FCC Radio Test Report

FCC ID: ZMOL860GL16G

Report No.	:	BTL-FCCP-6-2212T118
Equipment	:	LTE Module
Model Name	:	L860-GL-16
Brand Name	:	Fibocom
Applicant	:	Fibocom Wireless Inc.
Address	:	1101,Tower A, Building 6, Shenzhen International Innovation Valley, Dashi 1st Rd, Nanshan, ShenZhen, China
Radio Function	:	LTE Band 48
FCC Rule Part(s)	:	FCC CFR Title 47, Part 96
Measurement Procedure(s)	:	ANSI C63.26-2015 ANSI/TIA-603-E-2016 FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
Date of Receipt	:	2022/12/30
Date of Test	:	2022/12/30 ~ 2023/2/17
Issued Date	:	2023/2/23

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

Prepared by : Eric Lee, Engineer

Approved by : Jerry Chuang, 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** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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

1	SUMMARY OF TEST RESULTS	5
1.1	TEST FACILITY	6
1.2	MEASUREMENT UNCERTAINTY	6
1.3	TEST ENVIRONMENT CONDITIONS	6
2	GENERAL INFORMATION	7
2.1	DESCRIPTION OF EUT	7
2.2	TEST MODES	8
2.3	BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	9
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	EFFECTIVE ISOTROPICAL RADIATED POWER MEASUREMENT	13
4.1	LIMIT	13
4.2	TEST PROCEDURE	13
4.3	DEVIATION FROM TEST STANDARD	14
4.4	TEST SETUP	14
4.5	EUT OPERATING CONDITIONS	14
4.6	TEST RESULT	14
5	RADIATED SPURIOUS EMISSIONS MEASUREMENT	15
5.1	LIMIT	15
5.2	TEST PROCEDURE	15
5.3	DEVIATION FROM TEST STANDARD	15
5.4	TEST SETUP	16
5.5	EUT OPERATING CONDITIONS	16
5.6	TEST RESULT	16
6	LIST OF MEASURING EQUIPMENTS	17
7	EUT TEST PHOTO	19
8	EUT PHOTOS	19

APPENDIX A	AC POWER LINE CONDUCTED EMISSIONS	20
APPENDIX B	EFFECTIVE RADIATED POWER	25
APPENDIX C	RADIATED SPURIOUS EMISSIONS	36

REVISION HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-6-2212T118	R00	Original Report.	2023/2/23	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	------
2.1046 96.41(b)	Conducted Output Power Effective Isotropic Radiated Power	APPENDIX B	Pass	------
2.1053 96.41(e)	Radiated Spurious Emissions	APPENDIX C	Pass	------

NOTE:
(1) ”N/A” denotes test is not applicable in this Test Report.
(2) The report format version is TP.1.1.1.
(3) This test report is issued for the RF module (FCCID: ZMOL860GL16G) to be incorporated to the host device (Model number: TP00143B), Product name: Notebook Computer).
Since the RF module has been certificated, after evaluation, above test items were criticized and reconfirmed in this report.
(4) After spot check, this revision does not change original radio parameters.

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)
☒ C05 ☐ SR10 ☒ SR11
No. 72, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
(FCC DN: TW0659)
☐ C06 ☒ CB21 ☐ CB22

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **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)
C05	CISPR	150 kHz ~ 30MHz	3.44

B. Effective Isotropic Radiated Power and Radiated emissions test :

Test Site	Measurement Frequency Range	U,(dB)
CB21	0.03 GHz ~ 0.2 GHz	4.17
	0.2 GHz ~ 1 GHz	4.72
	1 GHz ~ 6 GHz	5.21
	6 GHz ~ 18 GHz	5.51
	18 GHz ~ 26 GHz	3.69
	26 GHz ~ 40 GHz	4.23

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	18 °C, 65 %	AC 120V	Paul Shen
Conducted Output Power	23.62 °C, 53 %	AC 120V	Paul Shen
Effective Isotropic Radiated Power	Refer to data	AC 120V	Mark Wang
Radiated Spurious Emissions	Refer to data	AC 120V	Mark Wang

2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	LTE Module			
Model Name	L860-GL-16			
Brand Name	Fibocom			
Model Difference	N/A			
Power Source	Supplied from host system.			
Power Rating	3.3 Vdc			
Host device information				
Equipment	Notebook Computer			
Model Name	TP00143B			
Brand Name	Lenovo			
Model Difference	N/A			
Power Source	DC voltage supplied from External Power Supply.			
Power Rating	For Lenovo / ADL135SLC3A, ADL135SDC3A, ADL135SCC3A: I/P: 100-240V~2.5A 50-60Hz, O/P: 20.0V⎓6.75A 135.0W For Lenovo / ADL230SLC3A, ADL230SDC3A, ADL230SCC3A: I/P: 100-240V~3.5A 50-60Hz, O/P: 20.0V⎓11.5A 230.0W For Lenovo / ADL170SLC3A, ADL170SDC3A, ADL170SCC3A: I/P: 100-240V~2.5A 50-60Hz, O/P: 20.0V⎓8.5A 135.0W			
WLAN Module	Intel® Wi-Fi 6E AX211 / AX211D2W			
WWAN Module	Fibocom / L860-GL-16			
NFC Module	FOXCONN / T77H747			
Operation Frequency	Band	UL Frequency (MHz)	DL Frequency (MHz)	
	LTE 48	3550 ~ 3700	-	
Maximum EIRP	Band	BW (MHz)	Mode	Power (W)
	LTE 48	1.4	QPSK	0.119
			16QAM	0.097
		3	QPSK	0.121
			16QAM	0.098
		5	QPSK	0.122
			16QAM	0.099
		10	QPSK	0.123
			16QAM	0.100
Test Model	L860-GL-16			
Sample Status	Engineering Sample			
EUT Modification(s)	N/A			

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) Table for Filed Antenna:

Antenna	Manufacture	Part Number	Type	Connector	Gain (dBi)	Note
Main	AWAN	DC33001WF00	PIFA	I-PEX	0.15	LTE Band 48
Aux	AWAN	DC33001WF10	PIFA	I-PEX	-	RX only
MIMO1	AWAN	DC33001WF30	PIFA	I-PEX	-	Rx only
MIMO2	AWAN	DC33001WF20	PIFA	I-PEX	0.79	LTE Band 48

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

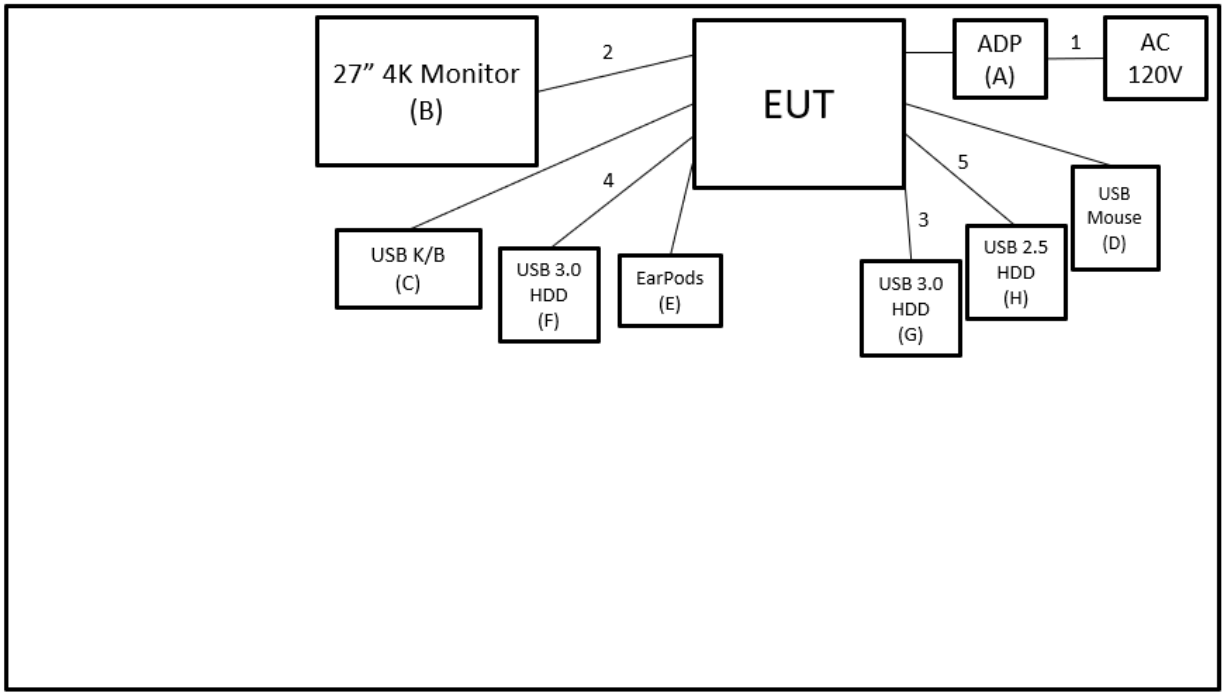
Test Items	Band	Test Mode	Note
AC Power Line Conducted Emissions	-	Normal/Idle	-
Conducted Output Power	LTE Band 48	Refer to APPENDIX B	-
Effective Isotropic Radiated Power	LTE Band 48	TX Mode (CH 55340/55990/56640)	-
Radiated Spurious Emissions	LTE Band 48	TX Mode (CH 55990)	-

NOTE:
(1) For Radiated Spurious Emissions both QPSK and 16QAM are evaluated, but only the worst case (QPSK) is recorded.

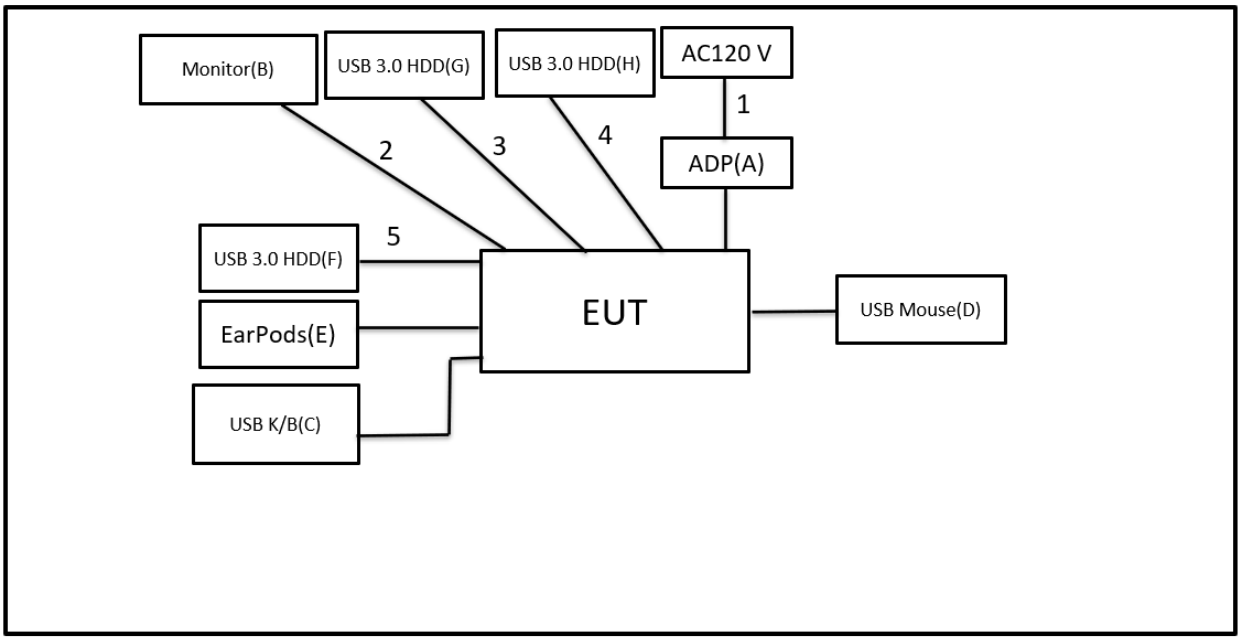
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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

AC Power Line Conducted Emissions Test



Radiated Emissions Test



2.4 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	Adapter	Lenovo	ADL230SLC3A	N/A	Supplied by test requester.
B	27” 4K Monitor	DELL	U2720Q	CN-083VF-WSL00-0B7-332L	Furnished by test lab.
C	USB K/B	DELL	KB216t	CN-0W33XP-L0300-797-05TY-A03	Furnished by test lab.
D	USB Mouse	DELL	MOCZUL	CN-049TWY-PRC00-79E-01HA	Furnished by test lab.
E	EarPods	Apple	A1472	N/A	Furnished by test lab.
F	USB 3.0 HDD	WD	WDBC3C0010BSL-0B	WX81A88ALJUC	Furnished by test lab.
G	USB 3.0 HDD	LACIE	1TB Rugged Mini USB3	NL33NGNK	Furnished by test lab.
G*	USB 2.5" HDD	AKITIO	Neutrino U3.1	SK21D1621D003F	Furnished by test lab.
H	USB 2.5" HDD	AKITIO	Neutrino U3.1	SK21D1621D003F	Furnished by test lab.

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	N/A	N/A	1.5m	Power Cable	Supplied by test requester.
2	N/A	N/A	1.7m	HDMI Cable	Furnished by test lab.
3	N/A	N/A	0.45m	Type C to Type C Cable	Furnished by test lab.
3*	N/A	N/A	1m	Type C to Type C Cable	Furnished by test lab.
4	N/A	N/A	1.5m	Type C to Type C Cable	Furnished by test lab.
4*	N/A	N/A	0.3m	Type C to Type C Cable	Furnished by test lab.
5	N/A	N/A	0.6m	Type C to Type C Cable	Furnished by test lab.

NOTE: Item “*” is only for radiated emissions test.

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

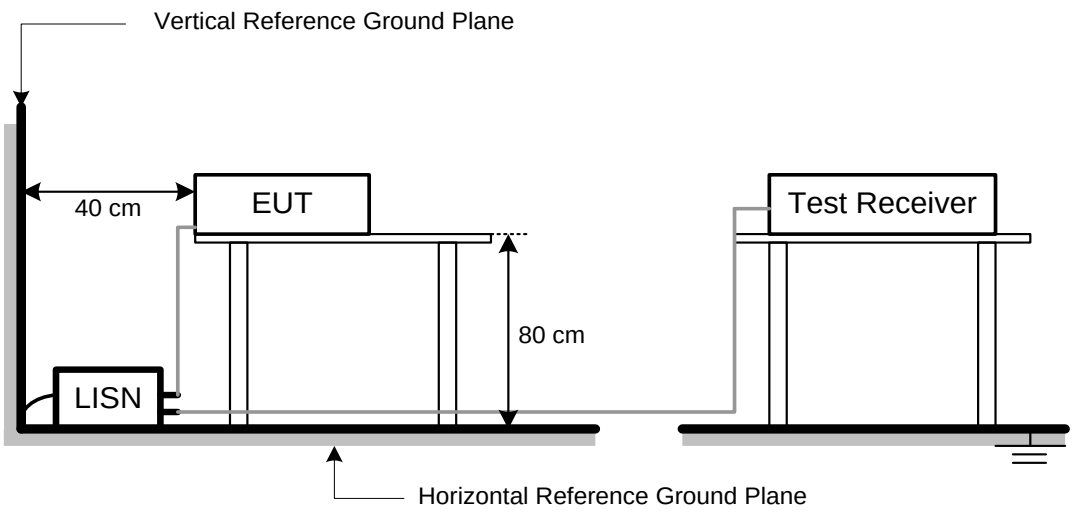
a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
All other support equipment were powered from an additional LISN(s).
The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
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 EFFECTIVE ISOTROPICAL RADIATED POWER MEASUREMENT

4.1 LIMIT

EIRP for CBRS equipment as below table:

Device		Maximum EIRP (dBm/10 MHz)	Maximum PSD (dBm/10 MHz)
☒	End User Device	23	N/A
☐	Category A CBSD	30	20
☐	Category B CBSD	47	37

NOTE:
(1) 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
-29.66	+	34.26	=	4.60

Measurement Value		Limit Value		Margin Level
4.60	-	38.45	=	-33.85

4.2 TEST PROCEDURE

The testing follows ANSI C63.26-2015 Section 5.2.4.4.2

CONDUCTED OUTPUT POWER:
The EUT can operate with a constant duty cycle.
a. Set span to 2 × to 3 × the OBW.
b. Set RBW = 1% to 5% of the OBW.
c. Set VBW ≥ 3 × RBW.
d. Set number of measurement points in sweep ≥ 2 × span / RBW.
e. Sweep time:
Set = auto-couple, or
Set ≥ [10 × (number of points in sweep) × (transmission symbol period)] for single sweep (automation-compatible) measurement.
f. Detector = power averaging (rms).
g. Set sweep trigger to “free run.”
h. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.
i. Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band or channel power measurement function with band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.
j. Add 10 log (1/duty cycle) to the measured power level to compute the average power during continuous transmission. For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is a constant 25%.

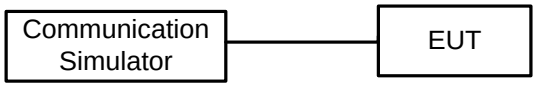
EIRP Power:
The testing follows ANSI C63.26-2015 Section 5.2.5.5
According to KDB 412172 D01 Power Approach,
EIRP = PT + GT – LC, where
PT = transmitter output power in dBm
GT = gain of the transmitting antenna in dBi
LC = signal attenuation in the connecting cable between the transmitter and antenna in dB

4.3 DEVIATION FROM TEST STANDARD

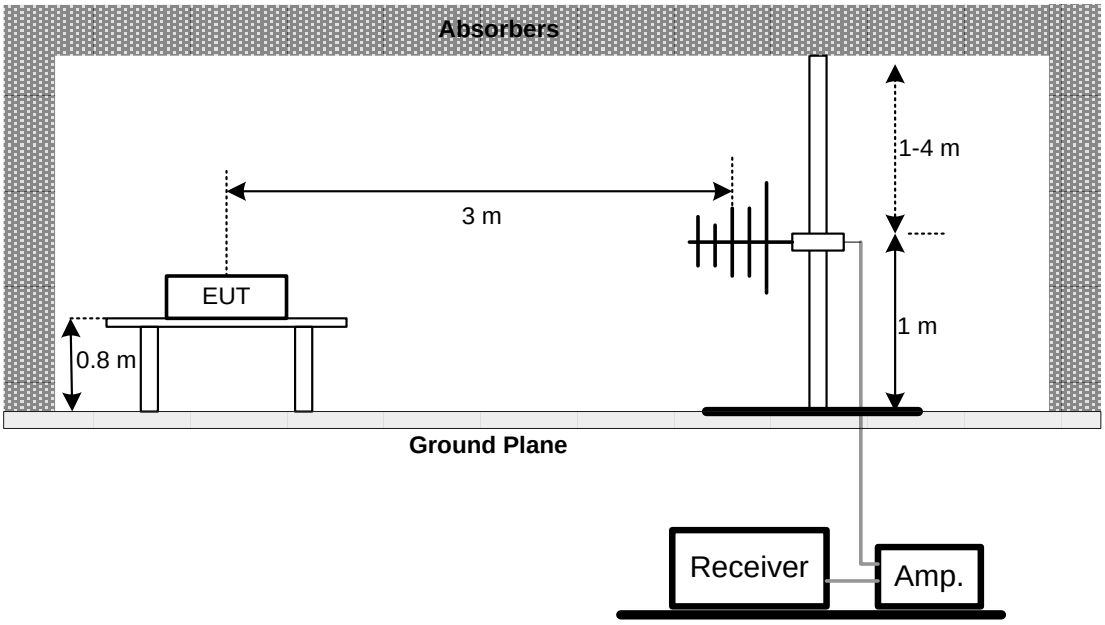
No deviation.

4.4 TEST SETUP

Conducted Measurement:



Radiated Measurement:



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT

Please refer to the APPENDIX B.

5 RADIATED SPURIOUS EMISSIONS MEASUREMENT

5.1 LIMIT

The power of any emission outside of the authorized operating frequency ranges shall not exceed -40dBm/MHz.

NOTE:
(1) The measurements of emission power can be expressed in peak or average values, provided they are expressed in the same parameters as the transmitter power.
(2) 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
-50.43	+	-2.11	=	-52.54

Measurement Value		Limit Value		Margin Level
-52.54	-	-13	=	-39.54

5.2 TEST PROCEDURE

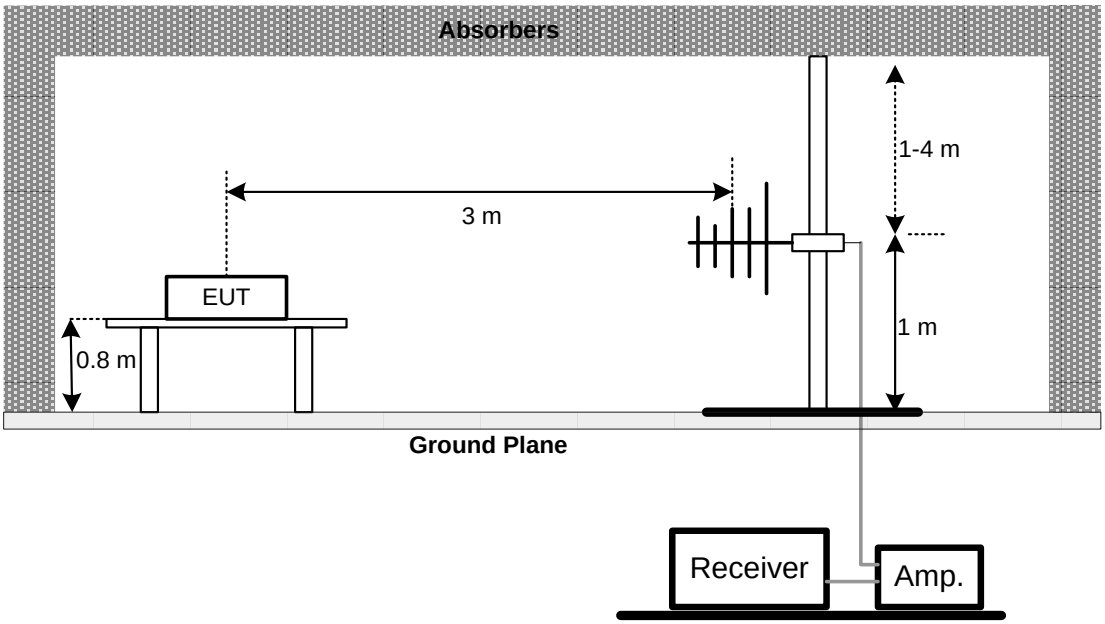
a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
b. The substitution horn antenna is substituted for EUT at the same position and signals generator export the CW signal to the substitution antenna via a TX cable. Rotated the Turn Table and moved receiving antenna to find the maximum radiation power. Adjust output power level of S.G to get a Value of spectrum reading equal to “Read Value “ of step a. Record the power level of S.G
c. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
d. ERP can be calculated form EIRP by subtracting the gain of dipole, ERP = EIPR - 2.15dBi..
e. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

5.3 DEVIATION FROM TEST STANDARD

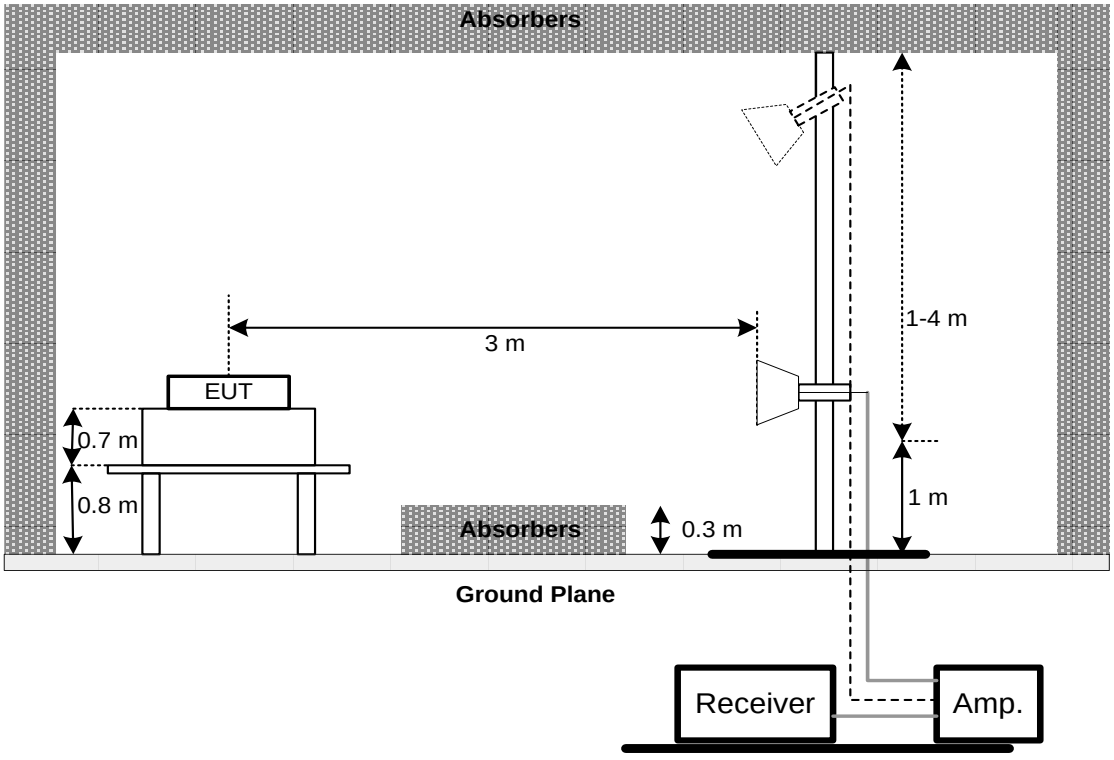
No deviation.

5.4 TEST SETUP

30 MHz to 1 GHz



Above 1 GHz



5.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULT

Please refer to the APPENDIX C.

6 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	101521	2022/9/28	2023/9/27
2	Test Cable	EMCI	EMCCFD300-BM-BMR-5000	220331	2022/3/31	2023/3/30
3	EMI Test Receiver	R&S	ESR 7	101433	2022/11/16	2023/11/15
4	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A

Effective Isotropic Radiated Power and Radiated Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Preamplifier	EMCI	EMC330N	980850	2022/9/19	2023/9/18
2	Preamplifier	EMCI	EMC118A45SE	980819	2022/3/8	2023/3/7
3	Pre-Amplifier	EMCI	EMC184045SE	980907	2022/9/28	2023/9/27
4	Test Cable	EMCI	EMC104-SM-SM-1000	220319	2022/3/15	2023/3/14
5	Test Cable	EMCI	EMC104-SM-SM-3000	220322	2022/3/15	2023/3/14
6	Test Cable	EMCI	EMC104-SM-SM-7000	220324	2022/3/15	2023/3/14
7	EXA Signal Analyzer	keysight	N9020B	MY57120120	2022/3/7	2023/3/6
8	Horn Antenna	RFSPIN	DRH18-E	211202A18EN	2022/5/18	2023/5/17
9	Horn Ant	Schwarzbeck	BBHA 9170D	1136	2022/5/18	2023/5/17
10	Log-bicon Antenna	Schwarzbeck	VULB9168	1369	2022/5/20	2023/5/19
11	6dB Attenuator	EMCI	EMCI-N-6-06	AT-N0625	2022/5/20	2023/5/19
12	Test Cable	EMCI	EMC101G-KM-KM-3000	220329	2022/3/15	2023/3/14
13	Test Cable	EMCI	EMC102-KM-KM-1000	220327	44635	2023/3/14
14	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A
15	WIRELESS COMMUNICATION TEST SET	Agilent	E5515C	GB47390193	44749	2023/7/6
16	Radio Communication Test Station	ANRITSU	MT8821C	6262044728	44890	2023/11/24

Conducted Output Power						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	8960 Series 10 Wireless Com Test Set	Agilent	E5515C	GB47390193	2022/7/7	2023/7/6
2	Radio Communication Analyzer	Anritsu	MT8820C	6201525878	2022/6/16	2023/6/15
3	Radio Communication Analyzer	Anritsu	MT8821C	6262044728	2022/11/24	2023/11/23

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

7 EUT TEST PHOTO

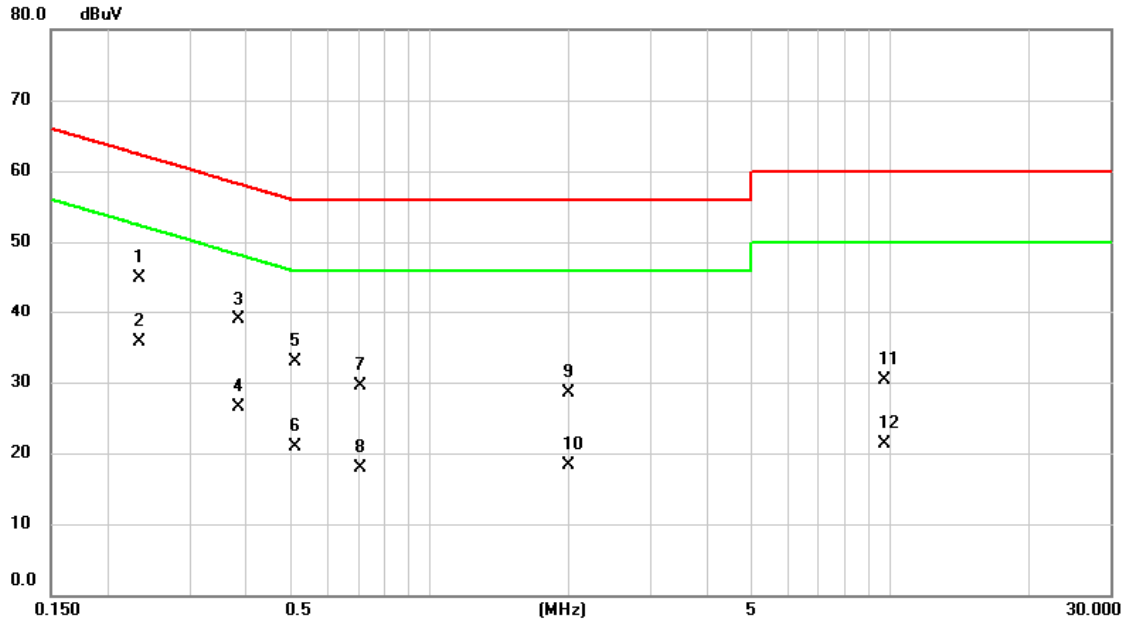
Please refer to document Appendix No.: TP-2212T118-FCCP-1 (APPENDIX-TEST PHOTOS).

8 EUT PHOTOS

Please refer to document Appendix No.: EP-2212T118-2 (APPENDIX-EUT PHOTOS).

APPENDIX A AC POWER LINE CONDUCTED EMISSIONS

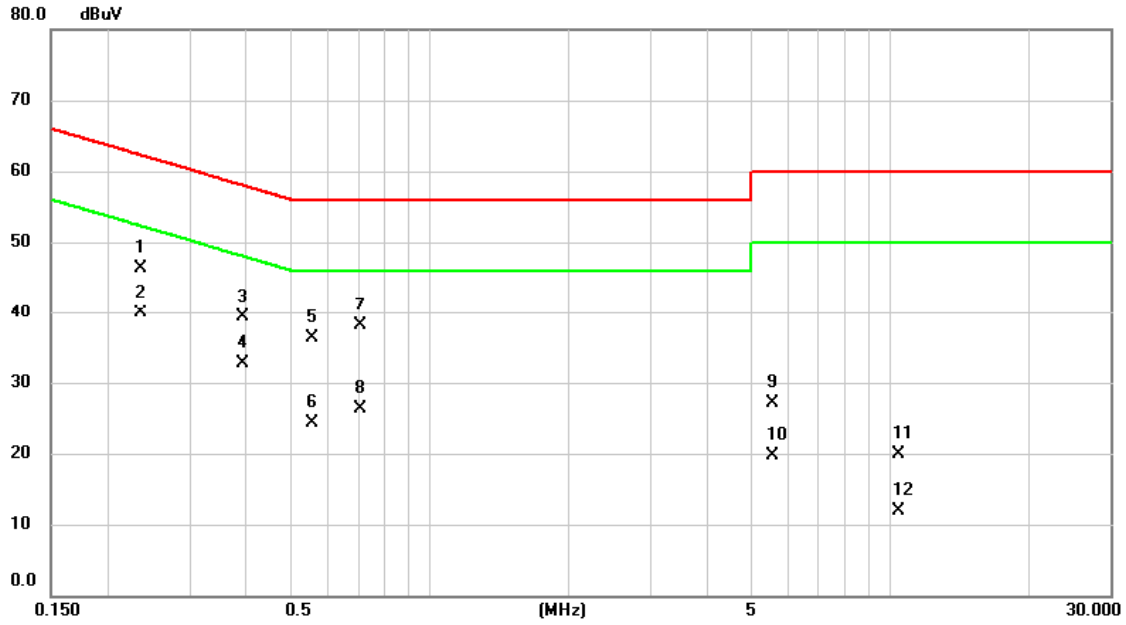
Test Mode	Normal	Tested Date	2023/2/3
Test Frequency	-	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2333	34.52	10.35	44.87	62.33	-17.46	QP	
2	*	0.2333	25.33	10.35	35.68	52.33	-16.65	AVG	
3		0.3840	28.63	10.36	38.99	58.19	-19.20	QP	
4		0.3840	16.05	10.36	26.41	48.19	-21.78	AVG	
5		0.5100	22.49	10.36	32.85	56.00	-23.15	QP	
6		0.5100	10.54	10.36	20.90	46.00	-25.10	AVG	
7		0.7056	19.20	10.39	29.59	56.00	-26.41	QP	
8		0.7056	7.60	10.39	17.99	46.00	-28.01	AVG	
9		1.9995	18.09	10.44	28.53	56.00	-27.47	QP	
10		1.9995	7.89	10.44	18.33	46.00	-27.67	AVG	
11		9.7530	19.56	10.67	30.23	60.00	-29.77	QP	
12		9.7530	10.67	10.67	21.34	50.00	-28.66	AVG	

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

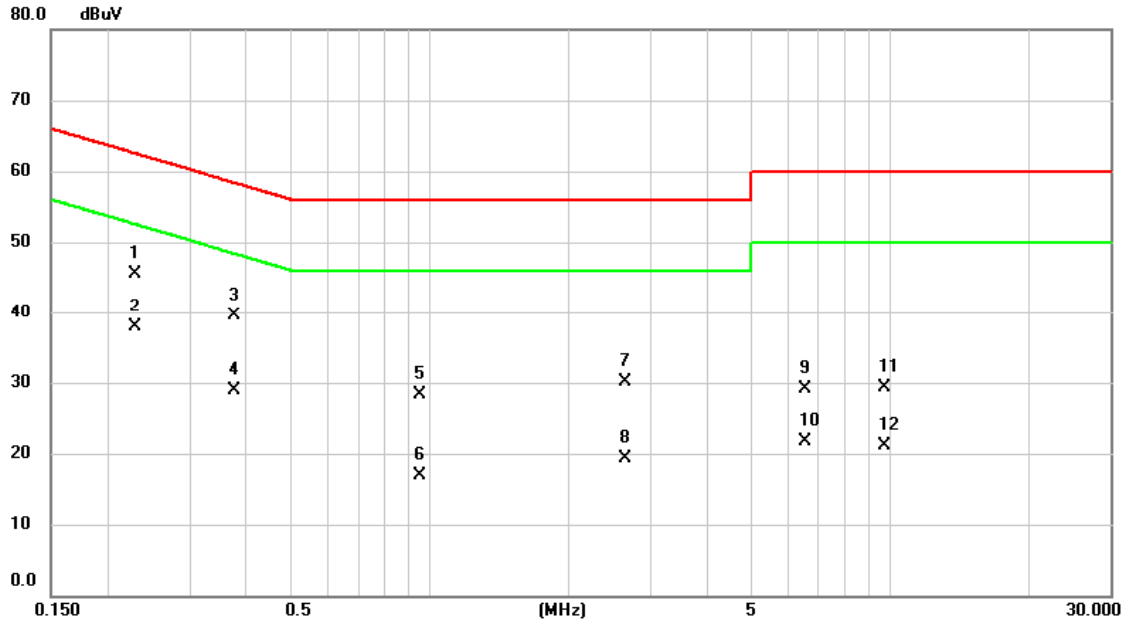
Test Mode	Normal	Tested Date	2023/2/3
Test Frequency	-	Phase	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2355	35.91	10.35	46.26	62.25	-15.99	QP	
2	*	0.2355	29.63	10.35	39.98	52.25	-12.27	AVG	
3		0.3930	28.99	10.37	39.36	58.00	-18.64	QP	
4		0.3930	22.37	10.37	32.74	48.00	-15.26	AVG	
5		0.5571	25.88	10.37	36.25	56.00	-19.75	QP	
6		0.5571	13.98	10.37	24.35	46.00	-21.65	AVG	
7		0.7080	27.63	10.40	38.03	56.00	-17.97	QP	
8		0.7080	15.83	10.40	26.23	46.00	-19.77	AVG	
9		5.5635	16.53	10.55	27.08	60.00	-32.92	QP	
10		5.5635	9.16	10.55	19.71	50.00	-30.29	AVG	
11		10.4078	9.22	10.67	19.89	60.00	-40.11	QP	
12		10.4078	1.33	10.67	12.00	50.00	-38.00	AVG	

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

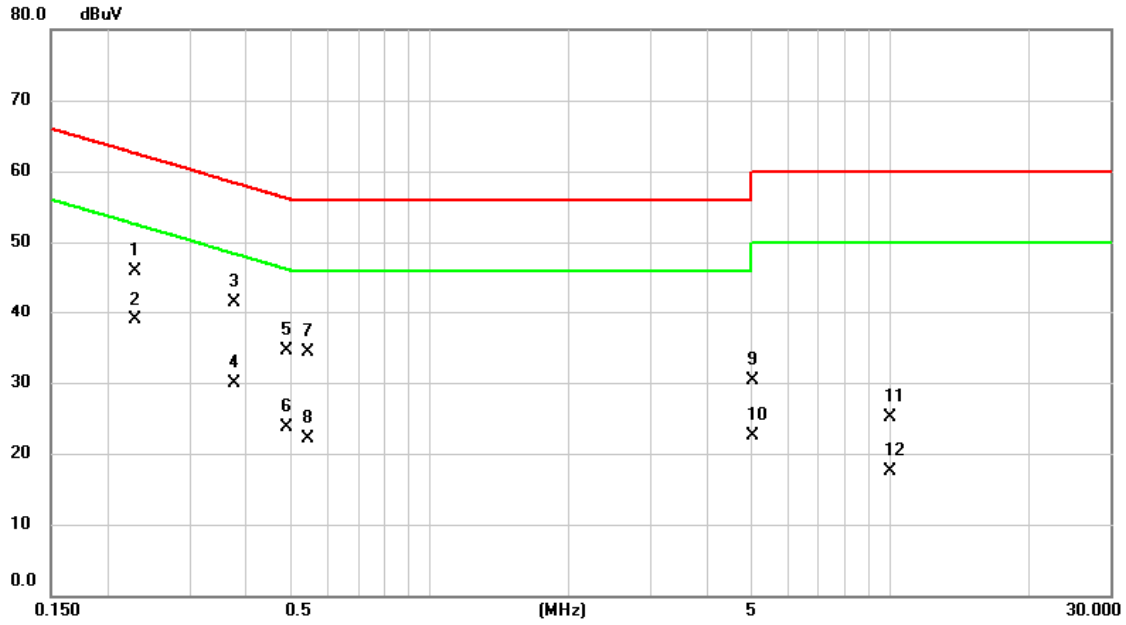
Test Mode	Idle	Tested Date	2023/2/3
Test Frequency	-	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2288	35.13	10.35	45.48	62.49	-17.01	QP	
2	*	0.2288	27.63	10.35	37.98	52.49	-14.51	AVG	
3		0.3772	29.22	10.36	39.58	58.34	-18.76	QP	
4		0.3772	18.53	10.36	28.89	48.34	-19.45	AVG	
5		0.9487	17.88	10.41	28.29	56.00	-27.71	QP	
6		0.9487	6.40	10.41	16.81	46.00	-29.19	AVG	
7		2.6475	19.70	10.47	30.17	56.00	-25.83	QP	
8		2.6475	8.80	10.47	19.27	46.00	-26.73	AVG	
9		6.5445	18.51	10.56	29.07	60.00	-30.93	QP	
10		6.5445	11.24	10.56	21.80	50.00	-28.20	AVG	
11		9.7530	18.70	10.67	29.37	60.00	-30.63	QP	
12		9.7530	10.42	10.67	21.09	50.00	-28.91	AVG	

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

Test Mode	Idle	Tested Date	2023/2/3
Test Frequency	-	Phase	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2288	35.63	10.35	45.98	62.49	-16.51	QP	
2	*	0.2288	28.64	10.35	38.99	52.49	-13.50	AVG	
3		0.3772	31.12	10.37	41.49	58.34	-16.85	QP	
4		0.3772	19.56	10.37	29.93	48.34	-18.41	AVG	
5		0.4897	24.06	10.37	34.43	56.17	-21.74	QP	
6		0.4897	13.30	10.37	23.67	46.17	-22.50	AVG	
7		0.5437	23.95	10.37	34.32	56.00	-21.68	QP	
8		0.5437	11.69	10.37	22.06	46.00	-23.94	AVG	
9		5.0438	19.69	10.53	30.22	60.00	-29.78	QP	
10		5.0438	12.05	10.53	22.58	50.00	-27.42	AVG	
11		9.9780	14.38	10.67	25.05	60.00	-34.95	QP	
12		9.9780	6.88	10.67	17.55	50.00	-32.45	AVG	

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

APPENDIX B EFFECTIVE RADIATED POWER

Conducted Output Power and Calculated ERP:

LTE Band 48 Power:

Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power	EIRP power (dBm)	EIRP power (W)
55265	3552.5	QPSK	1	0	0	20.12	20.27	0.106
			1	12	0	20.37	20.52	0.113
			1	24	0	20.29	20.44	0.111
			12	0	1	19.23	19.38	0.087
			12	6	1	19.53	19.68	0.093
			12	11	1	19.43	19.58	0.091
			25	0	1	19.23	19.38	0.087
		16QAM	1	0	1	19.21	19.36	0.086
			1	12	1	19.47	19.62	0.092
			1	24	1	19.40	19.55	0.090
			12	0	2	18.34	18.49	0.071
			12	6	2	18.48	18.63	0.073
			12	11	2	18.43	18.58	0.072
			25	0	2	18.40	18.55	0.072
56232	3649.2	QPSK	1	0	0	20.34	20.49	0.112
			1	12	0	20.61	20.76	0.119
			1	24	0	20.37	20.52	0.113
			12	0	1	19.45	19.60	0.091
			12	6	1	19.77	19.92	0.098
			12	11	1	19.51	19.66	0.092
			25	0	1	19.45	19.60	0.091
		16QAM	1	0	1	19.43	19.58	0.091
			1	12	1	19.71	19.86	0.097
			1	24	1	19.48	19.63	0.092
			12	0	2	18.42	18.57	0.072
			12	6	2	18.72	18.87	0.077
			12	11	2	18.67	18.82	0.076
			25	0	2	18.64	18.79	0.076
56715	3697.5	QPSK	1	0	0	20.04	20.19	0.104
			1	12	0	20.12	20.27	0.106
			1	24	0	20.23	20.38	0.109
			12	0	1	19.15	19.30	0.085
			12	6	1	19.28	19.43	0.088
			12	11	1	19.37	19.52	0.090
			25	0	1	19.15	19.30	0.085
		16QAM	1	0	1	19.13	19.28	0.085
			1	12	1	19.22	19.37	0.086
			1	24	1	19.34	19.49	0.089
			12	0	2	18.28	18.43	0.070
			12	6	2	18.23	18.38	0.069
			12	11	2	18.18	18.33	0.068
			25	0	2	18.15	18.30	0.068

NOTE:
(1) EIRP = Average power + Antenna gain.
(2) ERP = EIRP - 2.15.
(3) $P(W) = 1\ W \cdot 10^{(P(dBm)\ /\ 10)} / 1000$

Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power	EIRP power (dBm)	EIRP power (W)
55290	3555.0	QPSK	1	0	0	20.17	20.32	0.108
			1	24	0	20.42	20.57	0.114
			1	49	0	20.34	20.49	0.112
			25	0	1	19.28	19.43	0.088
			25	12	1	19.58	19.73	0.094
			25	24	1	19.48	19.63	0.092
			50	0	1	19.28	19.43	0.088
		16QAM	1	0	1	19.26	19.41	0.087
			1	24	1	19.52	19.67	0.093
			1	49	1	19.45	19.60	0.091
			25	0	2	18.39	18.54	0.071
			25	12	2	18.53	18.68	0.074
			25	24	2	18.48	18.63	0.073
			50	0	2	18.45	18.60	0.072
56223	3648.3	QPSK	1	0	0	20.39	20.54	0.113
			1	24	0	20.66	20.81	0.121
			1	49	0	20.42	20.57	0.114
			25	0	1	19.50	19.65	0.092
			25	12	1	19.82	19.97	0.099
			25	24	1	19.56	19.71	0.094
			50	0	1	19.50	19.65	0.092
		16QAM	1	0	1	19.48	19.63	0.092
			1	24	1	19.76	19.91	0.098
			1	49	1	19.53	19.68	0.093
			25	0	2	18.47	18.62	0.073
			25	12	2	18.77	18.92	0.078
			25	24	2	18.72	18.87	0.077
			50	0	2	18.69	18.84	0.077
56690	3695.0	QPSK	1	0	0	20.09	20.24	0.106
			1	24	0	20.17	20.32	0.108
			1	49	0	20.28	20.43	0.110
			25	0	1	19.20	19.35	0.086
			25	12	1	19.33	19.48	0.089
			25	24	1	19.42	19.57	0.091
			50	0	1	19.20	19.35	0.086
		16QAM	1	0	1	19.18	19.33	0.086
			1	24	1	19.27	19.42	0.087
			1	49	1	19.39	19.54	0.090
			25	0	2	18.33	18.48	0.070
			25	12	2	18.28	18.43	0.070
			25	24	2	18.23	18.38	0.069
			50	0	2	18.20	18.35	0.068

NOTE:
(1) EIRP = Average power + Antenna gain.
(2) ERP = EIRP - 2.15.
(3) $P(W) = 1\ W \cdot 10^{(P(dBm)/10)} / 1000$

Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power	EIRP power (dBm)	EIRP power (W)
55315	3557.5	QPSK	1	0	0	20.22	20.37	0.109
			1	37	0	20.47	20.62	0.115
			1	74	0	20.39	20.54	0.113
			36	0	1	19.33	19.48	0.089
			36	18	1	19.63	19.78	0.095
			36	35	1	19.53	19.68	0.093
			75	0	1	19.33	19.48	0.089
		16QAM	1	0	1	19.31	19.46	0.088
			1	37	1	19.57	19.72	0.094
			1	74	1	19.50	19.65	0.092
			36	0	2	18.44	18.59	0.072
			36	18	2	18.58	18.73	0.075
			36	35	2	18.53	18.68	0.074
			75	0	2	18.50	18.65	0.073
56215	3647.5	QPSK	1	0	0	20.44	20.59	0.115
			1	37	0	20.71	20.86	0.122
			1	74	0	20.47	20.62	0.115
			36	0	1	19.55	19.70	0.093
			36	18	1	19.87	20.02	0.100
			36	35	1	19.61	19.76	0.095
			75	0	1	19.55	19.70	0.093
		16QAM	1	0	1	19.53	19.68	0.093
			1	37	1	19.81	19.96	0.099
			1	74	1	19.58	19.73	0.094
			36	0	2	18.52	18.67	0.074
			36	18	2	18.82	18.97	0.079
			36	35	2	18.77	18.92	0.078
			75	0	2	18.74	18.89	0.077
56665	3692.5	QPSK	1	0	0	20.14	20.29	0.107
			1	37	0	20.22	20.37	0.109
			1	74	0	20.33	20.48	0.112
			36	0	1	19.25	19.40	0.087
			36	18	1	19.38	19.53	0.090
			36	35	1	19.47	19.62	0.092
			75	0	1	19.25	19.40	0.087
		16QAM	1	0	1	19.23	19.38	0.087
			1	37	1	19.32	19.47	0.089
			1	74	1	19.44	19.59	0.091
			36	0	2	18.38	18.53	0.071
			36	18	2	18.33	18.48	0.070
			36	35	2	18.28	18.43	0.070
			75	0	2	18.25	18.40	0.069

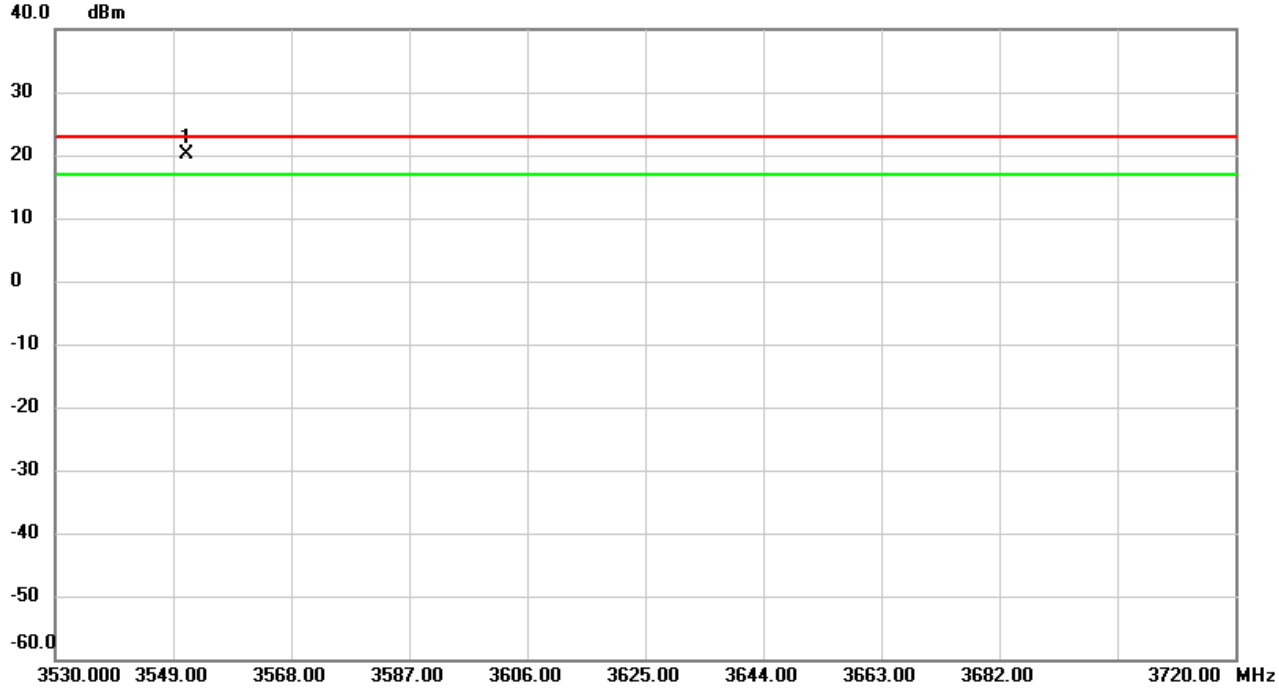
NOTE:
(1) EIRP = Average power + Antenna gain.
(2) ERP = EIRP - 2.15.
(3) $P(W) = 1\ W \cdot 10^{(P(dBm)/10)} / 1000$

Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power	EIRP power (dBm)	EIRP power (W)
55340	3560.0	QPSK	1	0	0	20.27	20.42	0.110
			1	49	0	20.52	20.67	0.117
			1	99	0	20.44	20.59	0.115
			50	0	1	19.38	19.53	0.090
			50	24	1	19.68	19.83	0.096
			50	49	1	19.58	19.73	0.094
			100	0	1	19.38	19.53	0.090
		16QAM	1	0	1	19.36	19.51	0.089
			1	49	1	19.62	19.77	0.095
			1	99	1	19.55	19.70	0.093
			50	0	2	18.49	18.64	0.073
			50	24	2	18.63	18.78	0.076
			50	49	2	18.58	18.73	0.075
			100	0	2	18.55	18.70	0.074
56207	3646.7	QPSK	1	0	0	20.49	20.64	0.116
			1	49	0	20.76	20.91	0.123
			1	99	0	20.52	20.67	0.117
			50	0	1	19.60	19.75	0.094
			50	24	1	19.92	20.07	0.102
			50	49	1	19.66	19.81	0.096
			100	0	1	19.60	19.75	0.094
		16QAM	1	0	1	19.58	19.73	0.094
			1	49	1	19.86	20.01	0.100
			1	99	1	19.63	19.78	0.095
			50	0	2	18.57	18.72	0.074
			50	24	2	18.87	19.02	0.080
			50	49	2	18.82	18.97	0.079
			100	0	2	18.79	18.94	0.078
56640	3690.0	QPSK	1	0	0	20.19	20.34	0.108
			1	49	0	20.27	20.42	0.110
			1	99	0	20.38	20.53	0.113
			50	0	1	19.30	19.45	0.088
			50	24	1	19.43	19.58	0.091
			50	49	1	19.52	19.67	0.093
			100	0	1	19.30	19.45	0.088
		16QAM	1	0	1	19.28	19.43	0.088
			1	49	1	19.37	19.52	0.090
			1	99	1	19.49	19.64	0.092
			50	0	2	18.43	18.58	0.072
			50	24	2	18.38	18.53	0.071
			50	49	2	18.33	18.48	0.070
			100	0	2	18.30	18.45	0.070

NOTE:
(1) EIRP = Average power + Antenna gain.
(2) ERP = EIRP - 2.15.
(3) $P(W) = 1\ W \cdot 10^{(P(dBm)/10)} / 1000$

Radiated ERIP Power:

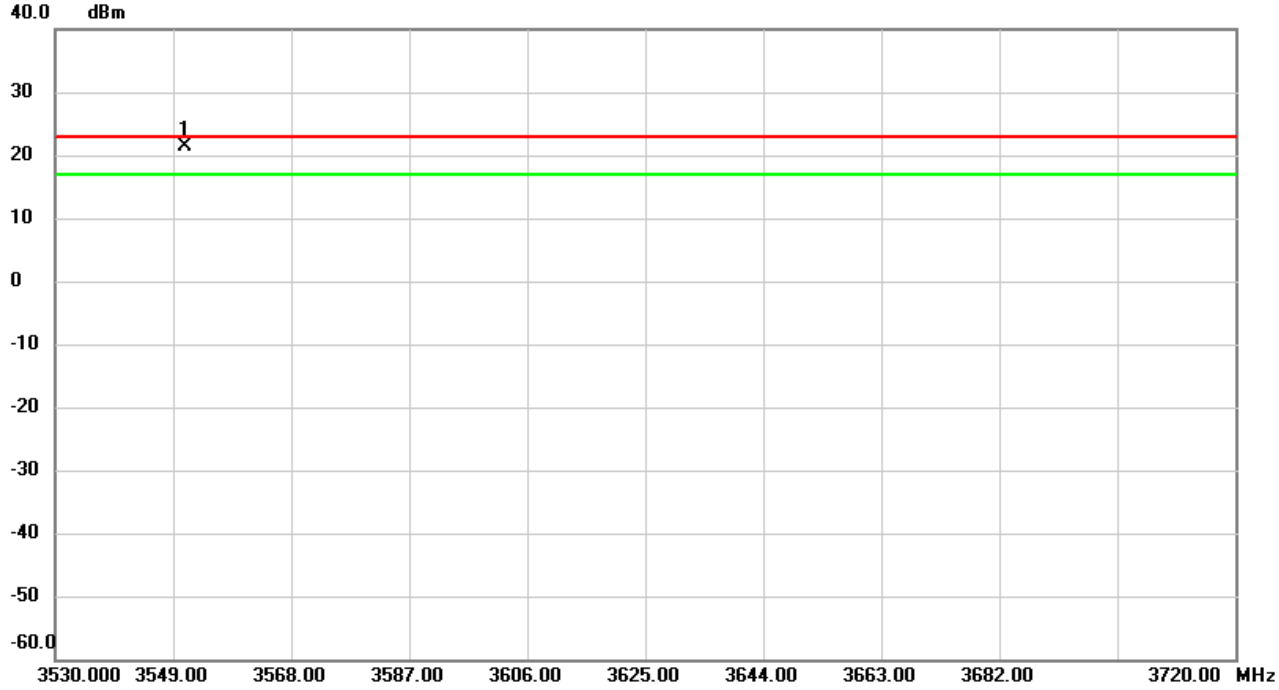
Test Mode	LTE Band 48	Test Date	2023/2/9
Test Channel	CH55340	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3551.160	10.31	9.93	20.24	23.00	-2.76	peak	

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

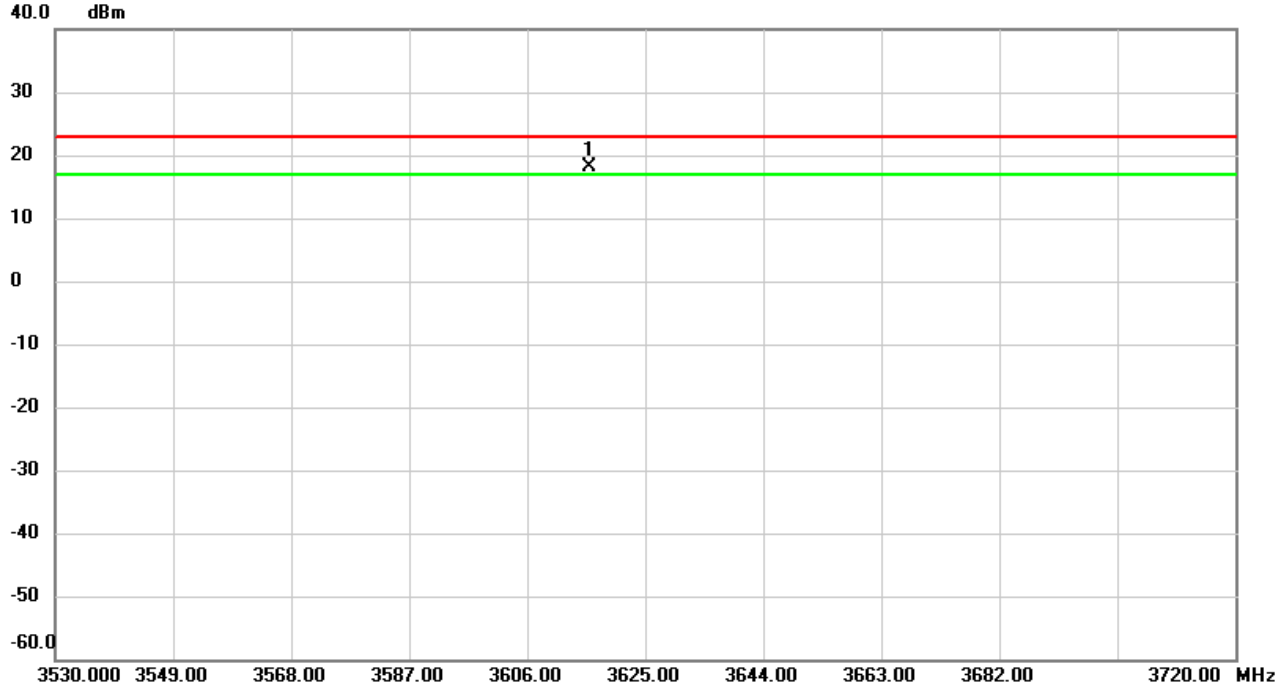
Test Mode	LTE Band 48	Test Date	2023/2/9
Test Channel	CH55340	Polarization	Horizontal
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3550.906	11.48	9.78	21.26	23.00	-1.74	peak	

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

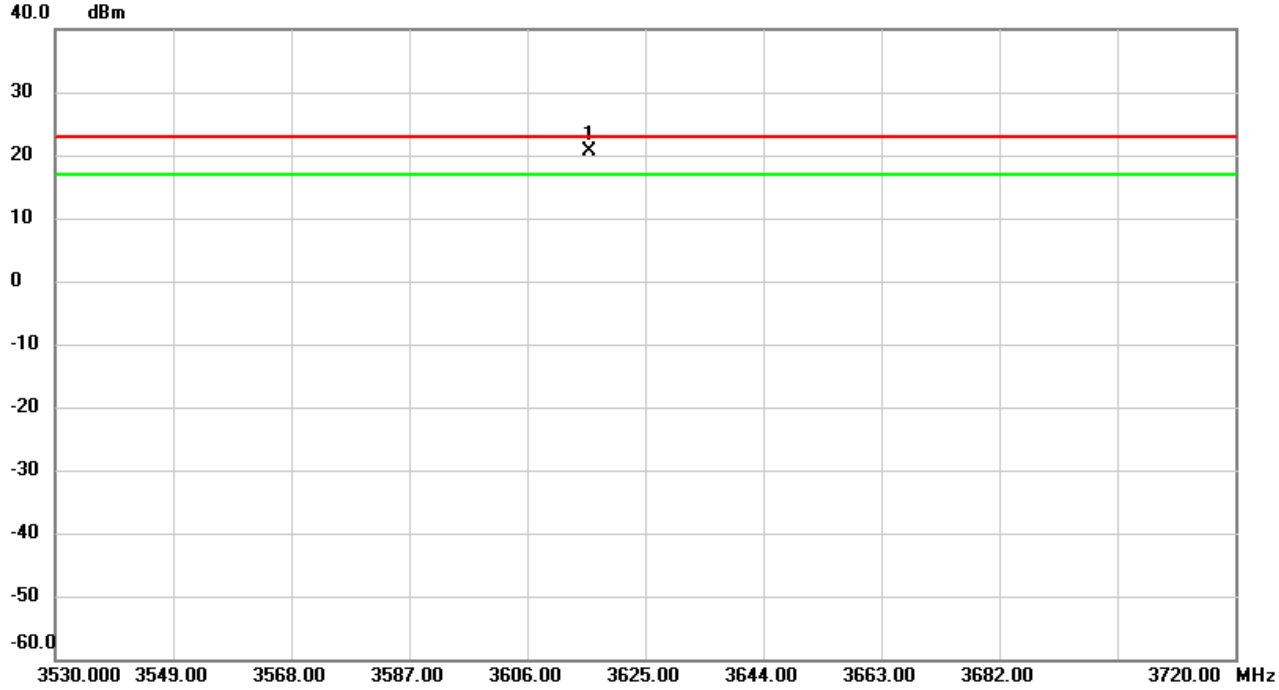
Test Mode	LTE Band 48	Test Date	2023/2/9
Test Channel	CH55990	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3615.918	8.27	9.96	18.23	23.00	-4.77	peak	

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

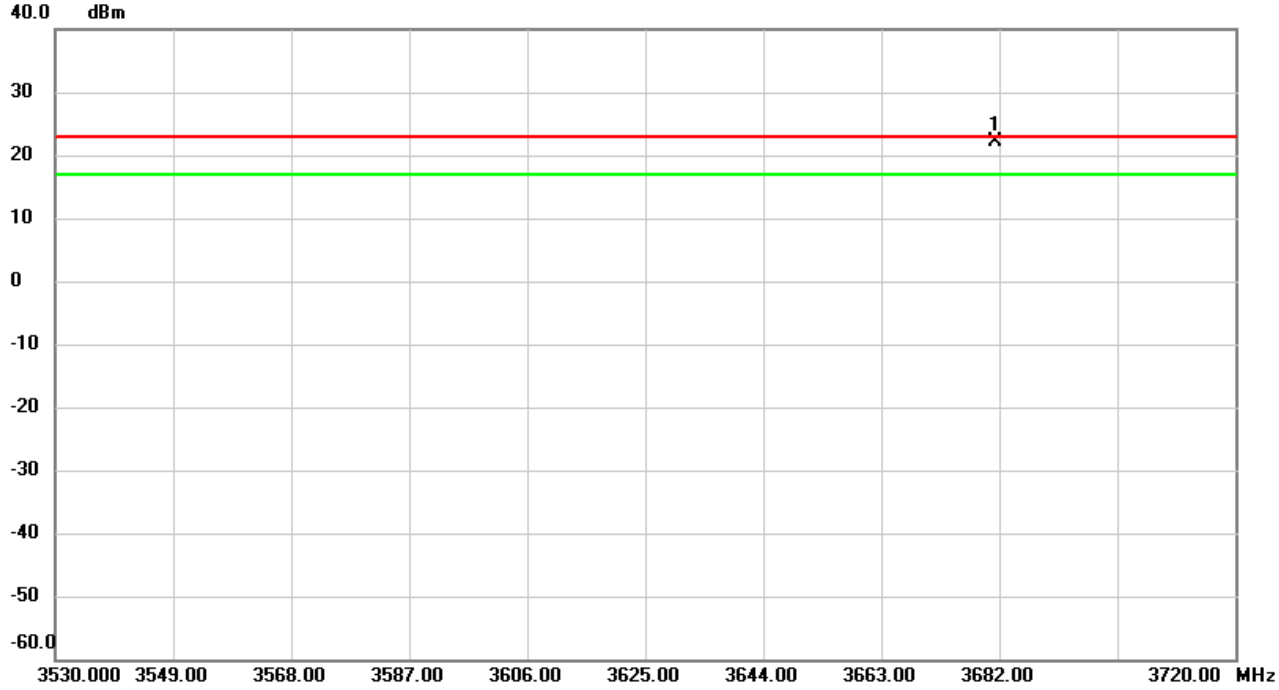
Test Mode	LTE Band 48	Test Date	2023/2/9
Test Channel	CH55990	Polarization	Horizontal
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3616.127	10.83	9.87	20.70	23.00	-2.30	peak	

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

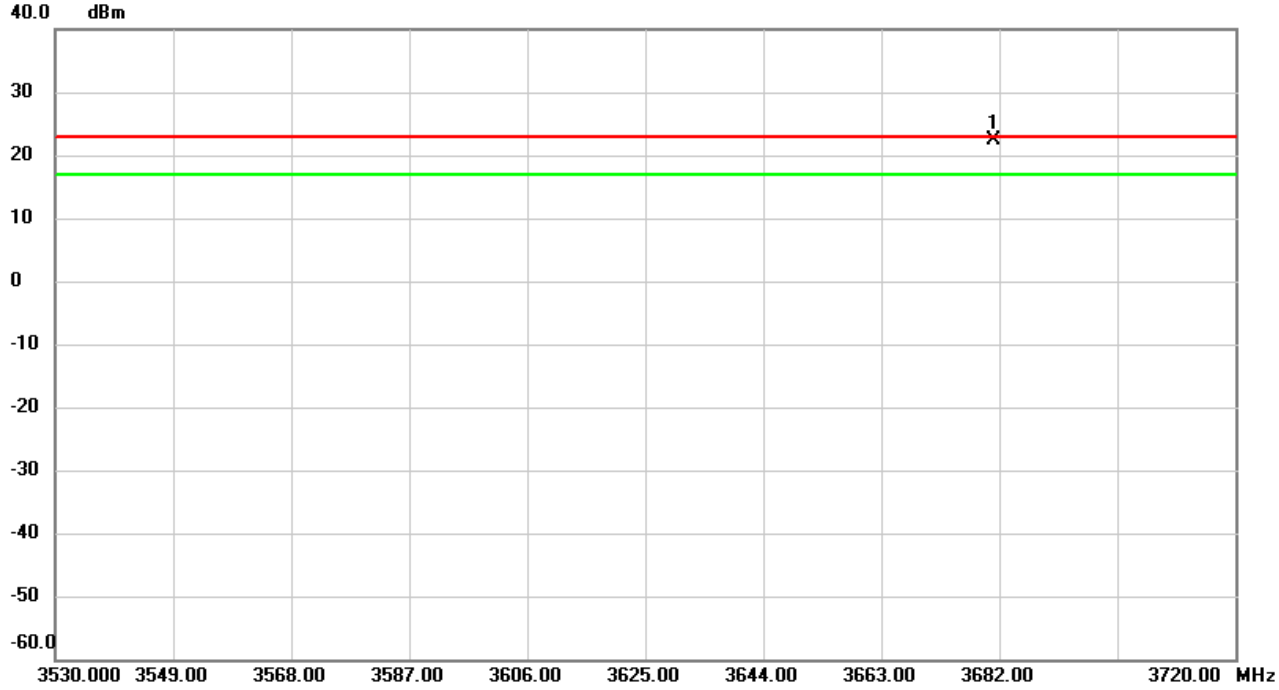
Test Mode	LTE Band 48	Test Date	2023/2/9
Test Channel	CH56640	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3681.259	12.07	10.11	22.18	23.00	-0.82	peak	

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

Test Mode	LTE Band 48	Test Date	2023/2/9
Test Channel	CH56640	Polarization	Horizontal
Temp	23°C	Hum.	59%

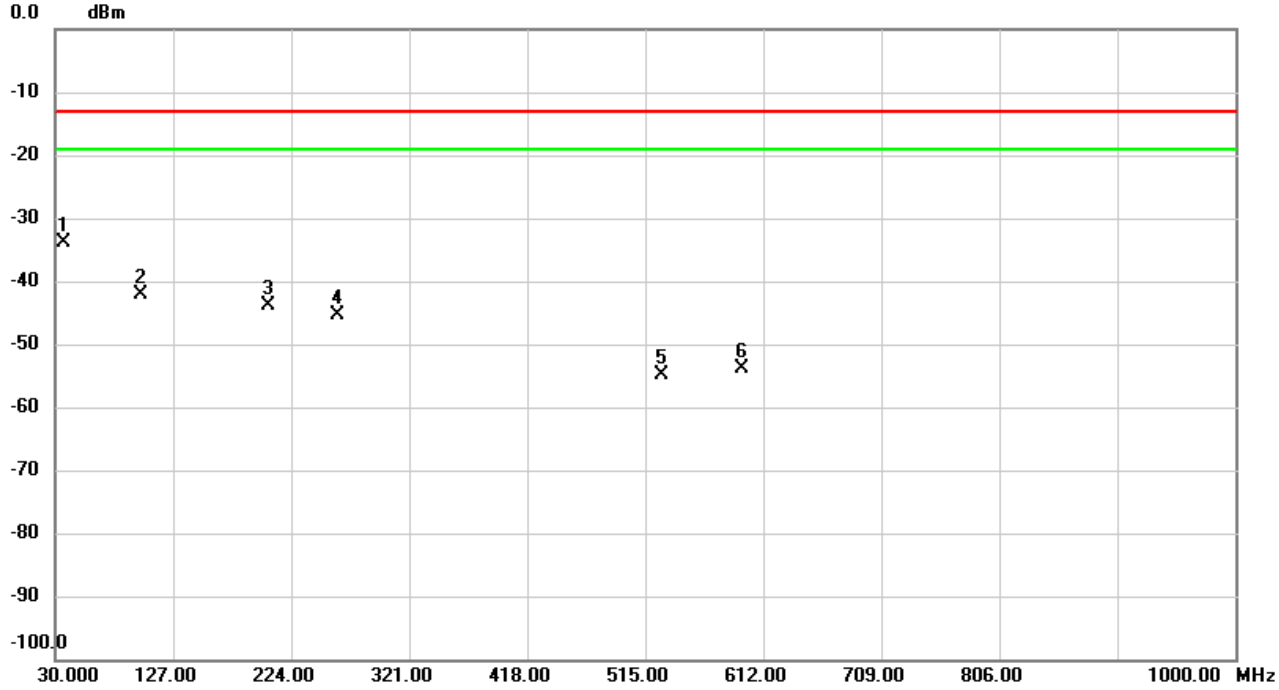


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3681.006	12.44	10.01	22.45	23.00	-0.55	peak	

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

APPENDIX C RADIATED SPURIOUS EMISSIONS

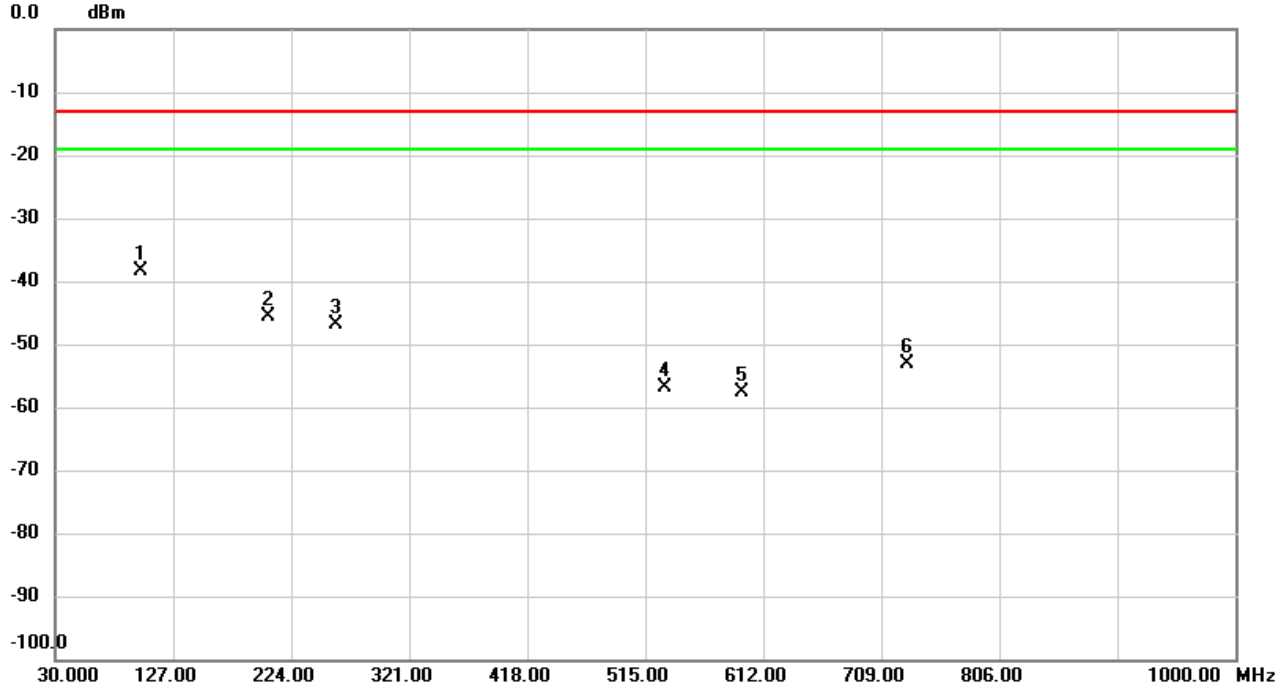
Test Mode	LTE Band 48	Test Date	2023/2/8
Test Channel	CH55990	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	37.5982	-56.58	22.78	-33.80	-13.00	-20.80	peak	
2		100.6160	-58.96	16.78	-42.18	-13.00	-29.18	peak	
3		205.0203	-56.08	12.16	-43.92	-13.00	-30.92	peak	
4		261.6360	-56.73	11.48	-45.25	-13.00	-32.25	peak	
5		528.1597	-64.58	9.63	-54.95	-13.00	-41.95	peak	
6		594.0227	-64.42	10.66	-53.76	-13.00	-40.76	peak	

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

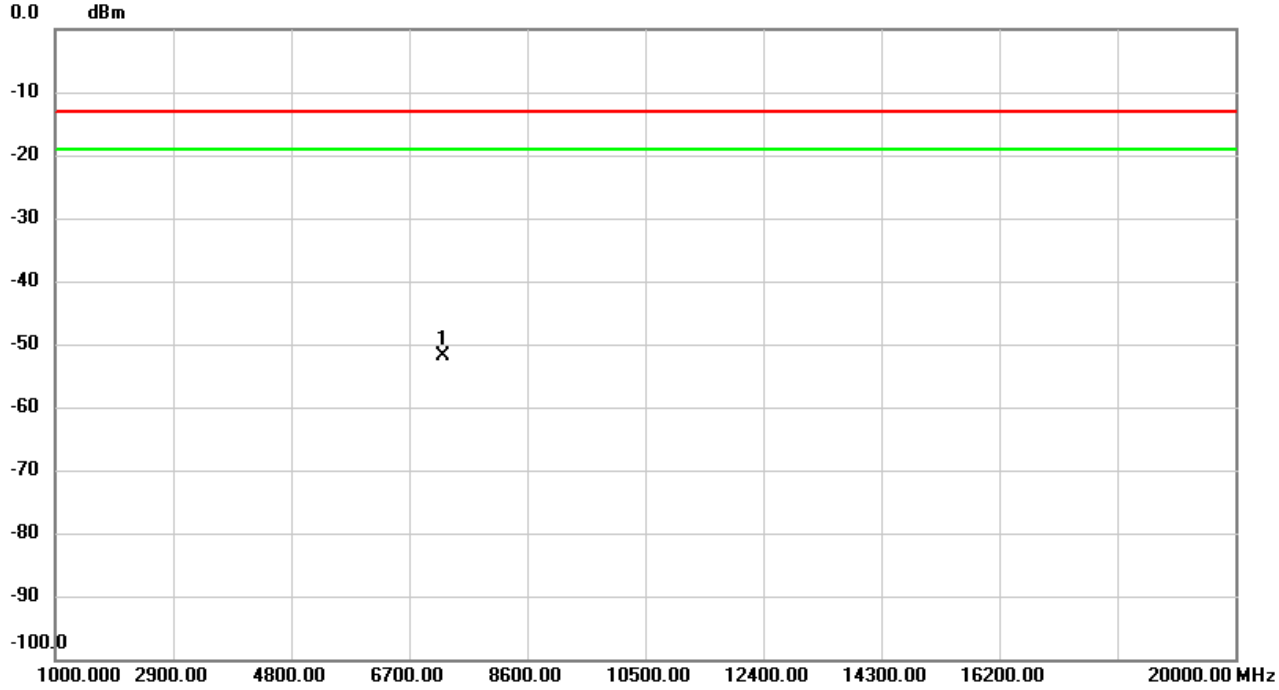
Test Mode	LTE Band 48	Test Date	2023/2/8
Test Channel	CH55990	Polarization	Horizontal
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	100.6160	-52.90	14.48	-38.42	-13.00	-25.42	peak	
2		205.8610	-51.93	6.33	-45.60	-13.00	-32.60	peak	
3		260.9893	-53.77	6.95	-46.82	-13.00	-33.82	peak	
4		530.8110	-64.32	7.41	-56.91	-13.00	-43.91	peak	
5		593.9903	-65.06	7.51	-57.55	-13.00	-44.55	peak	
6		730.4047	-62.23	9.10	-53.13	-13.00	-40.13	peak	

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

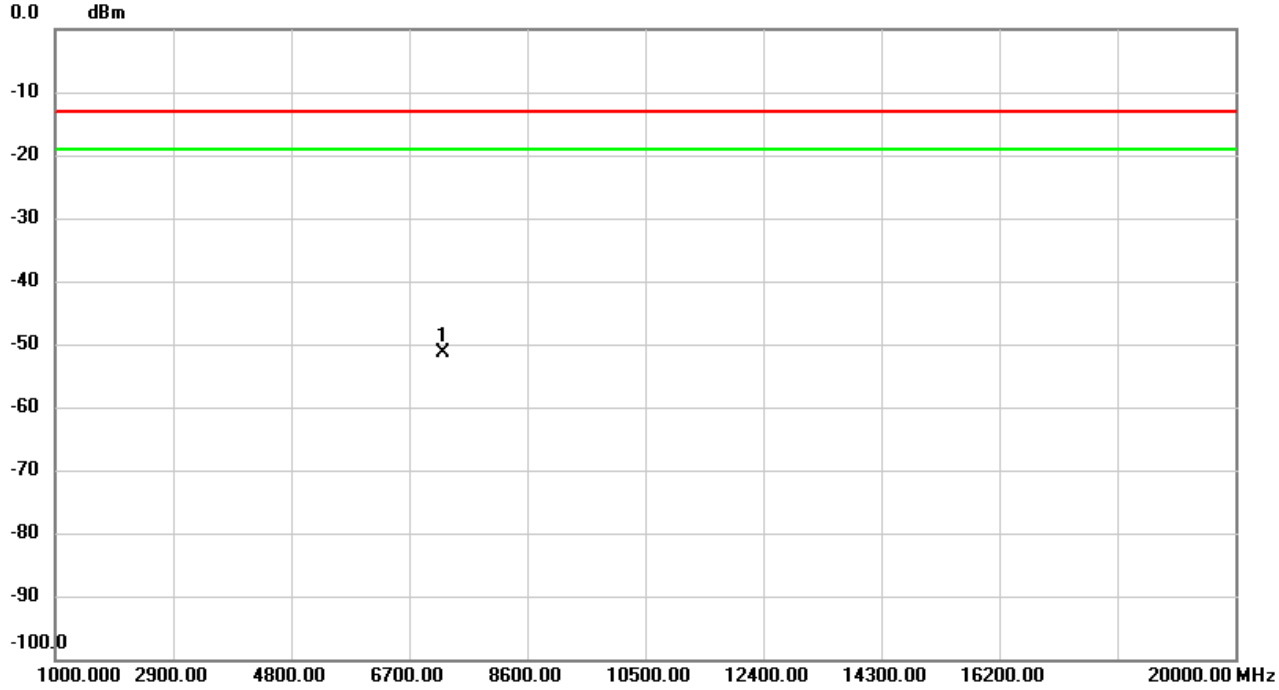
Test Mode	LTE Band 48	Test Date	2023/2/7
Test Channel	CH55990	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	7232.000	-68.76	16.90	-51.86	-13.00	-38.86	peak	

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

Test Mode	LTE Band 48	Test Date	2023/2/7
Test Channel	CH55990	Polarization	Horizontal
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	7232.000	-67.79	16.53	-51.26	-13.00	-38.26	peak	

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

End of Test Report