FCC Radio Test Report

FCC ID: 2AJN7-TP00143AL

Report No.	:	BTL-FCCP-16-2112T127
Equipment	:	Notebook Computer
Model Name	:	TP00143AL
Brand Name	:	Lenovo
Applicant	:	LC Future Center
Address	:	7F., No. 780, Beian Rd., Zhongshan Dist., Taipei City 104, Taiwan
Manufacturer	:	Lenovo PC HK Limited
Address	:	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, P.R. 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	:	2022/1/13
Date of Test	:	2022/1/13 ~ 2022/3/11
Issued Date	:	2022/3/31

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

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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

REVISION HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-16-2112T127	R00	Original Report.	2022/3/31	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	Conducted Output Power Effective Isotropic Radiated Power	APPENDIX B	Pass	------
96.41	Maximum Power Spectral Density	NOTE (3)	Pass	------
2.1049 96.41	Occupied Bandwidth	NOTE (3)	Pass	------
2.1051 96.41	Conducted Band Edge Measurements &ACLR			
2.1051 96.41	Conducted Spurious Emissions	NOTE (3)	Pass	------
2.1051 96.41	Radiated Spurious Emissions	APPENDIX C	Pass	------
96.41	Peak To Average Ratio	NOTE (3)	Pass	------
2.1055	Frequency Stability Temperature & Voltage	NOTE (3)	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 item is demonstrated to full compliance referring to the test report number FG0O3022F, FG0O3022G of the integrated module (model name: L860-GL-16, FCC ID: ZMOL860GL16), according to KDB 996369 D02 Q1 a) 2).
(4) The ac power lines conducted emissions and radiated emissions are tested to demonstrate full compliance of both module integrated into the host and host itself.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report:

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
The test sites and facilities are covered under FCC RN: 674415 and DN: TW0659.

☒ C05 ☐ CB08 ☐ CB11 ☒ CB15 ☐ CB16
☒ SR05

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)
CB15	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	23 °C, 60 %	AC 120V	Angela Wang
Conducted Output Power	23.5 °C, 58.5 %	AC 120V	William Wei
Effective Isotropic Radiated Power	Refer to data	AC 120V	Vincent Lee
Radiated Spurious Emissions	Refer to data	AC 120V	Vincent Lee Eddie Lee

2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	Notebook Computer			
Model Name	TP00143AL			
Brand Name	Lenovo			
Model Difference	N/A			
Power Source	DC voltage supplied from External Power Supply. (Lenovo/ ADL135SLC3A, ADL135SCC2A)			
Power Rating	I/P: 100-240V~ 2.5A 50-60Hz O/P: DC20.0V 6.75A 135.0W			
WWAN Module	Fibocom / L860-GL-16			
Operation Frequency	Band	UL Frequency (MHz)	DL Frequency (MHz)	
	LTE 48	3550 ~ 3700	-	
Maximum ERP	Band	BW (MHz)	Mode	Power (W)
	LTE 48	5	QPSK	0.150
			16QAM	0.121
		10	QPSK	0.153
			16QAM	0.124
		15	QPSK	0.158
			16QAM	0.128
		20	QPSK	0.161
			16QAM	0.130
Test Model	TP00143AL			
Sample Status	Engineering Sample			
EUT Modification(s)	N/A			

NOTE:
(1) For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

(2) Table for Filed Antenna:

Antenna	Manufacture	Parts 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

2.2 TEST MODES

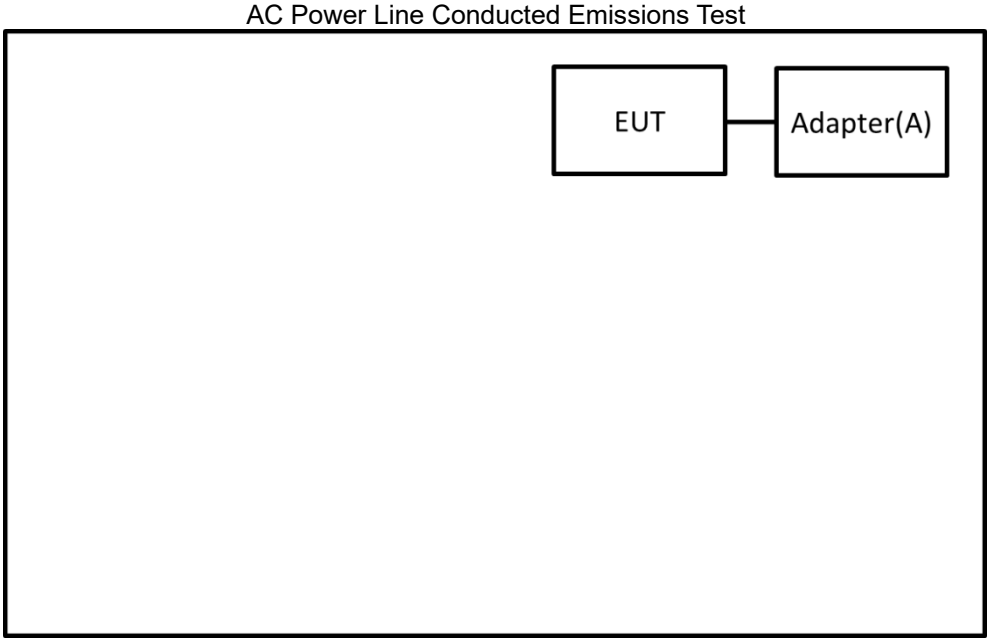
Test Items	Band	Test Mode	Note
AC Power Line Conducted Emissions	-	Normal/Idle	-
Conducted Output Power	LTE Band 48	Refer to APPENDIX B	-
Effective Isotropic Radiated Power	LTE Band 48	TX Mode (CH 55340/55990/56640)	-
Radiated Spurious Emissions	LTE Band 48	TX Mode (CH 55990)	-

NOTE:
(1) All X, Y and Z axes are evaluated, but only the worst case (Y axis) is recorded.
(2) For Radiated Spurious Emissions both QPSK and 16QAM are evaluated, but only the worst case (QPSK) is recorded.

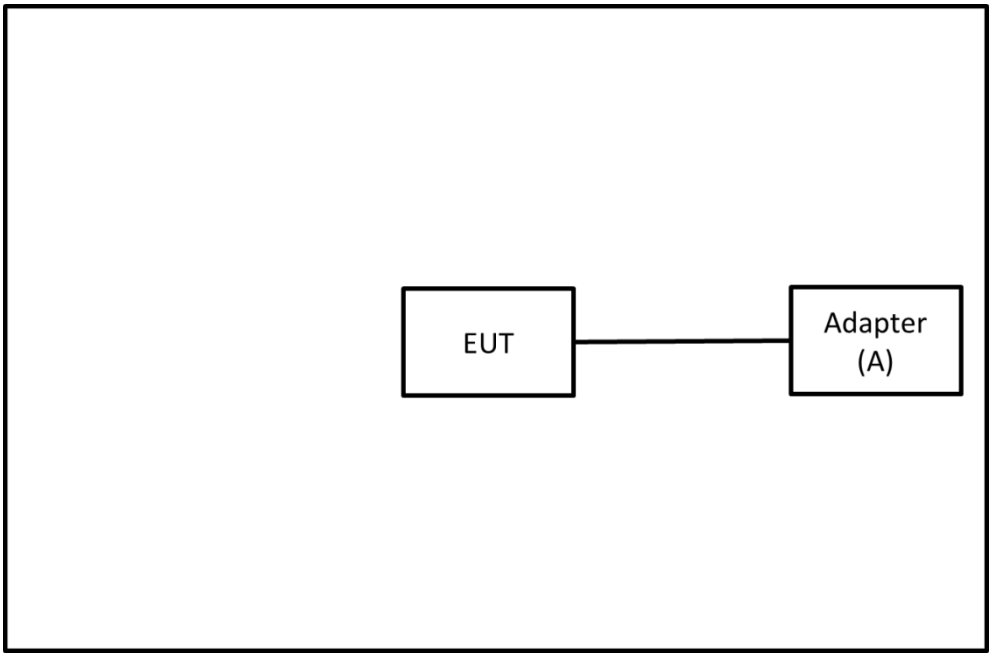
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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	ADL135SLC3A	N/A	Supplied by test requester.

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
-	-	-	-	-	-

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

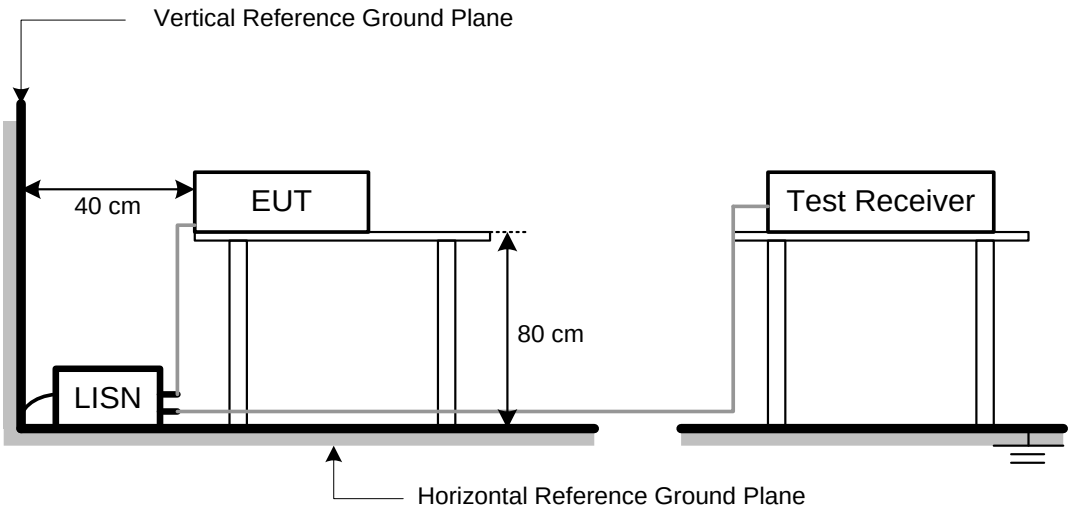
a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
All other support equipment were powered from an additional LISN(s).
The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.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

4.1 LIMIT

EIRP for CBRS equipment as below table:

Device	Maximum EIRP (dBm/10 MHz)
End User Device	23
Category A CBSD	30
Category B CBSD	47

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:
   (1) Set = auto-couple, or
   (2) 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%.

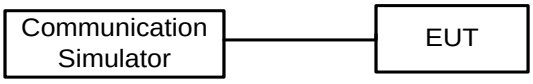
EIRP Power:
The testing follows ANSI C63.26-2015 Section 5.2.5.5
According to KDB 412172 D01 Power Approach,
EIRP = PT + GT – LC, where
PT = transmitter output power in dBm
GT = gain of the transmitting antenna in dBi
LC = signal attenuation in the connecting cable between the transmitter and antenna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

4.3 DEVIATION FROM TEST STANDARD

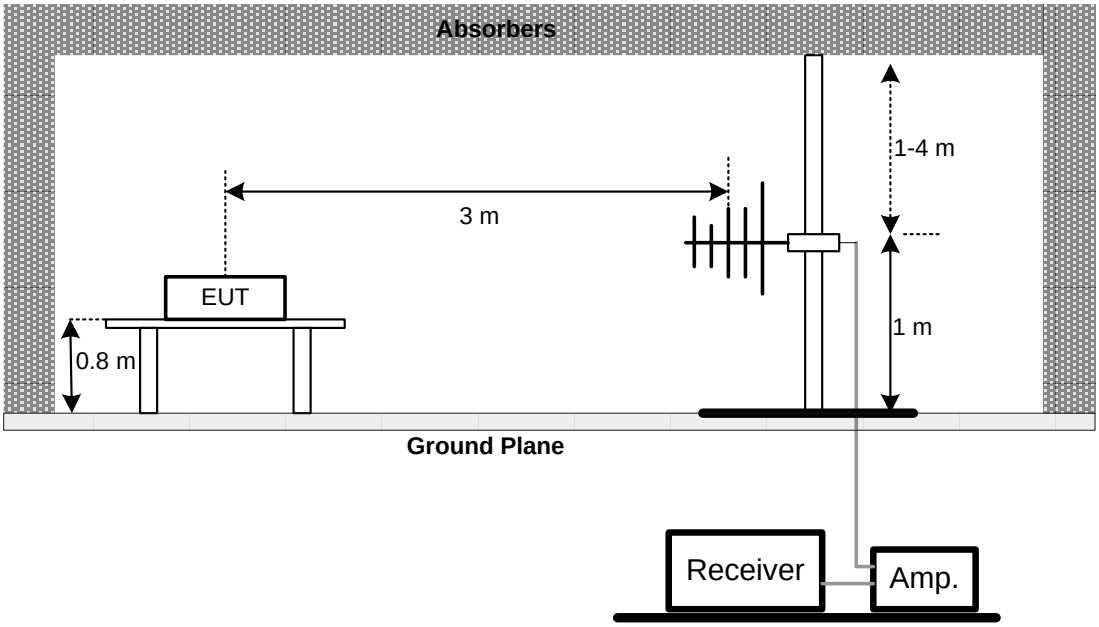
No deviation.

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 must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. The emission limit equal to -13dBm.

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

The testing follows FCC KDB 971168 v03r01 Section 6.2.

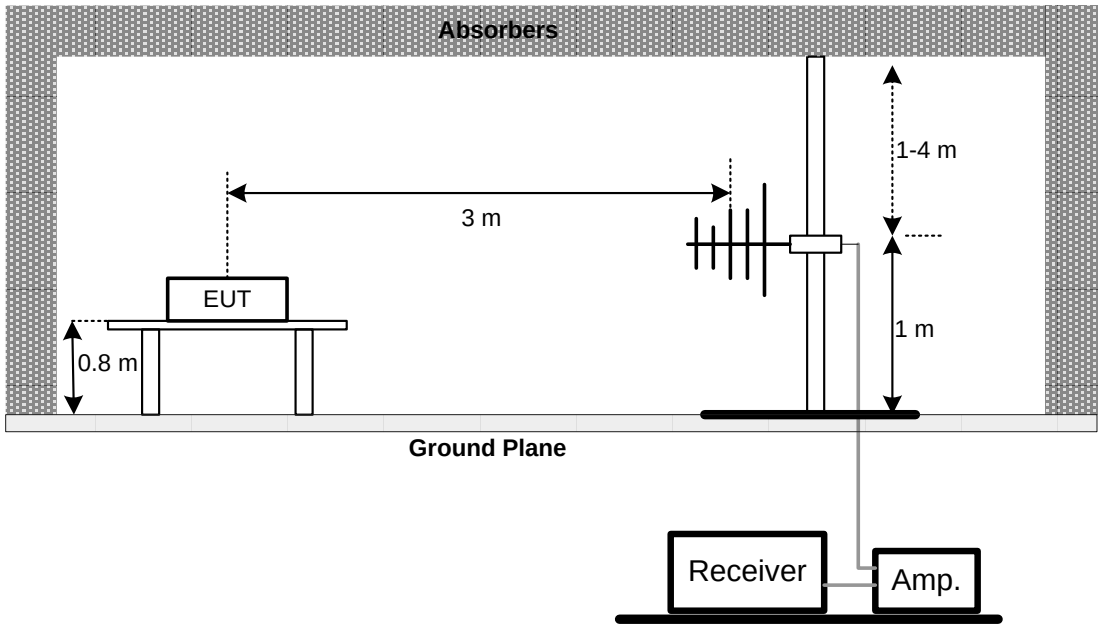
k. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. The “Read Value” is the spectrum reading the maximum power value.
l. 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
m. EIRP = Output power level of S.G – TX cable loss + Antenna gain of substitution horn.
n. ERP can be calculated form EIRP by subtracting the gain of dipole, ERP = EIPR - 2.15dBi..
o. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

5.3 DEVIATION FROM TEST STANDARD

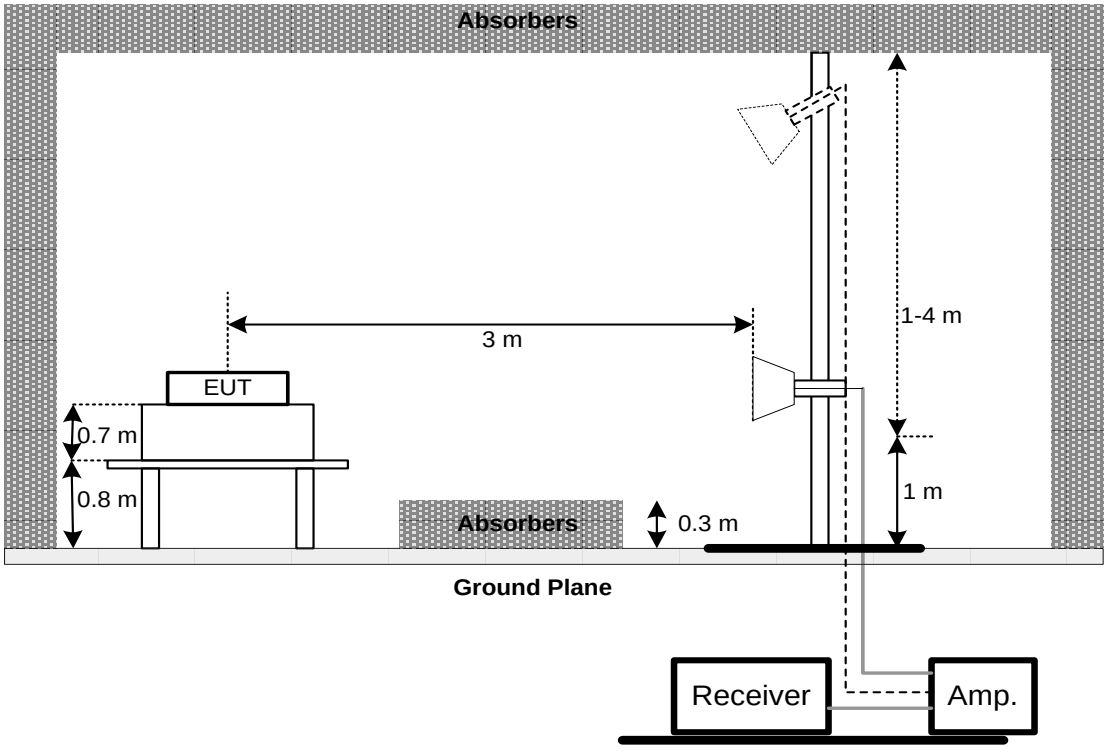
No deviation.

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	101339	2021/3/10	2022/3/9
2	Test Cable	EMCI	EMCCFD300-BM-BMR-6000	170714	2021/6/7	2022/6/6
3	EMI Test Receiver	R&S	ESR 7	101433	2021/11/24	2022/11/23
4	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A

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	2021/7/23	2022/7/22
2	Radio Communication Analyzer	Anritsu	MT8820C	6201381608	2021/12/15	2022/12/14

Effective Isotropic Radiated Power and Radiated Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Preamplifier	EMCI	EMC02325	980217	2021/4/8	2022/4/7
2	Preamplifier	EMCI	EMC012645B	980222	2021/4/8	2022/4/7
3	Test Cable	EMCI	EMC104-SM-100 0	180809	2021/4/8	2022/4/7
4	Test Cable	EMCI	EMC104-SM-SM-3000	151205	2021/4/8	2022/4/7
5	Test Cable	EMCI	EMC-SM-SM-700 0	180408	2021/4/8	2022/4/7
6	MXE EMI Receiver	Agilent	N9038A	MY56400087	2021/5/27	2022/5/26
7	Signal Analyzer	Agilent	N9010A	MY56480554	2021/8/25	2022/8/24
8	Horn Ant	SCHWARZBECK	BBHA 9120D	9120D-1342	2021/6/2	2022/6/1
9	Horn Ant	Schwarzbeck	BBHA 9170	340	2021/7/9	2022/7/8
10	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	9168-352	2021/8/11	2022/8/10
11	5dB Attenuator	EMCI	EMCI-N-6-05	AT-N0625	2021/8/11	2022/8/10
12	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A
13	8960 Series 10 Wireless Com Test Set	Agilent	E5515C	GB47390193	2021/7/23	2022/7/22
14	Radio Communication Analyzer (LTE)	Anritsu	MT8821C	6262044728	2021/11/28	2022/11/27

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

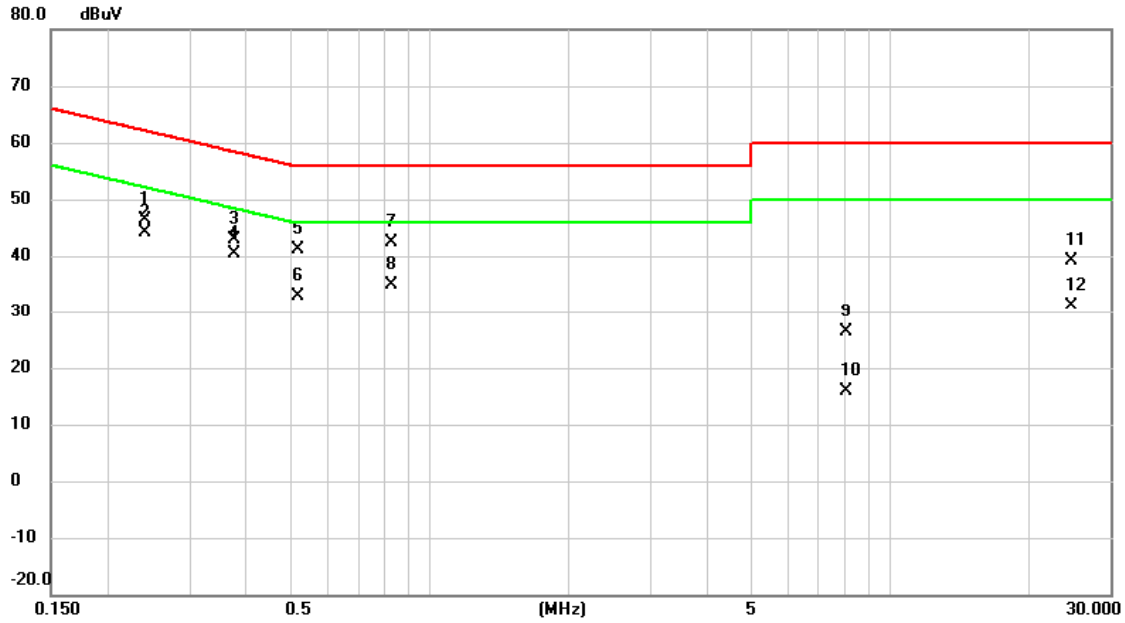
Please refer to document Appendix No.: TP-2112T127-1 (APPENDIX-TEST PHOTOS).

8 EUT PHOTOS

Please refer to document Appendix No.: EP-2112T127-1 (APPENDIX-EUT PHOTOS).

APPENDIX A AC POWER LINE CONDUCTED EMISSIONS

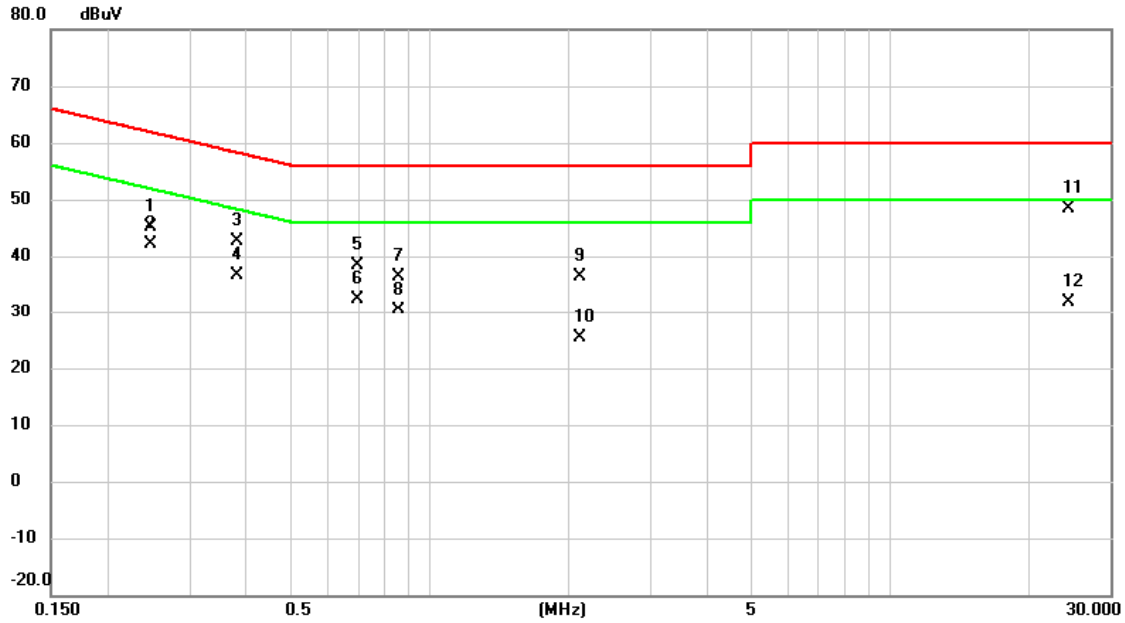
Test Mode	Normal	Tested Date	2022/2/16
Test Frequency	-	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2400	36.70	9.72	46.42	62.10	-15.68	QP	
2		0.2400	34.34	9.72	44.06	52.10	-8.04	AVG	
3		0.3772	33.21	9.72	42.93	58.34	-15.41	QP	
4	*	0.3772	30.69	9.72	40.41	48.34	-7.93	AVG	
5		0.5190	31.49	9.73	41.22	56.00	-14.78	QP	
6		0.5190	23.23	9.73	32.96	46.00	-13.04	AVG	
7		0.8272	32.56	9.74	42.30	56.00	-13.70	QP	
8		0.8272	25.06	9.74	34.80	46.00	-11.20	AVG	
9		8.0520	16.43	10.06	26.49	60.00	-33.51	QP	
10		8.0520	5.78	10.06	15.84	50.00	-34.16	AVG	
11		24.6525	28.97	10.24	39.21	60.00	-20.79	QP	
12		24.6525	20.84	10.24	31.08	50.00	-18.92	AVG	

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

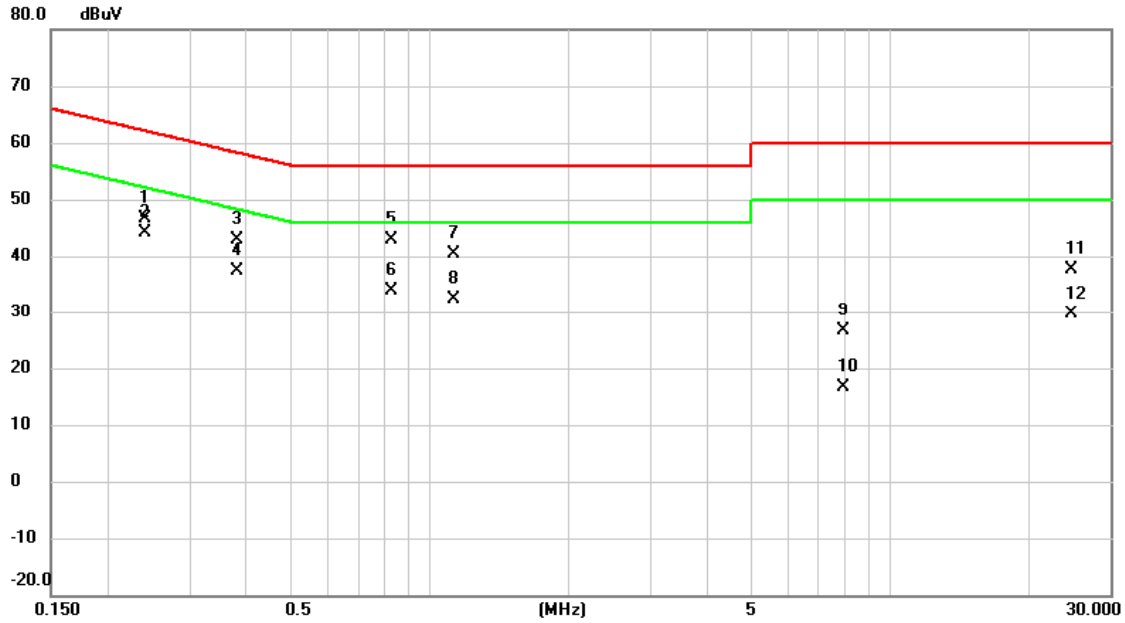
Test Mode	Normal	Tested Date	2022/2/16
Test Frequency	-	Phase	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2468	35.34	9.72	45.06	61.86	-16.80	QP	
2	*	0.2468	32.44	9.72	42.16	51.86	-9.70	AVG	
3		0.3817	32.96	9.73	42.69	58.24	-15.55	QP	
4		0.3817	26.99	9.73	36.72	48.24	-11.52	AVG	
5		0.6990	28.70	9.74	38.44	56.00	-17.56	QP	
6		0.6990	22.76	9.74	32.50	46.00	-13.50	AVG	
7		0.8587	26.55	9.75	36.30	56.00	-19.70	QP	
8		0.8587	20.65	9.75	30.40	46.00	-15.60	AVG	
9		2.1188	26.67	9.78	36.45	56.00	-19.55	QP	
10		2.1188	15.59	9.78	25.37	46.00	-20.63	AVG	
11		24.4298	38.03	10.41	48.44	60.00	-11.56	QP	
12		24.4298	21.56	10.41	31.97	50.00	-18.03	AVG	

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

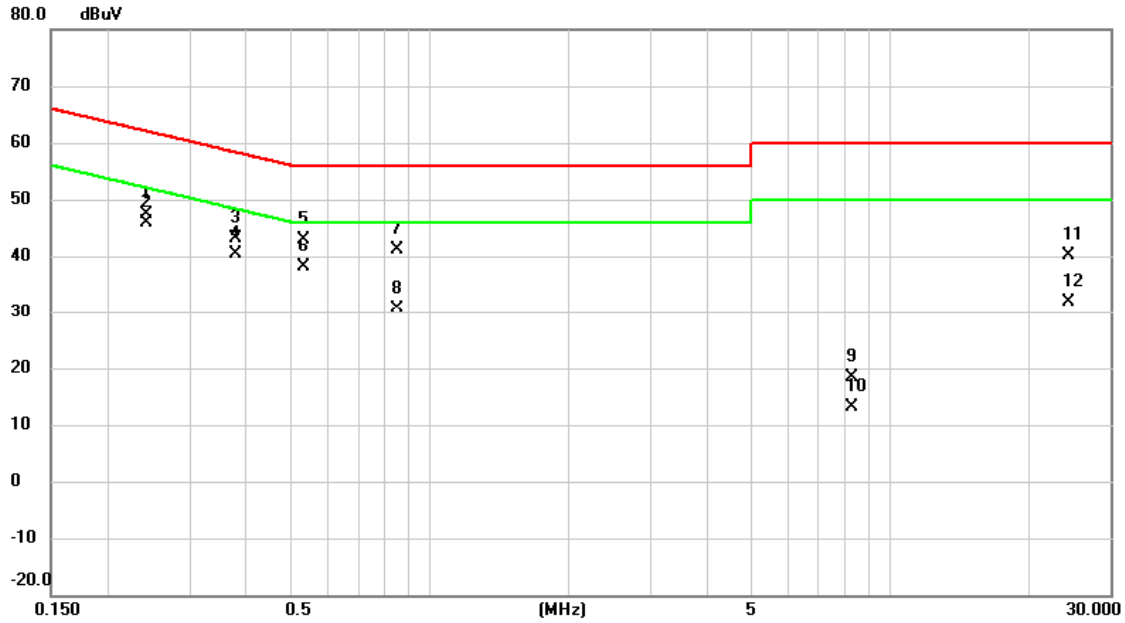
Test Mode	Idle	Tested Date	2022/2/16
Test Frequency	-	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2400	36.86	9.72	46.58	62.10	-15.52	QP	
2	*	0.2400	34.53	9.72	44.25	52.10	-7.85	AVG	
3		0.3817	33.21	9.72	42.93	58.24	-15.31	QP	
4		0.3817	27.63	9.72	37.35	48.24	-10.89	AVG	
5		0.8250	33.19	9.74	42.93	56.00	-13.07	QP	
6		0.8250	24.12	9.74	33.86	46.00	-12.14	AVG	
7		1.1242	30.66	9.74	40.40	56.00	-15.60	QP	
8		1.1242	22.63	9.74	32.37	46.00	-13.63	AVG	
9		7.9148	16.47	10.05	26.52	60.00	-33.48	QP	
10		7.9148	6.52	10.05	16.57	50.00	-33.43	AVG	
11		24.6480	27.37	10.24	37.61	60.00	-22.39	QP	
12		24.6480	19.51	10.24	29.75	50.00	-20.25	AVG	

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

Test Mode	Idle	Tested Date	2022/2/16
Test Frequency	-	Phase	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2423	37.60	9.72	47.32	62.02	-14.70	QP	
2	*	0.2423	36.16	9.72	45.88	52.02	-6.14	AVG	
3		0.3795	33.46	9.73	43.19	58.29	-15.10	QP	
4		0.3795	30.71	9.73	40.44	48.29	-7.85	AVG	
5		0.5347	33.14	9.74	42.88	56.00	-13.12	QP	
6		0.5347	28.43	9.74	38.17	46.00	-7.83	AVG	
7		0.8475	31.31	9.75	41.06	56.00	-14.94	QP	
8		0.8475	20.86	9.75	30.61	46.00	-15.39	AVG	
9		8.2703	8.38	10.10	18.48	60.00	-41.52	QP	
10		8.2703	2.96	10.10	13.06	50.00	-36.94	AVG	
11		24.4410	29.74	10.41	40.15	60.00	-19.85	QP	
12		24.4410	21.53	10.41	31.94	50.00	-18.06	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 EIRP:

LTE Band 48 Power:

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power	EIRP power (dBm)	EIRP power (W)
Band 48	5M	55265	3552.5	QPSK	1	0	0	21.55	21.70	0.148
					1	12	0	21.44	21.59	0.144
					1	24	0	21.35	21.50	0.141
					12	0	1	20.64	20.79	0.120
					12	6	1	20.49	20.64	0.116
					12	11	1	20.42	20.57	0.114
					25	0	1	20.59	20.74	0.119
				16QAM	1	0	1	20.62	20.77	0.119
					1	12	1	20.52	20.67	0.117
					1	24	1	20.45	20.60	0.115
					12	0	2	19.70	19.85	0.097
					12	6	2	19.52	19.67	0.093
					12	11	2	19.45	19.60	0.091
					25	0	2	19.62	19.77	0.095
		56232	3649.2	QPSK	1	0	0	21.62	21.77	0.150
					1	12	0	21.54	21.69	0.148
					1	24	0	21.46	21.61	0.145
					12	0	1	20.71	20.86	0.122
					12	6	1	20.59	20.74	0.119
					12	11	1	20.53	20.68	0.117
					25	0	1	20.66	20.81	0.121
				16QAM	1	0	1	20.69	20.84	0.121
					1	12	1	20.62	20.77	0.119
					1	24	1	20.56	20.71	0.118
					12	0	2	19.77	19.92	0.098
					12	6	2	19.62	19.77	0.095
					12	11	2	19.56	19.71	0.094
					25	0	2	19.69	19.84	0.096
		56715	3697.5	QPSK	1	0	0	21.55	21.70	0.148
					1	12	0	21.42	21.57	0.144
					1	24	0	21.28	21.43	0.139
					12	0	1	20.64	20.79	0.120
					12	6	1	20.47	20.62	0.115
					12	11	1	20.35	20.50	0.112
					25	0	1	20.59	20.74	0.119
				16QAM	1	0	1	20.62	20.77	0.119
					1	12	1	20.50	20.65	0.116
					1	24	1	20.38	20.53	0.113
					12	0	2	19.70	19.85	0.097
					12	6	2	19.50	19.65	0.092
					12	11	2	19.38	19.53	0.090
					25	0	2	19.62	19.77	0.095

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

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power	EIRP power (dBm)	EIRP power (W)
Band 48	10M	55290	3555.0	QPSK	1	0	0	21.64	21.79	0.151
					1	24	0	21.53	21.68	0.147
					1	49	0	21.44	21.59	0.144
					25	0	1	20.73	20.88	0.122
					25	12	1	20.58	20.73	0.118
					25	24	1	20.51	20.66	0.116
					50	0	1	20.68	20.83	0.121
				16QAM	1	0	1	20.71	20.86	0.122
					1	24	1	20.61	20.76	0.119
					1	49	1	20.54	20.69	0.117
					25	0	2	19.79	19.94	0.099
					25	12	2	19.61	19.76	0.095
					25	24	2	19.54	19.69	0.093
					50	0	2	19.71	19.86	0.097
		56223	3648.3	QPSK	1	0	0	21.71	21.86	0.153
					1	24	0	21.63	21.78	0.151
					1	49	0	21.55	21.70	0.148
					25	0	1	20.80	20.95	0.124
					25	12	1	20.68	20.83	0.121
					25	24	1	20.62	20.77	0.119
					50	0	1	20.75	20.90	0.123
				16QAM	1	0	1	20.78	20.93	0.124
					1	24	1	20.71	20.86	0.122
					1	49	1	20.65	20.80	0.120
					25	0	2	19.86	20.01	0.100
					25	12	2	19.71	19.86	0.097
					25	24	2	19.65	19.80	0.095
					50	0	2	19.78	19.93	0.098
		56690	3695.0	QPSK	1	0	0	21.64	21.79	0.151
					1	24	0	21.51	21.66	0.147
					1	49	0	21.37	21.52	0.142
					25	0	1	20.73	20.88	0.122
					25	12	1	20.56	20.71	0.118
					25	24	1	20.44	20.59	0.115
					50	0	1	20.68	20.83	0.121
				16QAM	1	0	1	20.71	20.86	0.122
					1	24	1	20.59	20.74	0.119
					1	49	1	20.47	20.62	0.115
					25	0	2	19.79	19.94	0.099
					25	12	2	19.59	19.74	0.094
					25	24	2	19.47	19.62	0.092
					50	0	2	19.71	19.86	0.097

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

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power	EIRP power (dBm)	EIRP power (W)
Band 48	15M	55315	3557.5	QPSK	1	0	0	21.77	21.92	0.156
					1	37	0	21.66	21.81	0.152
					1	74	0	21.57	21.72	0.149
					36	0	1	20.86	21.01	0.126
					36	18	1	20.71	20.86	0.122
					36	35	1	20.64	20.79	0.120
					75	0	1	20.81	20.96	0.125
				16QAM	1	0	1	20.84	20.99	0.126
					1	37	1	20.74	20.89	0.123
					1	74	1	20.67	20.82	0.121
					36	0	2	19.92	20.07	0.102
					36	18	2	19.74	19.89	0.097
					36	35	2	19.67	19.82	0.096
					75	0	2	19.84	19.99	0.100
		56215	3647.5	QPSK	1	0	0	21.84	21.99	0.158
					1	37	0	21.76	21.91	0.155
					1	74	0	21.68	21.83	0.152
					36	0	1	20.93	21.08	0.128
					36	18	1	20.81	20.96	0.125
					36	35	1	20.75	20.90	0.123
					75	0	1	20.88	21.03	0.127
				16QAM	1	0	1	20.91	21.06	0.128
					1	37	1	20.84	20.99	0.126
					1	74	1	20.78	20.93	0.124
					36	0	2	19.99	20.14	0.103
					36	18	2	19.84	19.99	0.100
					36	35	2	19.78	19.93	0.098
					75	0	2	19.91	20.06	0.101
		56665	3692.5	QPSK	1	0	0	21.77	21.92	0.156
					1	37	0	21.64	21.79	0.151
					1	74	0	21.50	21.65	0.146
					36	0	1	20.86	21.01	0.126
					36	18	1	20.69	20.84	0.121
					36	35	1	20.57	20.72	0.118
					75	0	1	20.81	20.96	0.125
				16QAM	1	0	1	20.84	20.99	0.126
					1	37	1	20.72	20.87	0.122
					1	74	1	20.60	20.75	0.119
					36	0	2	19.92	20.07	0.102
					36	18	2	19.72	19.87	0.097
					36	35	2	19.60	19.75	0.094
					75	0	2	19.84	19.99	0.100

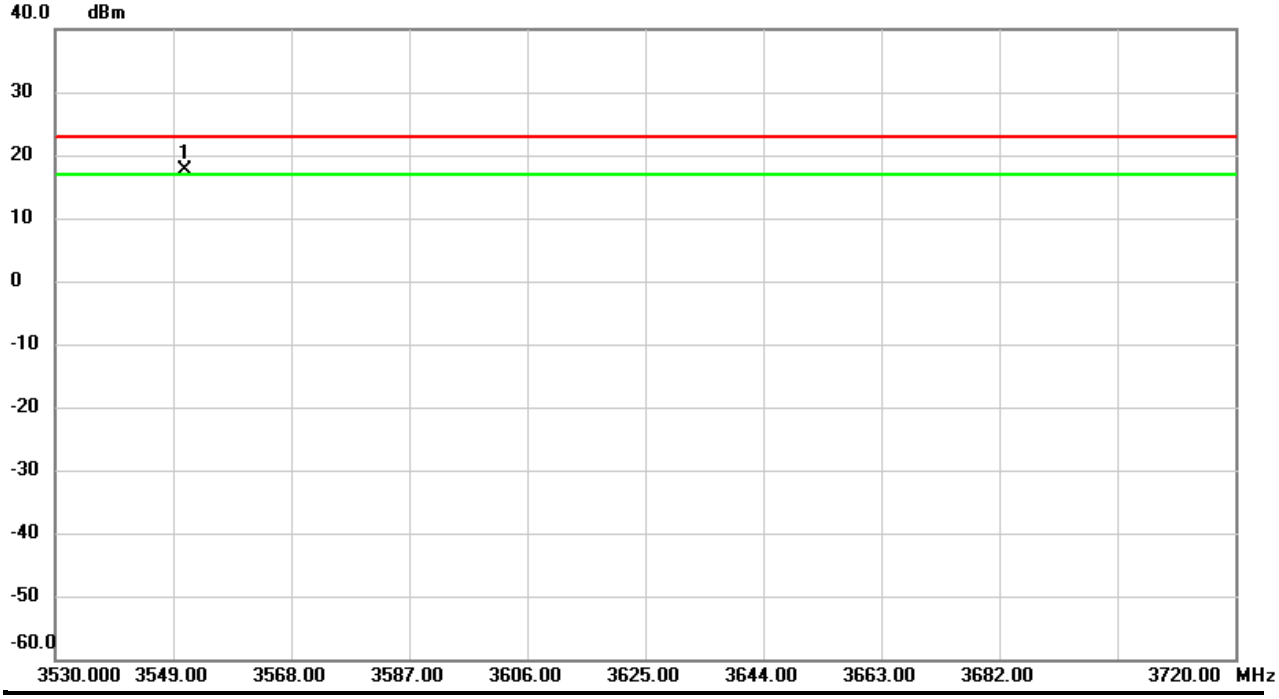
NOTE:
(1) EIRP = Average power + Antenna gain.
(2) ERP = EIRP - 2.15.
(3) $P(W) = 1\ W \cdot 10^{(P(dBm)\ /\ 10)} / 1000$

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Start	MPR	Average power	EIRP power (dBm)	EIRP power (W)
Band 41	20M	55340	3560.0	QPSK	1	0	0	21.85	22.00	0.158
					1	49	0	21.74	21.89	0.155
					1	99	0	21.65	21.80	0.151
					50	0	1	20.94	21.09	0.129
					50	24	1	20.79	20.94	0.124
					50	49	1	20.72	20.87	0.122
					100	0	1	20.89	21.04	0.127
				16QAM	1	0	1	20.92	21.07	0.128
					1	49	1	20.82	20.97	0.125
					1	99	1	20.75	20.90	0.123
					50	0	2	19.90	20.05	0.101
					50	24	2	19.82	19.97	0.099
					50	49	2	19.75	19.90	0.098
					100	0	2	19.92	20.07	0.102
		56207	3646.7	QPSK	1	0	0	21.92	22.07	0.161
					1	49	0	21.84	21.99	0.158
					1	99	0	21.76	21.91	0.155
					50	0	1	20.91	21.06	0.128
					50	24	1	20.89	21.04	0.127
					50	49	1	20.83	20.98	0.125
					100	0	1	20.96	21.11	0.129
				16QAM	1	0	1	20.99	21.14	0.130
					1	49	1	20.92	21.07	0.128
					1	99	1	20.86	21.01	0.126
					50	0	2	19.87	20.02	0.100
					50	24	2	19.92	20.07	0.102
					50	49	2	19.86	20.01	0.100
					100	0	2	19.99	20.14	0.103
		56640	3690.0	QPSK	1	0	0	21.85	22.00	0.158
					1	49	0	21.72	21.87	0.154
					1	99	0	21.58	21.73	0.149
					50	0	1	20.94	21.09	0.129
					50	24	1	20.77	20.92	0.124
					50	49	1	20.65	20.80	0.120
					100	0	1	20.89	21.04	0.127
				16QAM	1	0	1	20.92	21.07	0.128
					1	49	1	20.80	20.95	0.124
					1	99	1	20.68	20.83	0.121
					50	0	2	19.86	20.01	0.100
					50	24	2	19.80	19.95	0.099
					50	49	2	19.68	19.83	0.096
					100	0	2	19.92	20.07	0.102

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

Radiated EIRP Power:

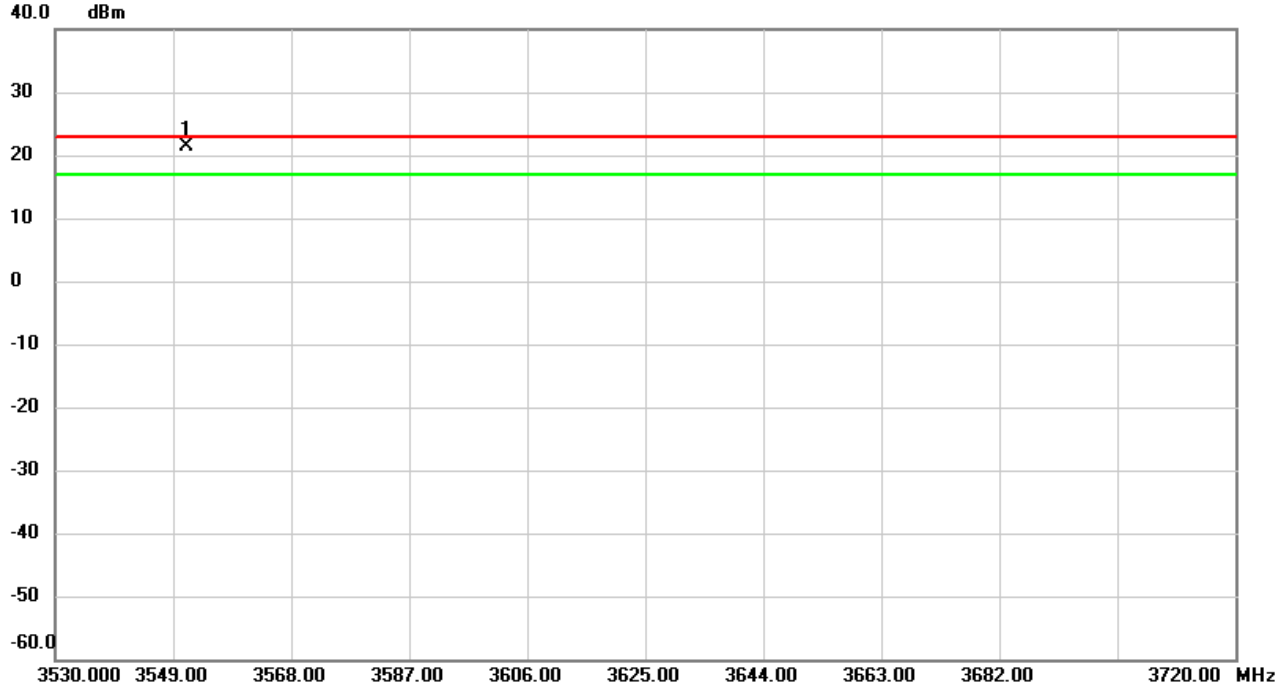
Test Mode	LTE Band 48	Test Date	2022/3/4
Test Channel	CH55340	Polarization	Vertical
Temp	21°C	Hum.	64%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3550.970	-23.41	41.16	17.75	23.00	-5.25	peak	

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

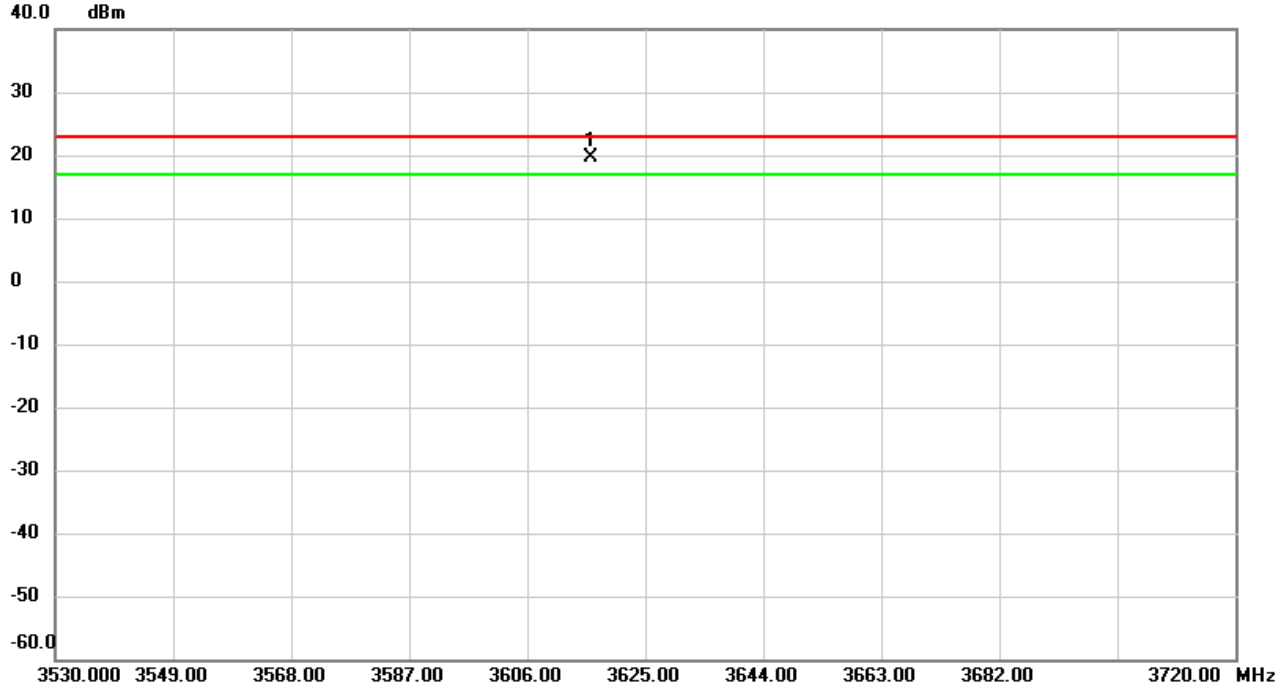
Test Mode	LTE Band 48	Test Date	2022/3/4
Test Channel	CH55340	Polarization	Horizontal
Temp	21°C	Hum.	64%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3551.128	-18.73	40.07	21.34	23.00	-1.66	peak	

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

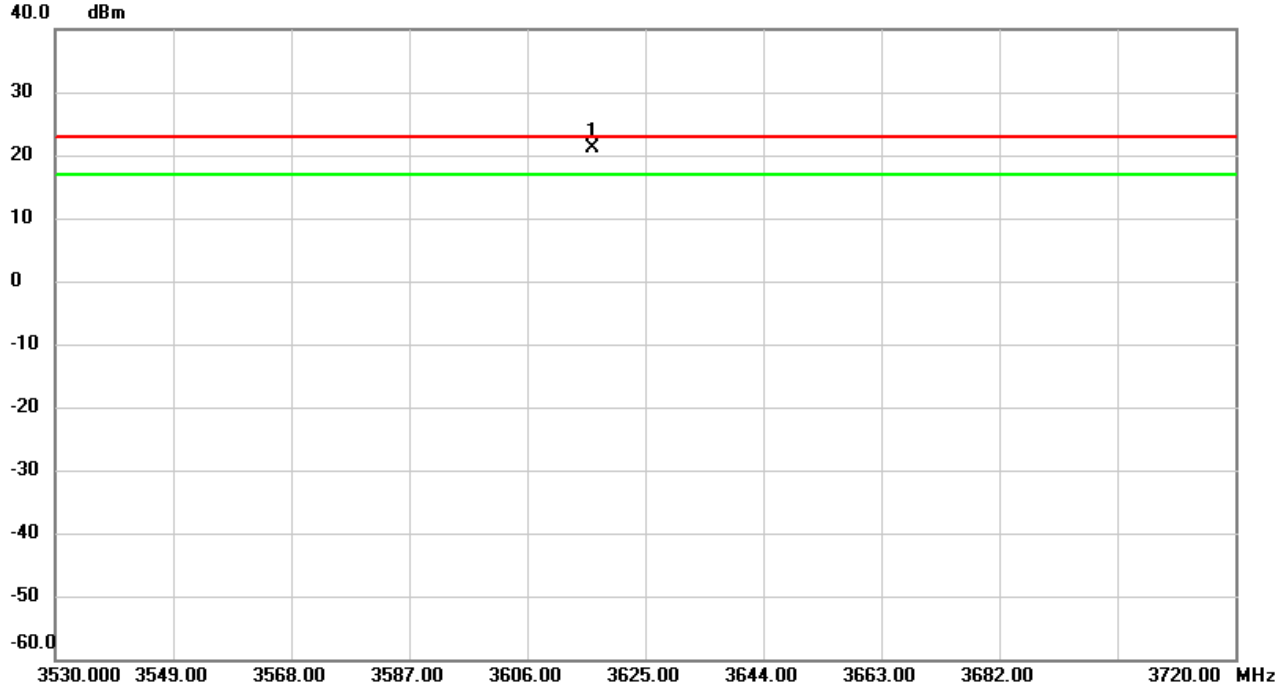
Test Mode	LTE Band 48	Test Date	2022/3/4
Test Channel	CH55990	Polarization	Vertical
Temp	21°C	Hum.	64%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3616.228	-21.55	41.19	19.64	23.00	-3.36	peak	

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

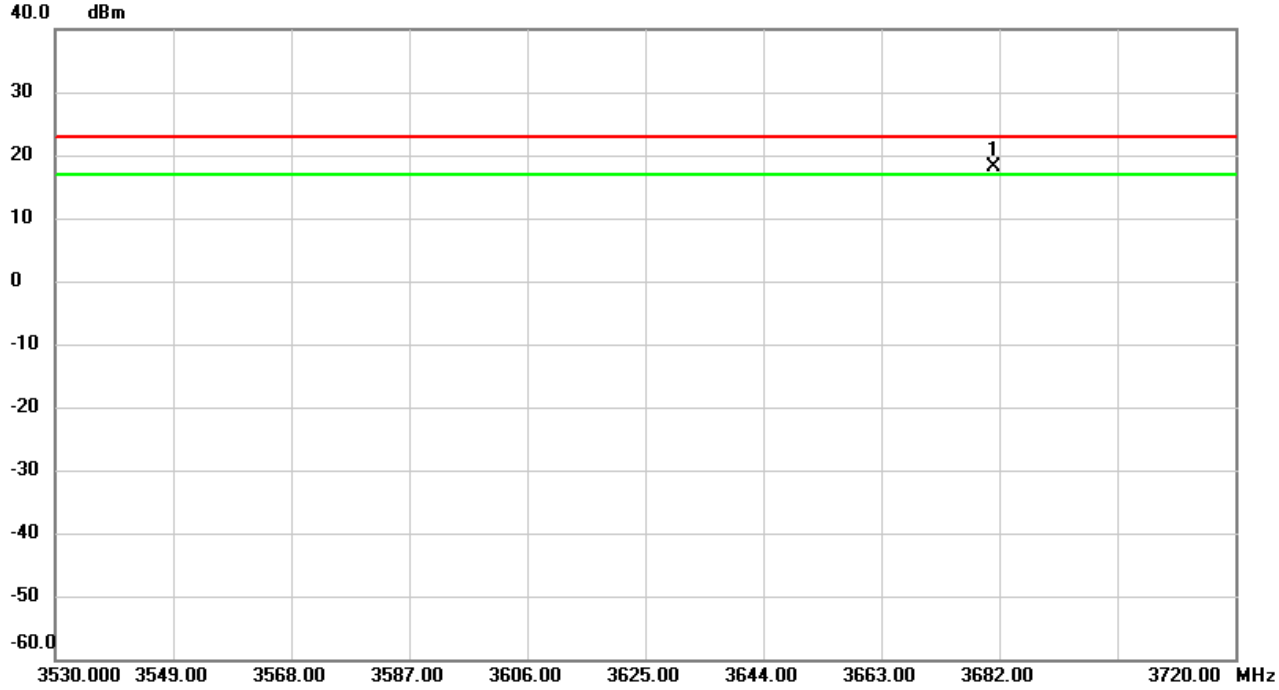
Test Mode	LTE Band 48	Test Date	2022/3/4
Test Channel	CH55990	Polarization	Horizontal
Temp	21°C	Hum.	64%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3616.437	-19.30	40.39	21.09	23.00	-1.91	peak	

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

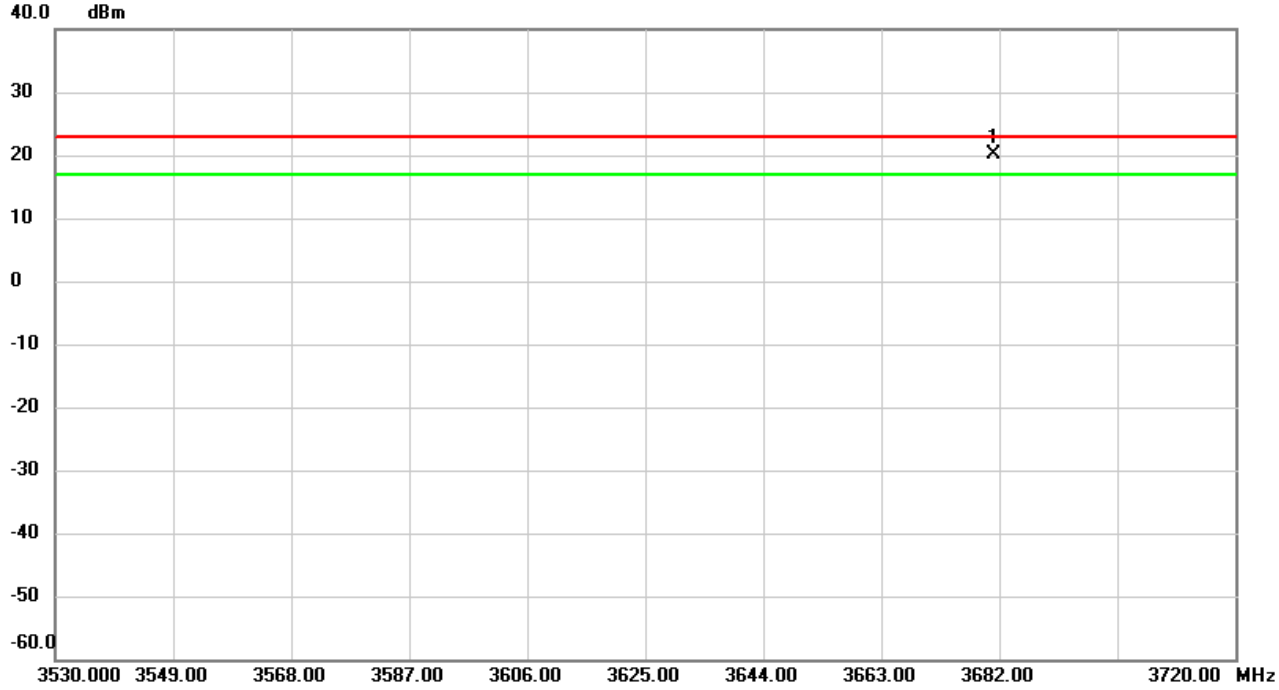
Test Mode	LTE Band 48	Test Date	2022/3/4
Test Channel	CH56640	Polarization	Vertical
Temp	21°C	Hum.	64%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3681.120	-23.08	41.22	18.14	23.00	-4.86	peak	

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

Test Mode	LTE Band 48	Test Date	2022/3/4
Test Channel	CH56640	Polarization	Horizontal
Temp	21°C	Hum.	64%

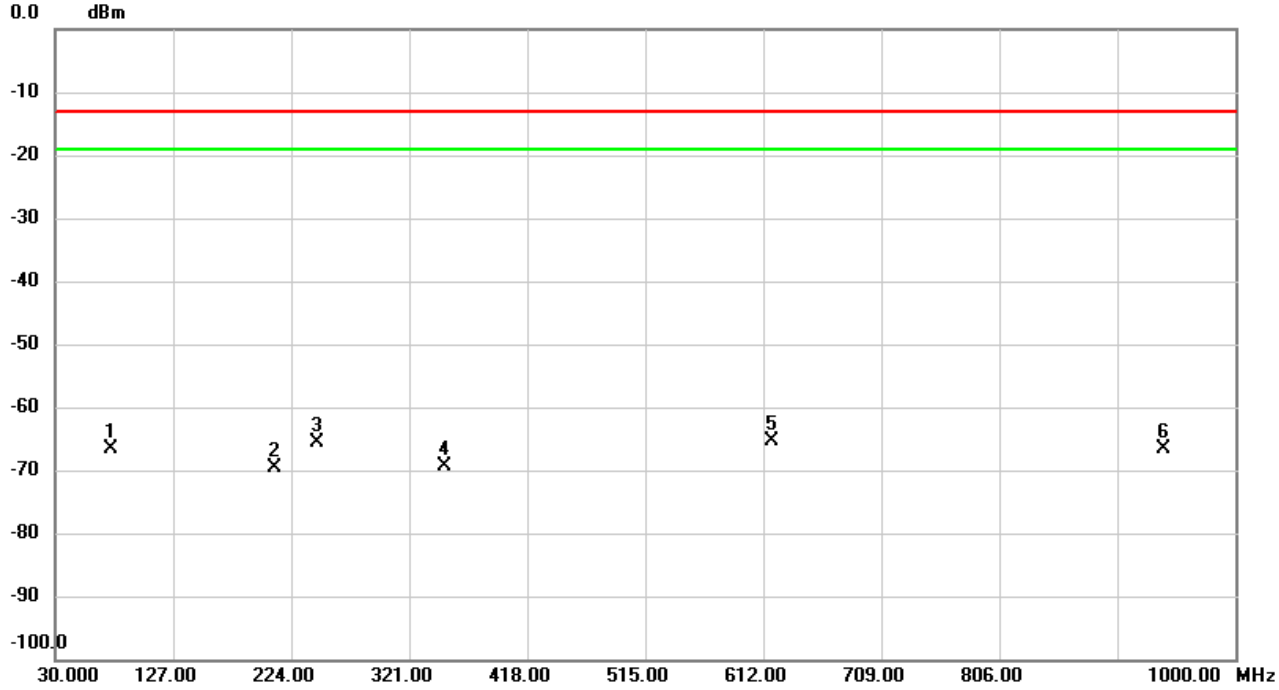


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	3681.151	-20.46	40.70	20.24	23.00	-2.76	peak	

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

APPENDIX C RADIATED SPURIOUS EMISSIONS

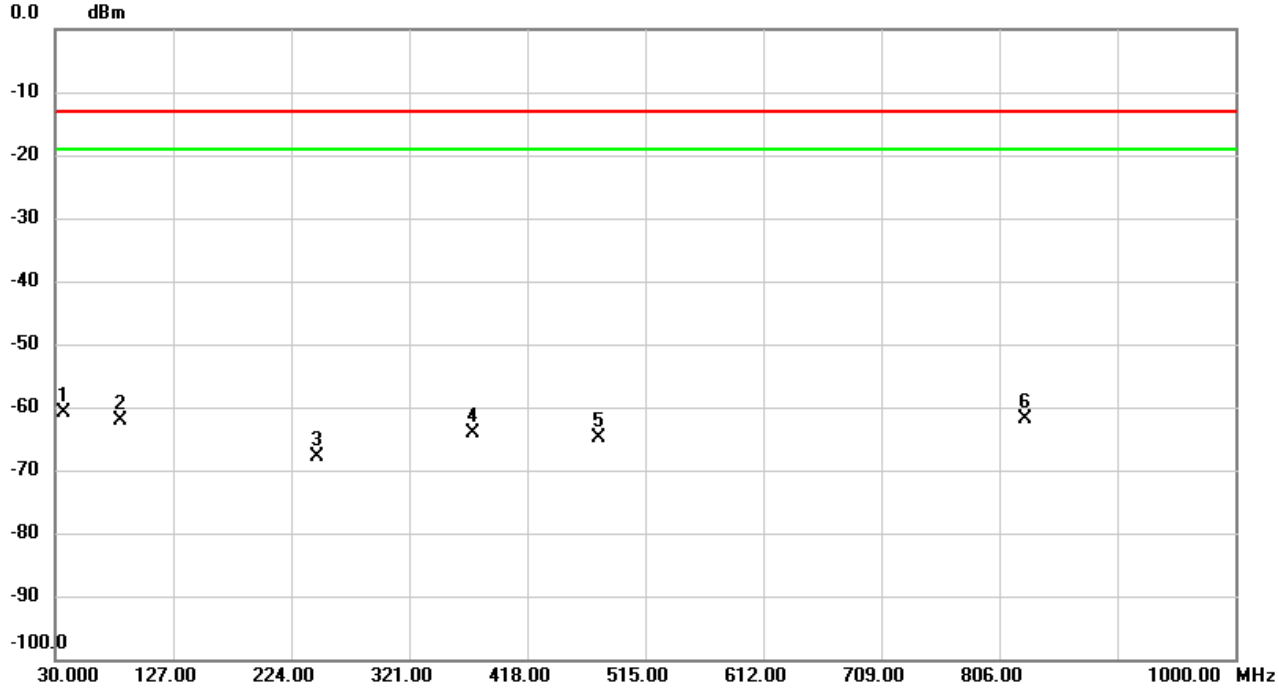
Test Mode	LTE Band48	Test Date	2022/3/3
Test Channel	CH55990	Polarization	Vertical
Temp	21°C	Hum.	64%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		75.7840	-64.29	-2.25	-66.54	-13.00	-53.54	peak	
2		210.1937	-71.88	2.15	-69.73	-13.00	-56.73	peak	
3		244.8873	-73.23	7.71	-65.52	-13.00	-52.52	peak	
4		350.2940	-76.47	7.03	-69.44	-13.00	-56.44	peak	
5	*	618.6930	-78.23	12.92	-65.31	-13.00	-52.31	peak	
6		940.9917	-78.74	12.17	-66.57	-13.00	-53.57	peak	

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

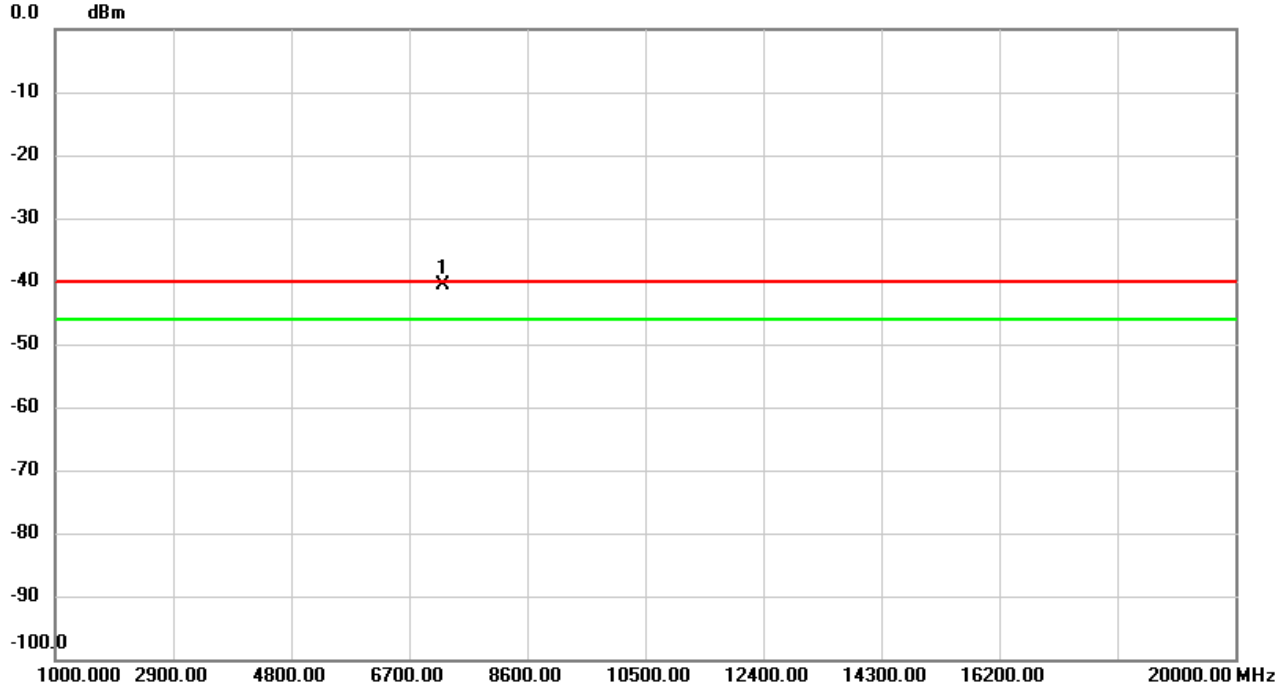
Test Mode	LTE Band48	Test Date	2022/3/3
Test Channel	CH55990	Polarization	Horizontal
Temp	21°C	Hum.	64%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	37.0810	-76.72	15.79	-60.93	-13.00	-47.93	peak	
2		83.5117	-67.06	5.02	-62.04	-13.00	-49.04	peak	
3		245.3400	-67.18	-0.59	-67.77	-13.00	-54.77	peak	
4		373.3153	-69.12	5.06	-64.06	-13.00	-51.06	peak	
5		477.2347	-76.69	11.82	-64.87	-13.00	-51.87	peak	
6		827.8250	-77.67	15.87	-61.80	-13.00	-48.80	peak	

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

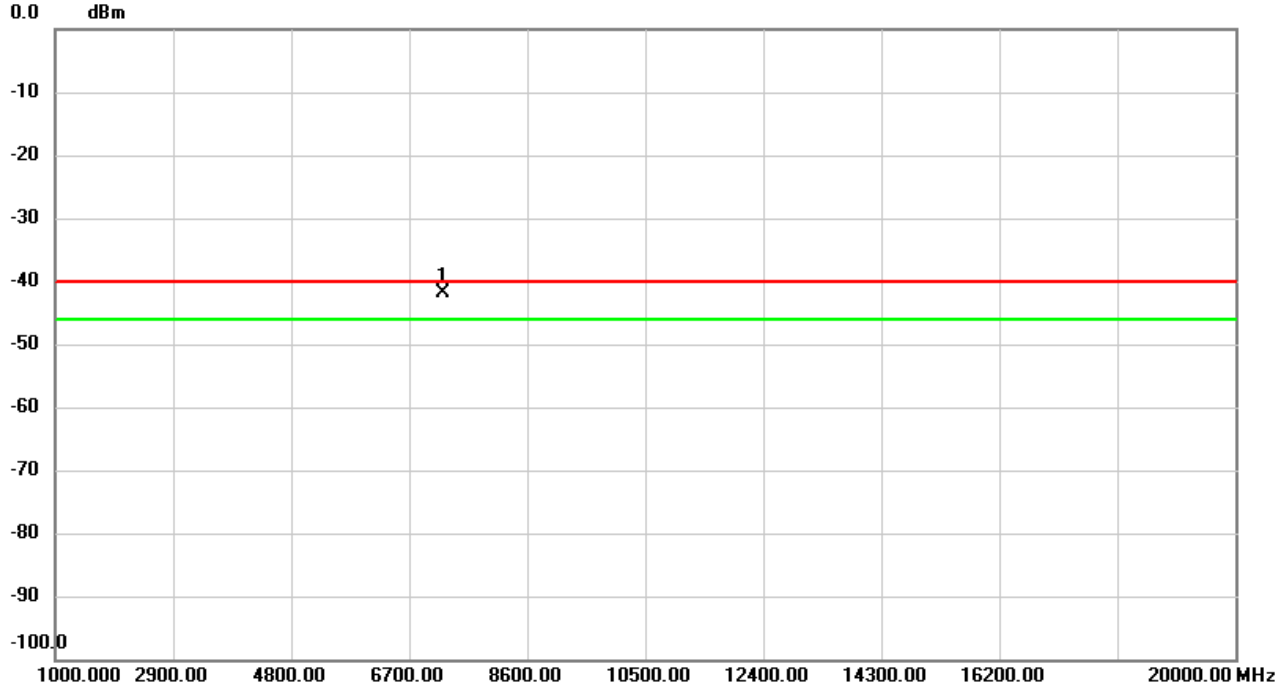
Test Mode	LTE Band 48	Test Date	2022/3/4
Test Channel	CH55990	Polarization	Vertical
Temp	21°C	Hum.	64%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	7232.000	-47.49	6.97	-40.52	-40.00	-0.52	peak	

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

Test Mode	LTE Band 48	Test Date	2022/3/4
Test Channel	CH55990	Polarization	Horizontal
Temp	21°C	Hum.	64%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	7232.000	-49.08	7.09	-41.99	-40.00	-1.99	peak	

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

End of Test Report