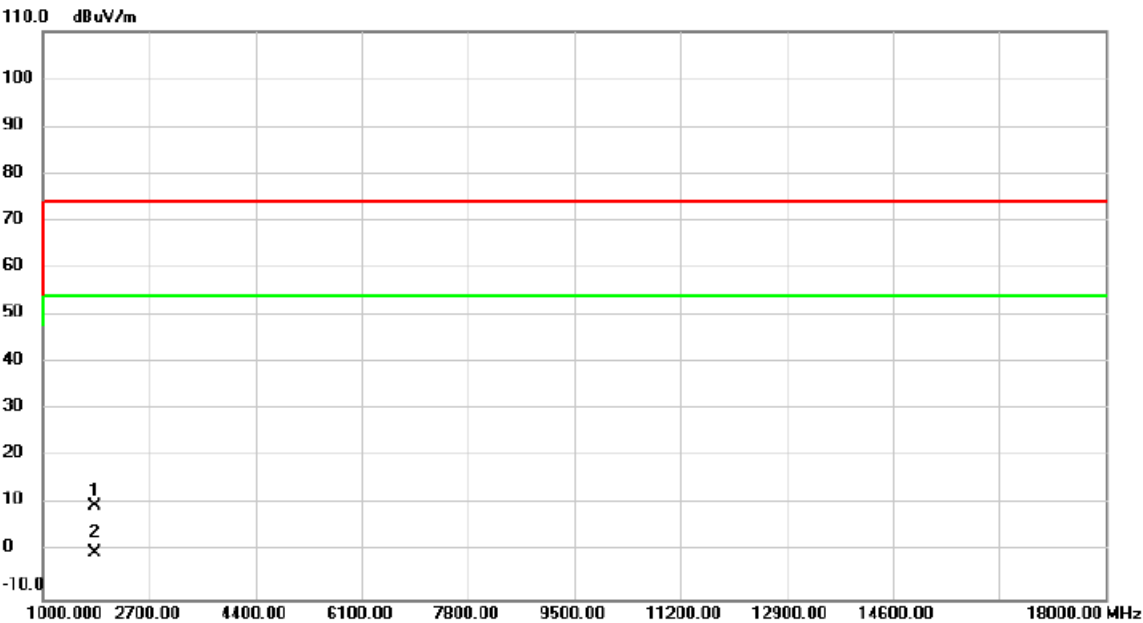


No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		1824.000	26.99	-17.55	9.44	74.00	-64.56			peak
2	*	1824.000	17.36	-17.55	-0.19	54.00	-54.19			AVG

REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

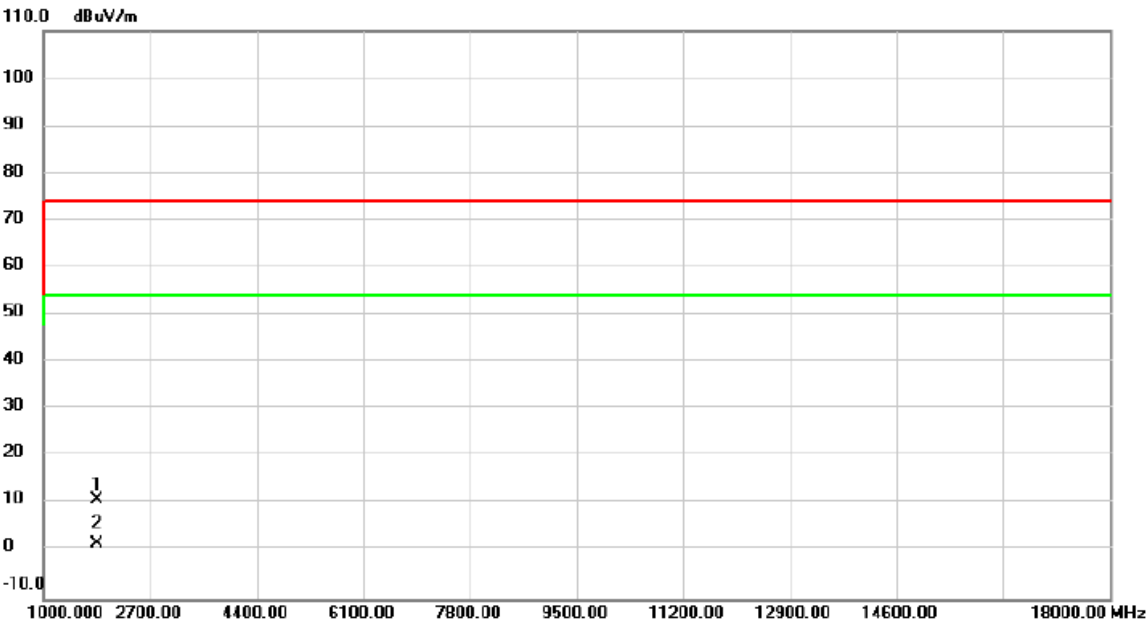
Test Mode	TX Mode	Test Date	2024/11/1
Test Frequency	912MHz	Polarization	Horizontal
Temp	25°C	Hum.	65%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		1824.000	27.27	-17.55	9.72	74.00	-64.28	peak		
2	*	1824.000	17.45	-17.55	-0.10	54.00	-54.10	AVG		

REMARKS:
 (1) Measurement Value = Reading Level + Correct Factor.
 (2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX Mode	Test Date	2024/11/1
Test Frequency	920MHz	Polarization	Vertical
Temp	25°C	Hum.	65%



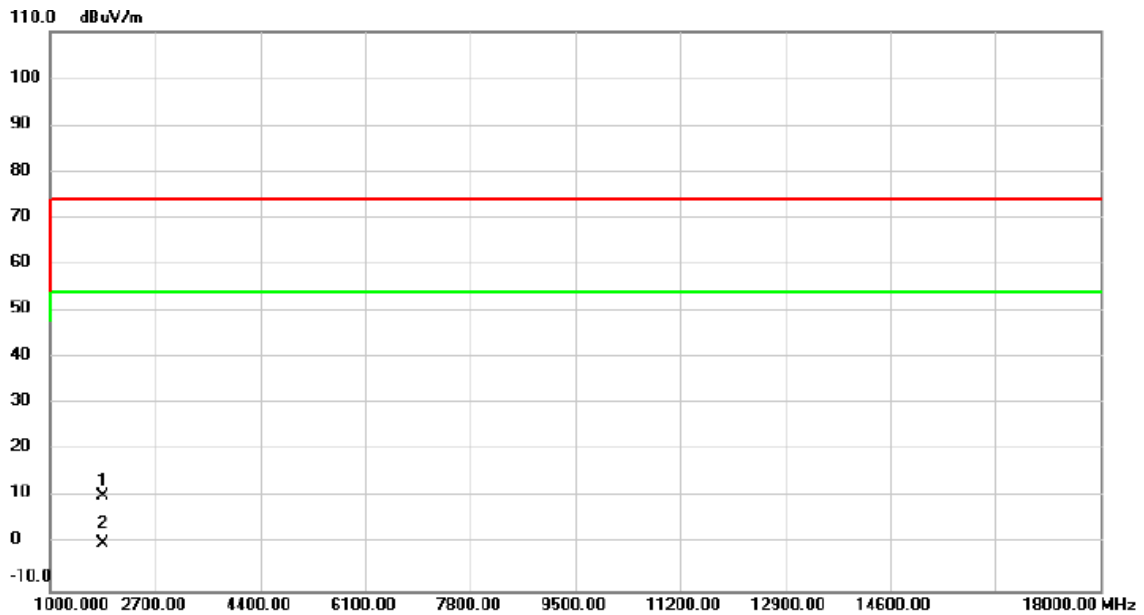
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		1840.000	28.24	-17.50	10.74	74.00	-63.26			peak
2	*	1840.000	18.95	-17.50	1.45	54.00	-52.55			AVG

REMARKS:

(1) Measurement Value = Reading Level + Correct Factor.

(2) Margin Level = Measurement Value - Limit Value.

Test Mode	TX Mode	Test Date	2024/11/1
Test Frequency	920MHz	Polarization	Horizontal
Temp	25°C	Hum.	65%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Margin	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		1840.000	27.63	-17.50	10.13	74.00	-63.87			peak
2	*	1840.000	17.70	-17.50	0.20	54.00	-53.80			AVG

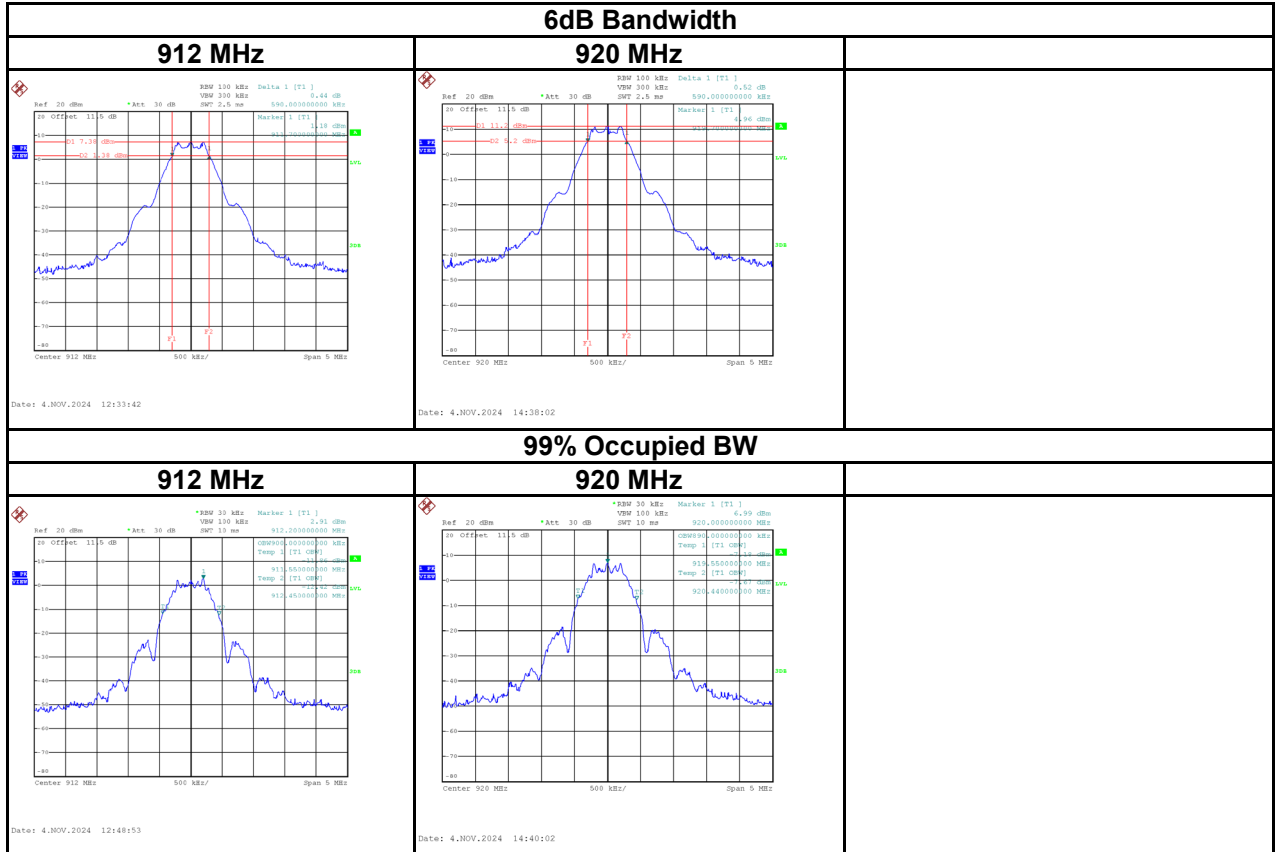
REMARKS:

- (1) Measurement Value = Reading Level + Correct Factor.
- (2) Margin Level = Measurement Value - Limit Value.

APPENDIX E BANDWIDTH

Test Mode: TX Mode

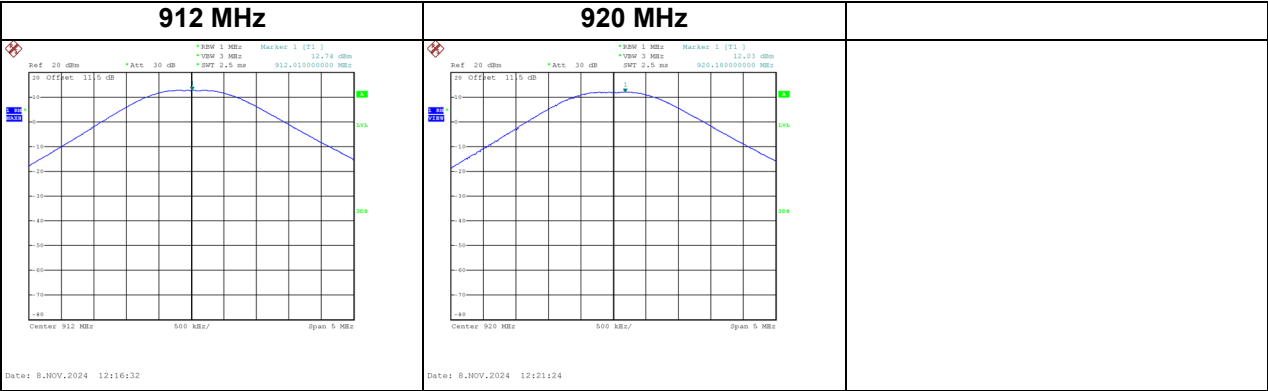
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result
912	0.59	0.59	500	Pass
920	0.90	0.89	500	Pass



APPENDIX F OUTPUT POWER

Test Mode :	TX Mode	Tested Date	2024/11/08
-------------	---------	-------------	------------

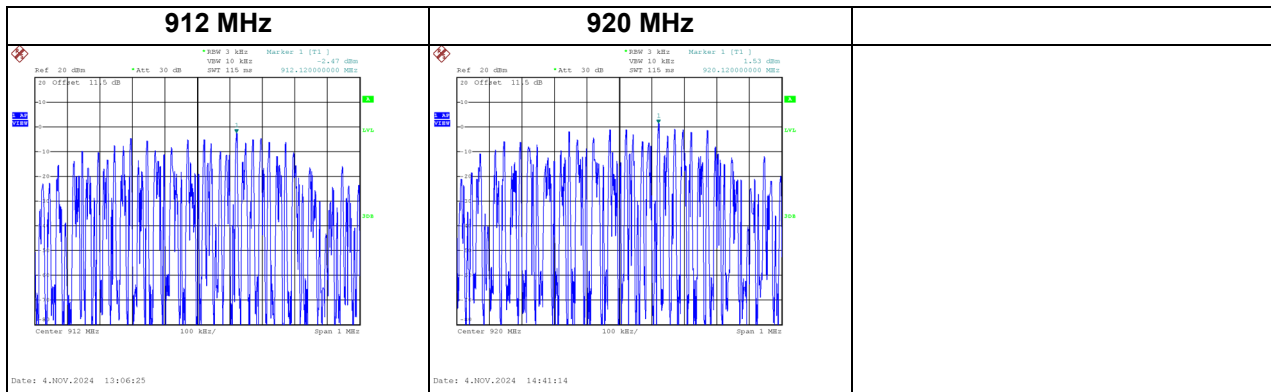
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
912	12.74	0.0188	30.00	1.0000	Pass
920	12.03	0.0160	30.00	1.0000	Pass



APPENDIX G POWER SPECTRAL DENSITY TEST

Test Mode:	TX Mode
------------	---------

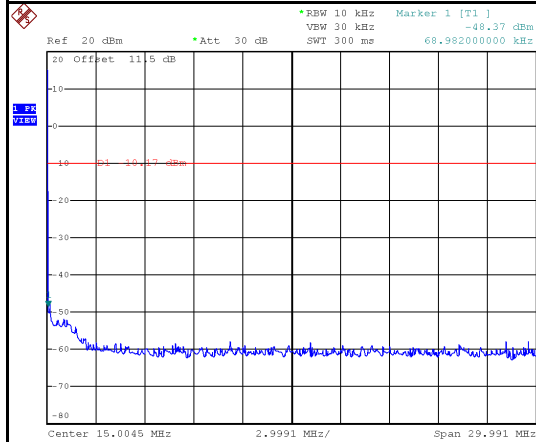
Frequency (MHz)	Power Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Test Result
912	-2.47	8	Pass
920	1.53	8	Pass



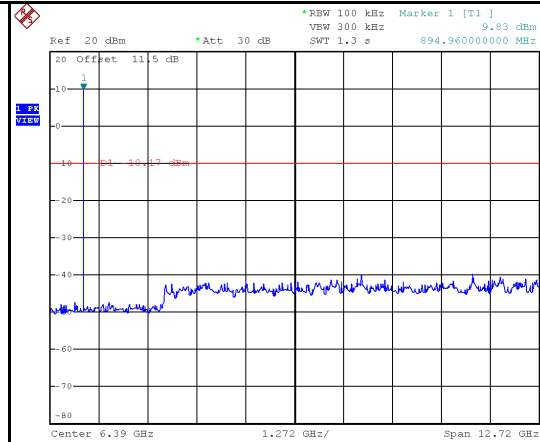
APPENDIX H ANTENNA CONDUCTED SPURIOUS EMISSION

Test Mode : TX Mode

Bandedge-912 MHz

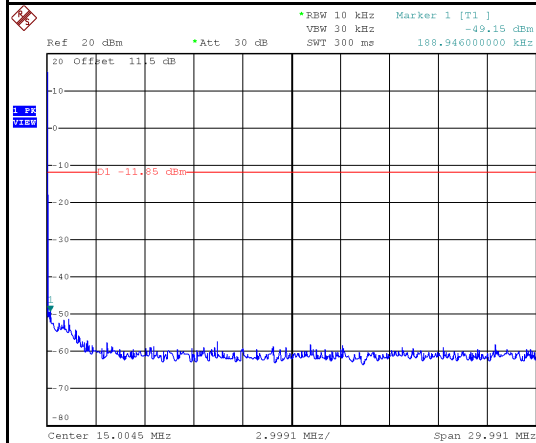


Date: 4.NOV.2024 16:03:22

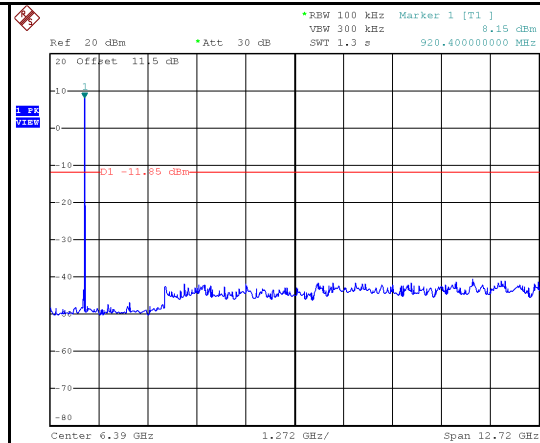


Date: 4.NOV.2024 15:52:25

Bandedge-920 MHz



Date: 4.NOV.2024 16:36:36



Date: 4.NOV.2024 16:33:17

End of Test Report