FCC Radio Test Report

FCC ID: 2AVVT-CU413UCMPS1

Report No.	:	BTL-FCCP-4-2103T126B
Equipment	:	iTraMS CCU
Model Name	:	CU-41-3U-CM-PS1
Brand Name	:	Bosch
Applicant	:	Bosch Global Software Technologies Private Limited
Address	:	MS/PAC, Ban 601, Post Box No 3000 Hosur Road, Adugodi, Bengaluru, Karnataka-560030, India
Radio Function	:	LTE Band 4, 12
FCC Rule Part(s)	:	47 CFR FCC Part 27 Subpart L 47 CFR FCC Part 27 Subpart H 47 CFR FCC Part 2
Measurement Procedure(s)	:	ANSI C63.26-2015 ANSI/TIA/EIA-603-E-2016 FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
Date of Receipt	:	2021/4/6
Date of Test	:	2021/4/6 ~ 2021/10/5
Issued Date	:	2022/11/22

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

Prepared by : Eric Lee

Eric Lee, Engineer

Approved by : Jerry Chuang

Jerry Chuang, Supervisor

Testing Laboratory 0659

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

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	11
2.3	BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	13
2.4	SUPPORT UNITS	14
3	ERP & EIRP TEST	15
3.1	LIMIT	15
3.2	TEST PROCEDURE	15
3.3	DEVIATION FROM TEST STANDARD	16
3.4	TEST SETUP	16
3.5	EUT OPERATING CONDITIONS	16
3.6	TEST RESULT	16
4	OCCUPIED BANDWIDTH MEASUREMENT	17
4.1	TEST PROCEDURE	17
4.2	DEVIATION FROM TEST STANDARD	17
4.3	TEST SETUP	17
4.4	TEST RESULT	17
5	CONDUCTED SPURIOUS EMISSIONS MEASUREMENT	18
5.1	LIMIT	18
5.2	TEST PROCEDURE	18
5.3	DEVIATION FROM TEST STANDARD	18
5.4	TEST SETUP	18
5.5	TEST RESULT	18
6	RADIATED SPURIOUS EMISSIONS TEST	19
6.1	LIMIT	19
6.2	TEST PROCEDURE	19
6.3	DEVIATION FROM TEST STANDARD	19
6.4	TEST SETUP	20
6.5	EUT OPERATING CONDITIONS	20
6.6	TEST RESULT	20
7	BAND EDGE MEASUREMENT	21
7.1	LIMIT	21
7.2	TEST PROCEDURE	21
7.3	DEVIATION FROM TEST STANDARD	21
7.4	TEST SETUP	21
7.5	TEST RESULT	21
8	PEAK TO AVERAGE RATIO MEASUREMENT	22
8.1	LIMIT	22
8.2	TEST PROCEDURE	22
8.3	DEVIATION FROM TEST STANDARD	22
8.4	TEST SETUP	22
8.5	TEST RESULT	22
9	FREQUENCY STABILITY MEASUREMENT	23

9.1	LIMIT	23
9.2	TEST PROCEDURE	23
9.3	DEVIATION FROM TEST STANDARD	23
9.4	TEST SETUP	23
9.5	TEST RESULT	23
10	LIST OF MEASURING EQUIPMENTS	24
11	EUT TEST PHOTO	25
12	EUT PHOTOS	25
APPENDIX A	ERP & EIRP	26
APPENDIX B	OCCUPIED BANDWIDTH	61
APPENDIX C	CONDUCTED SPURIOUS EMISSIONS	82
APPENDIX D	RADIATED SPURIOUS EMISSIONS	93
APPENDIX E	BAND EDGE	110
APPENDIX F	PEAK TO AVERAGE RATIO	121
APPENDIX G	FREQUENCY STABILITY	132

REVISION HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-4-2103T126	R00	Original Report.	2021/9/17	Invalid
BTL-FCCP-4-2103T126	R01	Revised Typo.	2021/9/27	Invalid
BTL-FCCP-4-2103T126	R02	Revised report to address TCB's comments.	2021/10/6	Invalid
BTL-FCCP-4-2103T126	R03	Revised report to address TCB's comments.	2021/10/13	Invalid
BTL-FCCP-4-2103T126	R04	Revised report to address TCB's comments.	2021/10/14	Valid
BTL-FCCP-4-2103T126B	R00	1. Added the fourth antenna. (MA173. A. LBI.001) 2. Modified applicant and address.	2022/11/22	Valid

1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

FCC Clause No	Description	Test Result	Judgement	Remark
15.207	AC Power Line Conducted Emissions	------	N/A	Note(3)
2.1046 27.50(d)(4) 27.50(c)(10)	Effective Radiated Power (ERP)& Equivalent Isotropic Radiated Power (EIRP)	APPENDIX A	Pass	------
2.1049	Occupied Bandwidth	APPENDIX B	Pass	------
2.1051 27.53(h) 27.53(g) 27.53(c)(2)(4)	Conducted Spurious Emissions	APPENDIX C	Pass	------
2.1053 27.53(h)	Radiated Spurious Emissions	APPENDIX D	Pass	------
2.1051 27.53(h) 27.53(g) 27.53(c)(2)(4)	Band Edge Measurements	APPENDIX E	Pass	------
-	Peak To Average Ratio	APPENDIX F	Pass	Record Only
2.1055 27.54	Frequency Stability	APPENDIX G	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 is a DC input device.

1.1 TEST FACILITY

Test Firm Location: No.18, Ln. 171, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan.
TAF Accreditation Number is 0659; FCC Designation Number is TW0659.
The satellite facilities under the test firm used to collect the test data in this report are:
No. 66, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
☒ CB15 ☐ CB16
No. 68-2, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
☐ CB12 ☒ 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. Radiated Spurious 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

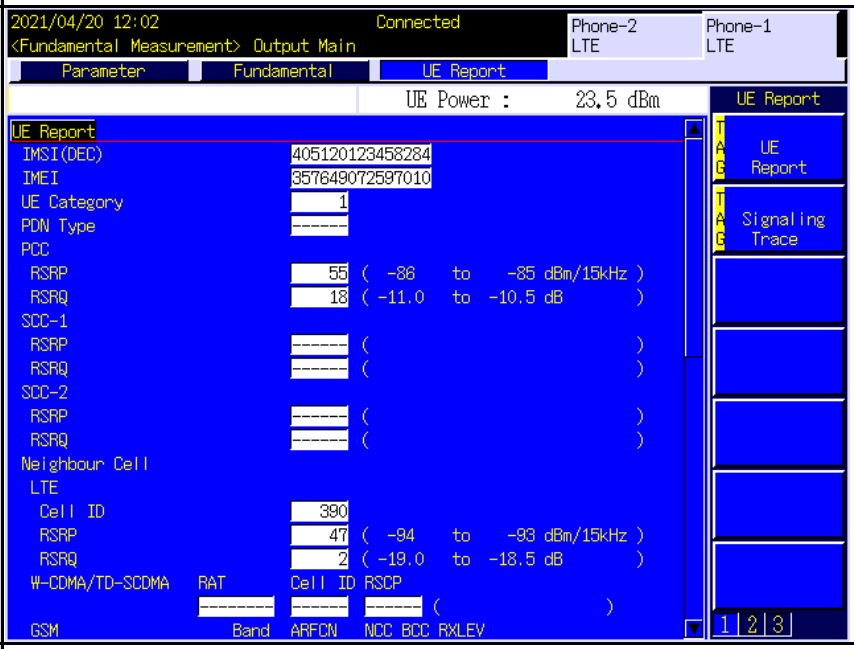
NOTE:
Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Test Voltage	Tested by
ERP & EIRP (Conducted)	24.8 °C, 49 %	DC 32V	William Wei
Occupied Bandwidth	24.8 °C, 49 %	DC 32V	William Wei
Conducted Spurious Emissions	24.8 °C, 49 %	DC 32V	William Wei
Radiated Spurious Emissions and ERP & EIRP (Radiated)	Refer to data	DC 32V	Jay Kao
Band Edge	24.8 °C, 49 %	DC 32V	William Wei
Peak to Average Ratio	24.8 °C, 49 %	DC 32V	William Wei
Frequency Stability	Normal and Extreme		William Wei

2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	iTraMS CCU
Model Name	CU-41-3U-CM-PS1
Brand Name	Bosch
Model Difference	N/A
Power Source	DC Voltage supplied from DC Source.
Power Rating	DC 9-32V (12V or 24V)
Products Covered	N/A
Hardware Version/Test Model	AD00 A10 062
Software Version	1277401063
IEMI No.	
Test Model	CU-41-3U-CM-PS1
Sample Status	Engineering Sample
Operation Frequency	

Mode	Band	UL Frequency (MHz)	DL Frequency (MHz)
LTE	4	1710 ~1755	2110 ~ 2155
LTE	12	699 ~716	725 ~746

Maximum EIRP	LTE Band 4 (1.4 MHz, QPSK): 0.615 W LTE Band 4 (1.4 MHz, 16QAM): 0.509 W LTE Band 4 (3 MHz, QPSK): 0.622 W LTE Band 4 (3 MHz, 16QAM): 0.515 W LTE Band 4 (5 MHz, QPSK): 0.630 W LTE Band 4 (5 MHz, 16QAM): 0.521 W LTE Band 4 (10 MHz, QPSK): 0.637 W LTE Band 4 (10 MHz, 16QAM): 0.527 W LTE Band 4 (15 MHz, QPSK): 0.644 W LTE Band 4 (15 MHz, 16QAM): 0.533 W LTE Band 4 (20 MHz, QPSK): 0.652 W LTE Band 4 (20 MHz, 16QAM): 0.540 W
Maximum ERP	LTE Band 12 (1.4 MHz, QPSK): 0.292 W LTE Band 12 (1.4 MHz, 16QAM): 0.240 W LTE Band 12 (3 MHz, QPSK): 0.295 W LTE Band 12 (3 MHz, 16QAM): 0.243 W LTE Band 12 (5 MHz, QPSK): 0.299 W LTE Band 12 (5 MHz, 16QAM): 0.245 W LTE Band 12 (10 MHz, QPSK): 0.302 W LTE Band 12 (10 MHz, 16QAM): 0.248 W
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) Channel List:

LTE Band 4					
Test Frequency ID	Bandwidth (MHz)	N_{UL}	Frequency of Uplink (MHz)	N_{DL}	Frequency of Downlink (MHz)
Low Range	1.4	19957	1710.7	1957	2110.7
	3	19965	1711.5	1965	2111.5
	5	19975	1712.5	1975	2112.5
	10	20000	1715	2000	2115
	15	20025	1717.5	2025	2117.5
	20	20050	1720	2050	2120
Mid Range	1.4/3/5/10/15/20	20175	1732.5	2175	2132.5
High Range	1.4	20393	1754.3	2393	2154.3
	3	20385	1753.5	2385	2153.5
	5	20375	1752.5	2375	2152.5
	10	20350	1750	2350	2150
	15	20325	1747.5	2325	2147.5
	20	20300	1745	2300	2145

LTE Band 12					
Test Frequency ID	Bandwidth (MHz)	N_{UL}	Frequency of Uplink (MHz)	N_{DL}	Frequency of Downlink (MHz)
Low Range	1.4	23017	699.7	5017	729.7
	3	23025	700.5	5025	730.5
	5	23035	701.5	5035	731.5
	10	23060	704	5060	734
Mid Range	1.4/3/5/10	23095	707.5	5095	737.5
High Range	1.4	23173	715.3	5173	745.3
	3	23165	714.5	5165	744.5
	5	23155	713.5	5155	743.5
	10	23130	711	5130	741

(3) Table for Filed Antenna:

Group I:

Antenna	Manufacture	Part No.	Type	Connector	Gain (dBi)	Note
External antenna	TAOGLAS.	MA250.A.LBI.001	N/A	SMA(M)ST	3.79	LTE Band 4
					0.72	LTE Band 12
		TG.08.0723	N/A	Fakra Code D	3.43	LTE Band 4 (RX only)
					-1.96	LTE Band 12 (RX only)

Group II:

Antenna	Manufacture	Part No.	Type	Connector	Gain (dBi)	Note
Built-in antenna	BOSCH	N/A	N/A	Integrated (Through Hole)	4.6	LTE Band 4
					-1.5	LTE Band 12

Group III:

Antenna	Manufacture	Part No.	Type	Connector	Gain (dBi)	Note
External antenna	taoglas antenna solutions	MA240.LBI.001	N/A	SMA(M)	2.46	LTE Band 4
					3.11	LTE Band 12

Group IV:

Antenna	Manufacture	Part No.	Type	Connector	Gain (dBi)	Note
External antenna	TAOGLAS.	MA173. A. LBI.001	N/A	SMA(M)ST	2.40	LTE Band 4
					0.98	LTE Band 12

Note: The EUT includes three groups of external antennas, for Radiated test items only the worst case Band 4: MA250.A.LBI.001, Band 12: MA240.LBI.001 antenna is recorded.

(4) 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.

(5) This is a supplement report of BTL-FCCP-4-2103T126 report. The differences compared with original report are
   (1) Added the fourth antenna (MA173. A. LBI.001).
   (2) Modified applicant and address.

   After evaluated, the changes with respect to the original one, not affect the test results.

2.2 TEST MODES

LTE BAND 4 MODE					
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
EIRP (Conducted)	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM	1RB/3RB/6RB
	19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM	1RB/8RB/15RB
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	1RB/12RB/25RB
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	1RB/25RB/50RB
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	1RB/36RB/75RB
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	1RB/50RB/100RB
EIRP (Radiated)	20050 to 20300	20050, 20175, 20300	20MHz	QPSK	1RB/50RB/100RB
Occupied Bandwidth	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM	6RB
	19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM	15RB
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	25RB
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	50RB
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	75 RB
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	100RB
Conducted Spurious Emissions	19957 to 20393	20175	1.4MHz	QPSK	1RB
	19965 to 20385	20175	3MHz	QPSK	1RB
	19975 to 20375	20175	5MHz	QPSK	1RB
	20000 to 20350	20175	10MHz	QPSK	1RB
	20025 to 20325	20175	15MHz	QPSK	1RB
	20050 to 20300	20175	20MHz	QPSK	1RB
Radiated Spurious Emissions	20050 to 20300	20175	20MHz	QPSK	1RB
Band Edge	19957 to 20393	19957, 20393	1.4MHz	QPSK	1RB/6RB
	19965 to 20385	19965, 20385	3MHz	QPSK	1RB/15RB
	19975 to 20375	19975, 20375	5MHz	QPSK	1RB/25RB
	20000 to 20350	20000, 20350	10MHz	QPSK	1RB/50RB
	20025 to 20325	20025, 20325	15MHz	QPSK	1RB/75RB
	20050 to 20300	20050, 20300	20MHz	QPSK	1RB/100RB
Peak To Average Ratio	19957 to 20393	19957, 20175, 20393	1.4MHz	QPSK, 16QAM	1RB
	19965 to 20385	19965, 20175, 20385	3MHz	QPSK, 16QAM	1RB
	19975 to 20375	19975, 20175, 20375	5MHz	QPSK, 16QAM	1RB
	20000 to 20350	20000, 20175, 20350	10MHz	QPSK, 16QAM	1RB
	20025 to 20325	20025, 20175, 20325	15MHz	QPSK, 16QAM	1RB
	20050 to 20300	20050, 20175, 20300	20MHz	QPSK, 16QAM	1RB
Frequency Stability	19957 to 20393	20175	1.4MHz	QPSK	1RB
	19965 to 20385	20175	3MHz	QPSK	1RB
	19975 to 20375	20175	5MHz	QPSK	1RB
	20000 to 20350	20175	10MHz	QPSK	1RB
	20025 to 20325	20175	15MHz	QPSK	1RB
	20050 to 20300	20175	20MHz	QPSK	1RB

LTE BAND 12 MODE					
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
ERP (Conducted)	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK, 16QAM	1RB/3RB/6RB
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK, 16QAM	1RB/8RB/15RB
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK, 16QAM	1RB/12RB/25RB
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK, 16QAM	1RB/25RB/50RB
ERP (Radiated)	23060 to 23130	23060, 23095, 23130	10MHz	QPSK	1RB/25RB/50RB
Occupied Bandwidth	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK, 16QAM	6RB
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK, 16QAM	15RB
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK, 16QAM	25RB
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK, 16QAM	50RB
Conducted Spurious Emissions	23017 to 23173	23095	1.4MHz	QPSK	1RB
	23025 to 23165	23095	3MHz	QPSK	1RB
	23035 to 23155	23095	5MHz	QPSK	1RB
	23060 to 23130	23095	10MHz	QPSK	1RB
Radiated Spurious Emissions	23060 to 23130	23095	10MHz	QPSK	1RB
Band Edge	23017 to 23173	23017, 23173	1.4MHz	QPSK, 16QAM	1RB/6RB
	23025 to 23165	23025, 23165	3MHz	QPSK, 16QAM	1RB/15RB
	23035 to 23155	23035, 23155	5MHz	QPSK, 16QAM	1RB/25RB
	23060 to 23130	23060, 23130	10MHz	QPSK, 16QAM	1RB/50RB
Peak To Average Ratio	23017 to 23173	23017, 23095, 23173	1.4MHz	QPSK, 16QAM	1RB/3RB/6RB
	23025 to 23165	23025, 23095, 23165	3MHz	QPSK, 16QAM	1RB/8RB/15RB
	23035 to 23155	23035, 23095, 23155	5MHz	QPSK, 16QAM	1RB/12RB/25RB
	23060 to 23130	23060, 23095, 23130	10MHz	QPSK, 16QAM	1RB/25RB/50RB
Frequency Stability	23017 to 23173	23095	1.4MHz	QPSK	1RB
	23025 to 23165	23095	3MHz	QPSK	1RB
	23035 to 23155	23095	5MHz	QPSK	1RB
	23060 to 23130	23095	10MHz	QPSK	1RB

NOTE:

(1) All X, Y and Z axes are evaluated, but only the worst case is recorded. See below table for detail.

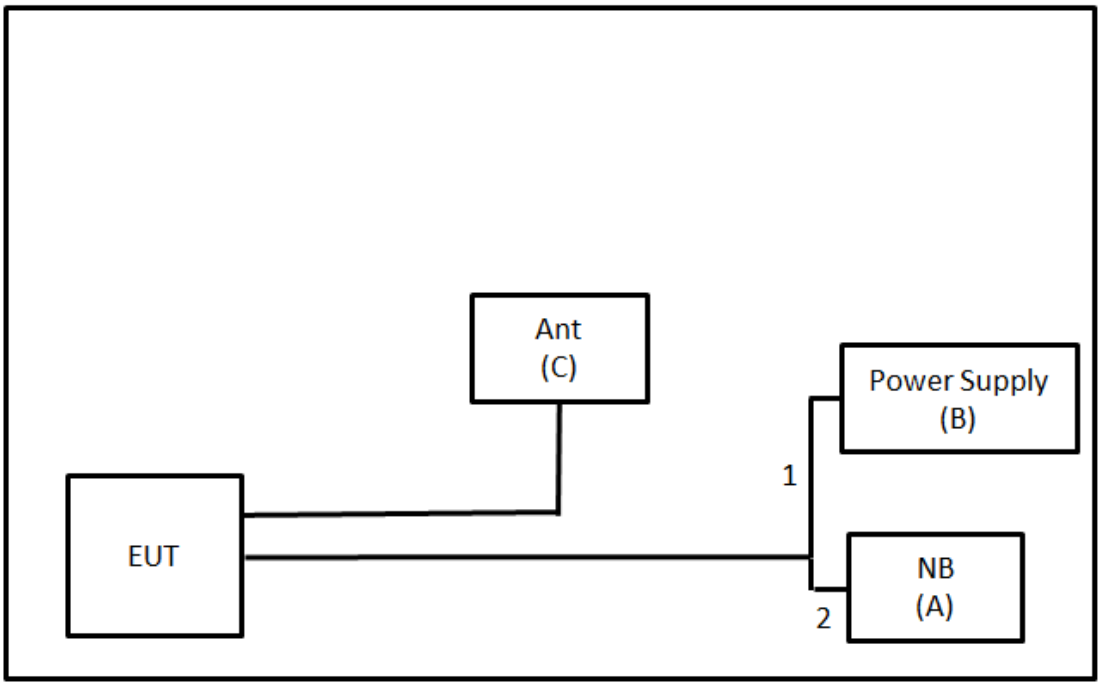
Test Item	External antenna		Built-in antenna	
	BAND 4	BAND 12	BAND 4	BAND 12
Radiated Spurious Emissions (below 1G)	X axis	Z axis	Y axis	Z axis
Radiated Spurious Emissions (above 1G)	X axis	Z axis	Y axis	Z axis

(2) For ERP & EIRP radiated part, only the worst cases are recorded.

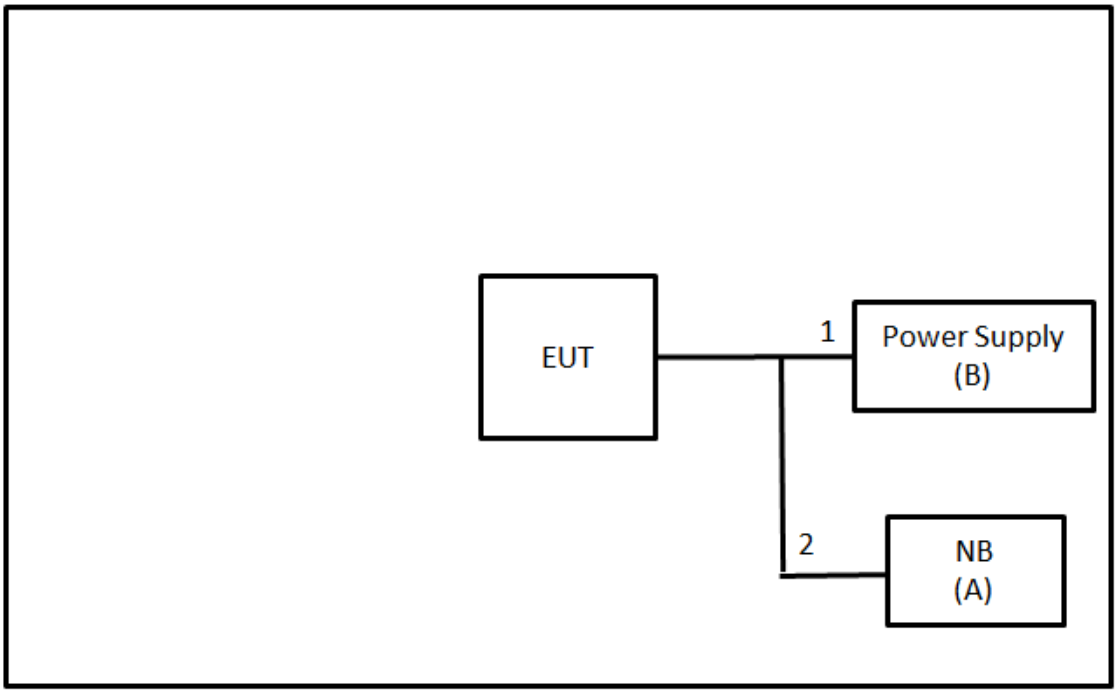
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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

Radiated Emissions_External antenna



Radiated Emissions_Built-in antenna



2.4 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	NB	HP	TPN-I119	N/A	Furnished by test lab.
B	Power Supply	Twintex	TDS-60-15	N/A	Furnished by test lab.
C	external antenna	Taoglas	MA250.A.LBI.001	N/A	Supplied by test requester
D	Stubby antenna	Taoglas	TG.08.0723	N/A	Supplied by test requester

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	N/A	N/A	2m	Power Cord	Supplied by test requester
2	N/A	N/A	2.1m	RS 232 to USB	Supplied by test requester

3 ERP & EIRP TEST

3.1 LIMIT

LTE Band 4:
27.50(d)(4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP (30 dBm).

LTE Band 12:
27.50(c)(10) Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP (34.77 dBm).

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	-	30	=	-25.40

3.2 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 5.

EIRP / ERP Power Measurement:
EIRP = Conducted Power + Antenna gain.
ERP power = EIPR power - 2.15 dBi.

Conducted Measurement:

The EUT was set up for the maximum power with LTE link data modulation and link up with simulator. Set the EUT to transmit under low, middle and high channel and record the power level shown on simulator.

Radiated Measurement:

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.

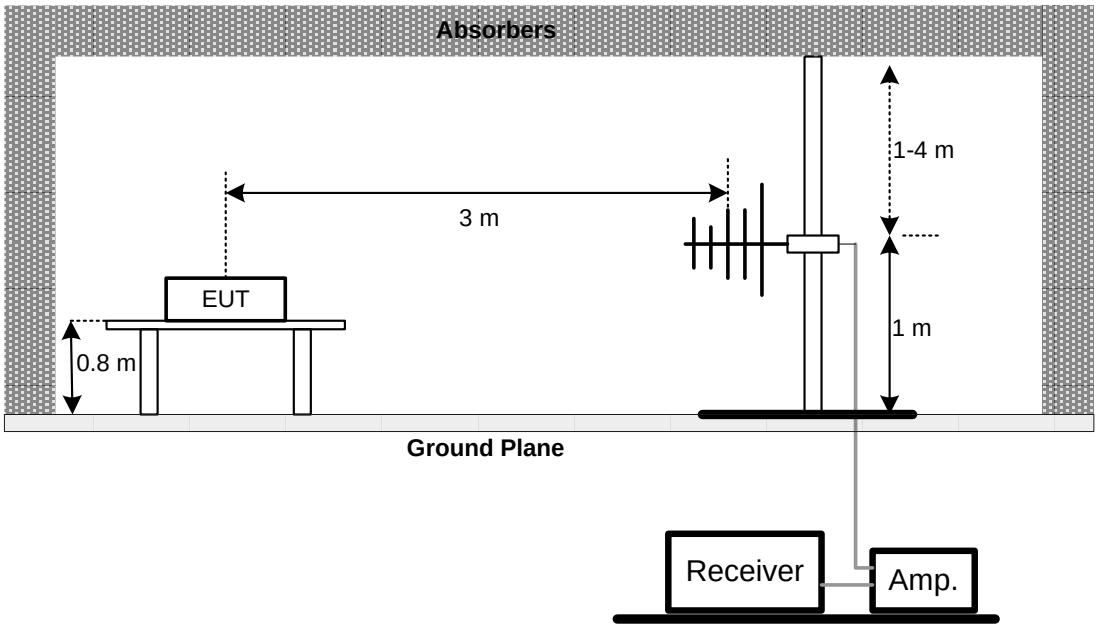
3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP

Conducted Measurement:

Radiated Measurement:



3.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

3.6 TEST RESULT

Please refer to the APPENDIX A.

4 OCCUPIED BANDWIDTH MEASUREMENT

4.1 TEST PROCEDURE

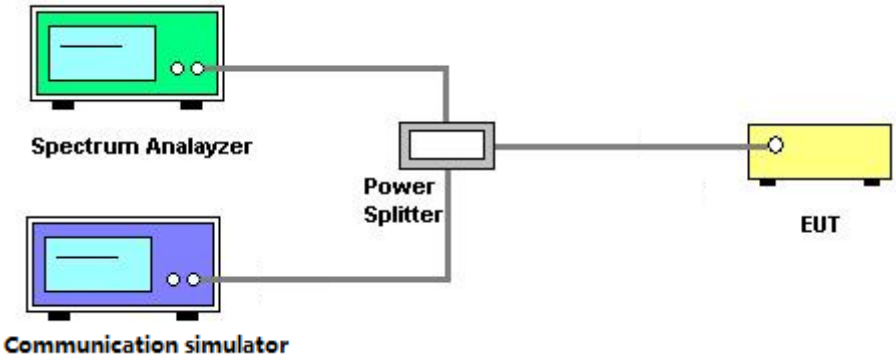
The testing follows FCC KDB 971168 v03r01 Section 4.

a. The EUT makes a call to the communication simulator. All measurements were done at low, middle and high operational frequency range. The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth and 26dB bandwidth.
b. The EUT was connected to spectrum analyzer and system simulator via a power divider.
c. RBW=(1% ~ 5%)*EBW
   VBW⩾3* RBW.
d. Set spectrum analyzer with Peak detector.

4.2 DEVIATION FROM TEST STANDARD

No deviation.

4.3 TEST SETUP



4.4 TEST RESULT

Please refer to the APPENDIX B.

5 CONDUCTED 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. (Part 27 Subpart L & H)

5.2 TEST PROCEDURE

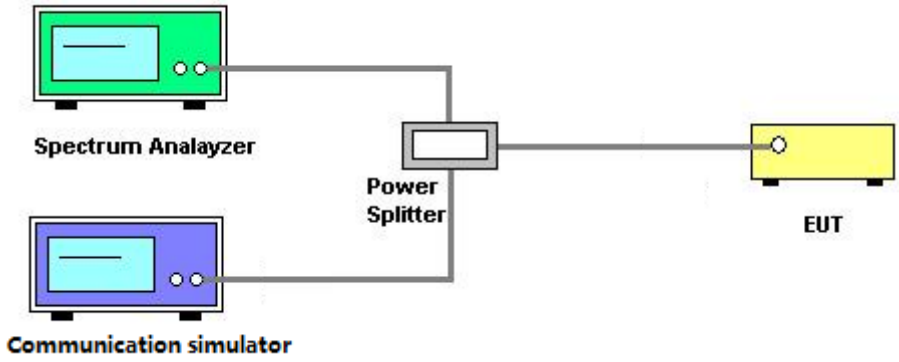
The testing follows FCC KDB 971168 v03r01 Section 6.

a. The EUT was connected to spectrum analyzer and system simulator via a power divider.
b. The band edges of low and high channels for the highest RF powers were measured. Set RBW>=1% EBW in the 1MHz band immediately outside and adjacent to the band edge.
c. Set spectrum analyzer with Peak detector.
d. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

5.3 DEVIATION FROM TEST STANDARD

No deviation.

5.4 TEST SETUP



5.5 TEST RESULT

Please refer to the APPENDIX C.

6 RADIATED SPURIOUS EMISSIONS TEST

6.1 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. (Part 27 Subpart L & H)

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
-50.43	+	-2.11	=	-52.54

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

6.2 TEST PROCEDURE

The testing follows FCC KDB 971168 v03r01 Section 6.2.

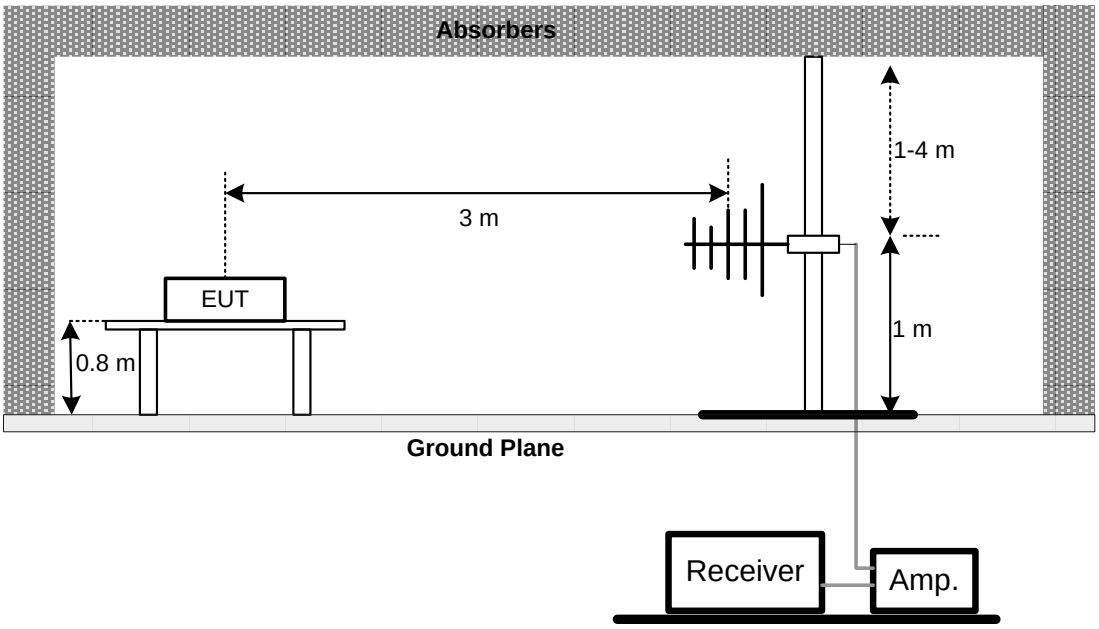
a. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power. 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.
The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1MHz/3MHz.

6.3 DEVIATION FROM TEST STANDARD

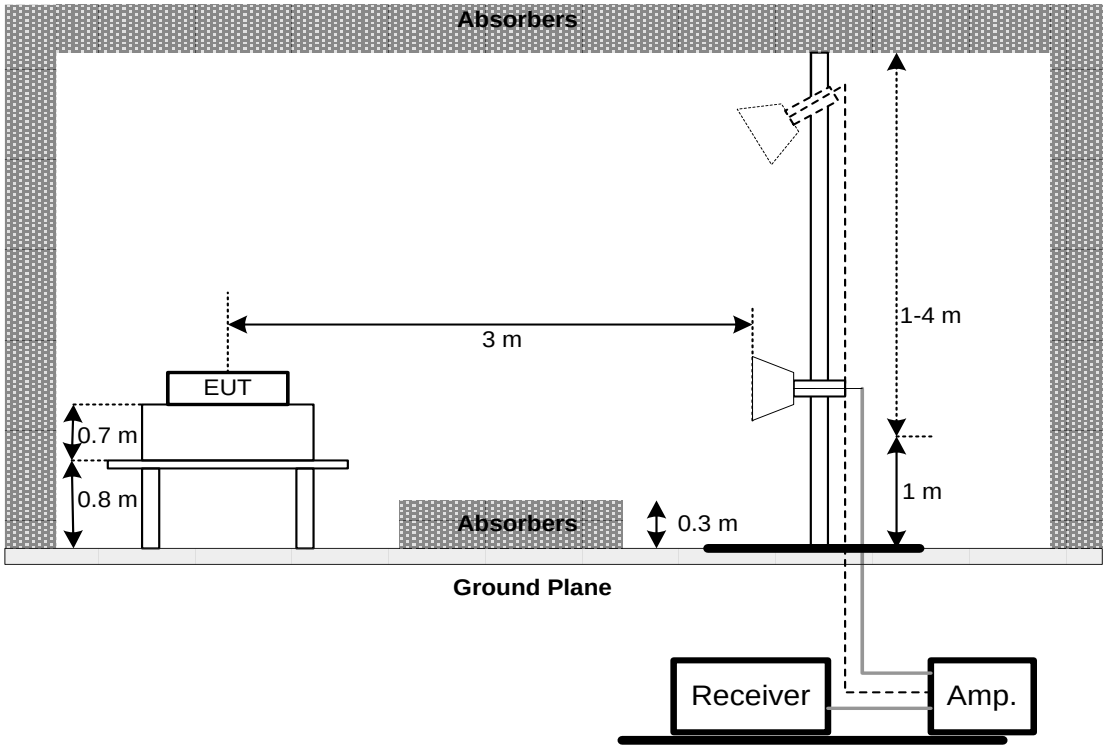
No deviation.

6.4 TEST SETUP

30 MHz to 1 GHz



Above 1 GHz



6.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULT

Please refer to the APPENDIX D

7 BAND EDGE MEASUREMENT

7.1 LIMIT

The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed. (Part 27 Subpart L & H)

7.2 TEST PROCEDURE

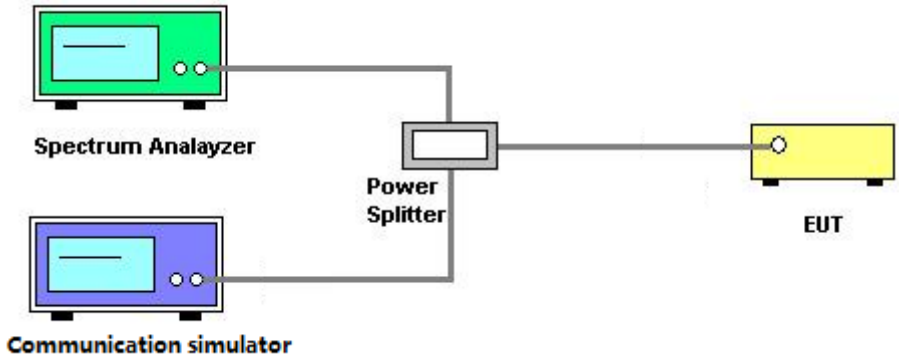
The testing follows FCC KDB 971168 v03r01 Section 6.

a. All measurements were done at low and high operational frequency range.
b. Record the max trace plot into the test report.

7.3 DEVIATION FROM TEST STANDARD

No deviation.

7.4 TEST SETUP



7.5 TEST RESULT

Please refer to the APPENDIX E.

8 PEAK TO AVERAGE RATIO MEASUREMENT

8.1 LIMIT

In measuring transmissions in this band using an average power technique, the peak to-average ratio (PAR) of the transmission may not exceed 13 dB.

8.2 TEST PROCEDURE

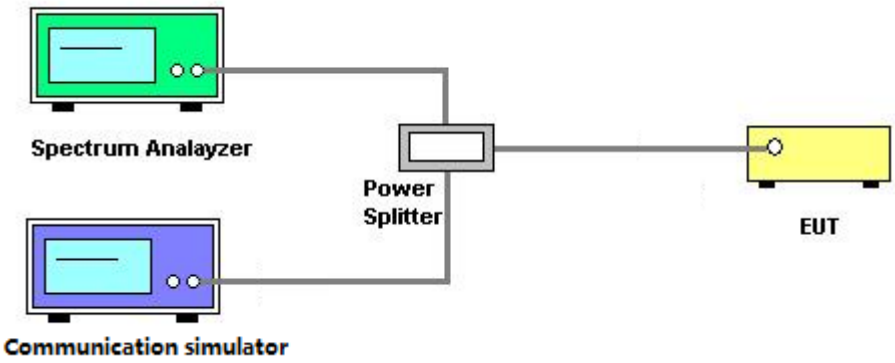
The testing follows FCC KDB 971168 v03r01 Section 5.7.

a. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth.
b. Set the number of counts to a value that stabilizes the measured CCDF curve.
c. Record the maximum PAPR level associated with a probability of 0.1%.

8.3 DEVIATION FROM TEST STANDARD

No deviation.

8.4 TEST SETUP



8.5 TEST RESULT

Please refer to the APPENDIX F.

9 FREQUENCY STABILITY MEASUREMENT

9.1 LIMIT

±1.5 ppm is for base and fixed station. ±2.5 ppm is for mobile station.

9.2 TEST PROCEDURE

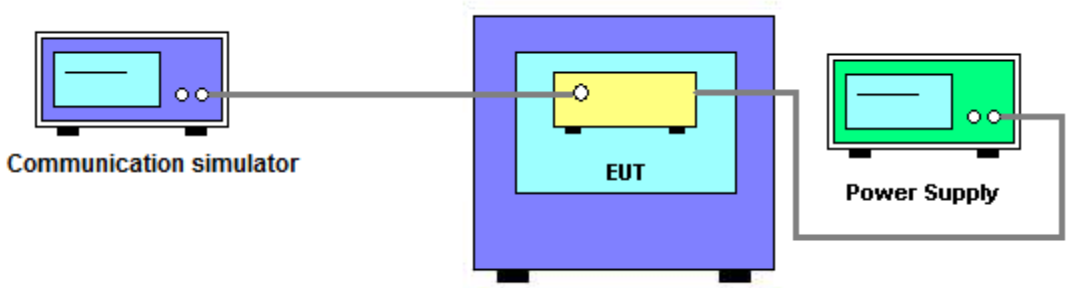
The testing follows FCC KDB 971168 v03r01 Section 9.

a. Device is placed at the oven room. The oven room could control the temperatures and humidity. Power warm up is at least 15 min and power applied should perform before recording frequency error.
b. EUT is connected the external power supply to control the DC input power. The test voltage range is from minimum to maximum working voltage. Each step shall be record the frequency error rate.
c. The temperature range step is 10 degrees in this test items. All temperature levels shall be hold the ±0.5°C during the measurement testing. The each temperature step shall be at least 0.5 hours, consider the EUT could be test under the stability condition.
d. The frequency error was recorded frequency error from the communication simulator.

9.3 DEVIATION FROM TEST STANDARD

No deviation.

9.4 TEST SETUP



9.5 TEST RESULT

Please refer to the APPENDIX G.

10 LIST OF MEASURING EQUIPMENTS

RF Power Output						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	8960 Series 10 Wireless Com Test Set	Agilent	E5515C	GB47390193	2020/6/4	2021/6/3
2	Radio Communication Analyzer	Anritsu	MT8820C	6201525878	2020/6/19	2021/6/18

Radiated Spurious Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Preamplifier	EMCI	EMC02325B	980217	2021/4/8	2022/4/7
2	Preamplifier	EMCI	EMC012645B	980267	2021/4/8	2022/4/7
3	Test Cable	EMCI	EMC-SM-SM-1000	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-7000	180408	2021/4/8	2022/4/7
6	MXE EMI Receiver	Agilent	N9038A	MY554200087	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	Trilog-Broadband Antenna	Schwarzbeck	VULB 9168	VULB 9168-352	2021/8/11	2022/8/10
10	5dB Attenuator	EMCI	EMCI-N-6-05	AT-N0625	2021/8/11	2022/8/10
11	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A
12	8960 Series 10 Wireless Com Test Set	Agilent	E5515C	GB47390193	2020/7/23	2021/7/22
13	Radio Communication Analyzer (LTE)	Anritsu	MT8820C	6201381608	2021/1/7	2022/1/6

Frequency Stability Measurement						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	8960 Series 10 Wireless Com Test Set	Agilent	E5515C	GB47390193	2020/6/4	2021/6/3
2	Radio Communication Analyzer	Anritsu	MT8820C	6201525878	2020/6/19	2021/6/18

Others Conducted Measurement						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP40	100129	2020/5/22	2021/5/21

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

11 EUT TEST PHOTO

Please refer to document Appendix No.: TP-2103T126B-FCCP-2 (APPENDIX-TEST PHOTOS).

12 EUT PHOTOS

Please refer to document Appendix No.: EP-2103T126B-3 (APPENDIX-EUT PHOTOS).

APPENDIX A ERP & EIRP

EIRP (Conducted):

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power	Gain (dBi)	EIRP (dBm)	EIRP (W)
4	1.4	19957	1710.7	QPSK	1	0	0	23.09	4.60	27.69	0.587
					1	2	0	22.81	4.60	27.41	0.551
					1	5	0	22.50	4.60	27.10	0.513
					3	0	0	23.09	4.60	27.69	0.587
					3	1	0	22.81	4.60	27.41	0.551
					3	2	0	22.50	4.60	27.10	0.513
					6	0	1	22.15	4.60	26.75	0.473
				16QAM	1	0	1	22.27	4.60	26.87	0.486
					1	2	1	22.23	4.60	26.83	0.482
					1	5	1	21.57	4.60	26.17	0.414
					3	0	1	22.27	4.60	26.87	0.486
					3	1	1	22.23	4.60	26.83	0.482
					3	2	1	21.57	4.60	26.17	0.414
					6	0	2	21.24	4.60	25.84	0.384
		20175	1732.5	QPSK	1	0	0	23.19	4.60	27.79	0.601
					1	2	0	22.73	4.60	27.33	0.541
					1	5	0	22.60	4.60	27.20	0.525
					3	0	0	23.19	4.60	27.79	0.601
					3	1	0	22.73	4.60	27.33	0.541
					3	2	0	22.60	4.60	27.20	0.525
					6	0	1	22.25	4.60	26.85	0.484
				16QAM	1	0	1	22.37	4.60	26.97	0.498
					1	2	1	22.33	4.60	26.93	0.493
					1	5	1	21.67	4.60	26.27	0.424
					3	0	1	22.37	4.60	26.97	0.498
					3	1	1	22.33	4.60	26.93	0.493
					3	2	1	21.67	4.60	26.27	0.424
					6	0	2	20.50	4.60	25.10	0.324
		20392	1754.2	QPSK	1	0	0	23.29	4.60	27.89	**0.615**
					1	2	0	22.85	4.60	27.45	0.556
					1	5	0	22.66	4.60	27.26	0.532
					3	0	0	23.29	4.60	27.89	**0.615**
					3	1	0	22.85	4.60	27.45	0.556
					3	2	0	22.66	4.60	27.26	0.532
					6	0	1	22.35	4.60	26.95	0.495
				16QAM	1	0	1	22.47	4.60	27.07	**0.509**
					1	2	1	22.43	4.60	27.03	0.505
					1	5	1	21.73	4.60	26.33	0.430
					3	0	1	22.47	4.60	27.07	**0.509**
					3	1	1	22.43	4.60	27.03	0.505
					3	2	1	21.73	4.60	26.33	0.430
					6	0	2	20.60	4.60	25.20	0.331

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

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power	Gain (dBi)	EIRP (dBm)	EIRP (W)
4	3	19965	1711.5	QPSK	1	0	0	23.14	4.60	27.74	0.594
					1	7	0	22.86	4.60	27.46	0.557
					1	14	0	22.55	4.60	27.15	0.519
					8	0	1	22.25	4.60	26.85	0.484
					8	4	1	21.90	4.60	26.50	0.447
					8	7	1	21.73	4.60	26.33	0.430
					15	0	1	22.20	4.60	26.80	0.479
				16QAM	1	0	1	22.32	4.60	26.92	0.492
					1	7	1	22.28	4.60	26.88	0.488
					1	14	1	21.62	4.60	26.22	0.419
					8	0	2	21.15	4.60	25.75	0.376
					8	4	2	21.00	4.60	25.60	0.363
					8	7	2	20.58	4.60	25.18	0.330
					15	0	2	21.29	4.60	25.89	0.388
		20175	1732.5	QPSK	1	0	0	23.24	4.60	27.84	0.608
					1	7	0	22.78	4.60	27.38	0.547
					1	14	0	22.65	4.60	27.25	0.531
					8	0	1	22.35	4.60	26.95	0.495
					8	4	1	21.82	4.60	26.42	0.439
					8	7	1	21.83	4.60	26.43	0.440
					15	0	1	22.30	4.60	26.90	0.490
				16QAM	1	0	1	22.42	4.60	27.02	0.504
					1	7	1	22.38	4.60	26.98	0.499
					1	14	1	21.72	4.60	26.32	0.429
					8	0	2	21.25	4.60	25.85	0.385
					8	4	2	20.92	4.60	25.52	0.356
					8	7	2	20.68	4.60	25.28	0.337
					15	0	2	21.39	4.60	25.99	0.397
		20384	1753.4	QPSK	1	0	0	23.34	4.60	27.94	**0.622**
					1	7	0	22.90	4.60	27.50	0.562
					1	14	0	22.71	4.60	27.31	0.538
					8	0	1	22.45	4.60	27.05	0.507
					8	4	1	21.94	4.60	26.54	0.451
					8	7	1	21.89	4.60	26.49	0.446
					15	0	1	22.40	4.60	27.00	0.501
				16QAM	1	0	1	22.52	4.60	27.12	**0.515**
					1	7	1	22.48	4.60	27.08	0.511
					1	14	1	21.78	4.60	26.38	0.435
					8	0	2	21.35	4.60	25.95	0.394
					8	4	2	21.04	4.60	25.64	0.366
					8	7	2	20.74	4.60	25.34	0.342
					15	0	2	21.49	4.60	26.09	0.406

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

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power	Gain (dBi)	EIRP (dBm)	EIRP (W)
4	5	19975	1712.5	QPSK	1	0	0	23.19	4.60	27.79	0.601
					1	12	0	22.91	4.60	27.51	0.564
					1	24	0	22.60	4.60	27.20	0.525
					12	0	1	22.30	4.60	26.90	0.490
					12	6	1	21.95	4.60	26.55	0.452
					12	11	1	21.78	4.60	26.38	0.435
					25	0	1	22.25	4.60	26.85	0.484
				16QAM	1	0	1	22.37	4.60	26.97	0.498
					1	12	1	22.33	4.60	26.93	0.493
					1	24	1	21.67	4.60	26.27	0.424
					12	0	2	21.20	4.60	25.80	0.380
					12	6	2	21.05	4.60	25.65	0.367
					12	11	2	20.63	4.60	25.23	0.333
					25	0	2	21.34	4.60	25.94	0.393
		20175	1732.5	QPSK	1	0	0	23.29	4.60	27.89	0.615
					1	12	0	22.83	4.60	27.43	0.553
					1	24	0	22.70	4.60	27.30	0.537
					12	0	1	22.40	4.60	27.00	0.501
					12	6	1	21.87	4.60	26.47	0.444
					12	11	1	21.88	4.60	26.48	0.445
					25	0	1	22.35	4.60	26.95	0.495
				16QAM	1	0	1	22.47	4.60	27.07	0.509
					1	12	1	22.43	4.60	27.03	0.505
					1	24	1	21.77	4.60	26.37	0.434
					12	0	2	21.30	4.60	25.90	0.389
					12	6	2	20.97	4.60	25.57	0.361
					12	11	2	20.73	4.60	25.33	0.341
					25	0	2	21.44	4.60	26.04	0.402
		20375	1752.5	QPSK	1	0	0	23.39	4.60	27.99	**0.630**
					1	12	0	22.95	4.60	27.55	0.569
					1	24	0	22.76	4.60	27.36	0.545
					12	0	1	22.50	4.60	27.10	0.513
					12	6	1	21.99	4.60	26.59	0.456
					12	11	1	21.94	4.60	26.54	0.451
					25	0	1	22.45	4.60	27.05	0.507
				16QAM	1	0	1	22.57	4.60	27.17	**0.521**
					1	12	1	22.53	4.60	27.13	0.516
					1	24	1	21.83	4.60	26.43	0.440
					12	0	2	21.40	4.60	26.00	0.398
					12	6	2	21.09	4.60	25.69	0.371
					12	11	2	20.79	4.60	25.39	0.346
					25	0	2	21.54	4.60	26.14	0.411

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

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power	Gain (dBi)	EIRP (dBm)	EIRP (W)
4	10	20000	1715.0	QPSK	1	0	0	23.24	4.60	27.84	0.608
					1	24	0	22.96	4.60	27.56	0.570
					1	49	0	22.65	4.60	27.25	0.531
					25	0	1	22.35	4.60	26.95	0.495
					25	12	1	22.00	4.60	26.60	0.457
					25	24	1	21.83	4.60	26.43	0.440
					50	0	1	22.30	4.60	26.90	0.490
				16QAM	1	0	1	22.42	4.60	27.02	0.504
					1	24	1	22.38	4.60	26.98	0.499
					1	49	1	21.72	4.60	26.32	0.429
					25	0	2	21.25	4.60	25.85	0.385
					25	12	2	21.10	4.60	25.70	0.372
					25	24	2	20.68	4.60	25.28	0.337
					50	0	2	21.39	4.60	25.99	0.397
		20175	1732.5	QPSK	1	0	0	23.34	4.60	27.94	0.622
					1	24	0	22.88	4.60	27.48	0.560
					1	49	0	22.75	4.60	27.35	0.543
					25	0	1	22.45	4.60	27.05	0.507
					25	12	1	21.92	4.60	26.52	0.449
					25	24	1	21.93	4.60	26.53	0.450
					50	0	1	22.40	4.60	27.00	0.501
				16QAM	1	0	1	22.52	4.60	27.12	0.515
					1	24	1	22.48	4.60	27.08	0.511
					1	49	1	21.82	4.60	26.42	0.439
					25	0	2	21.35	4.60	25.95	0.394
					25	12	2	21.02	4.60	25.62	0.365
					25	24	2	20.78	4.60	25.38	0.345
					50	0	2	21.49	4.60	26.09	0.406
		20350	1750.0	QPSK	1	0	0	23.44	4.60	28.04	**0.637**
					1	24	0	23.00	4.60	27.60	0.575
					1	49	0	22.81	4.60	27.41	0.551
					25	0	1	22.55	4.60	27.15	0.519
					25	12	1	22.04	4.60	26.64	0.461
					25	24	1	21.99	4.60	26.59	0.456
					50	0	1	22.50	4.60	27.10	0.513
				16QAM	1	0	1	22.62	4.60	27.22	**0.527**
					1	24	1	22.58	4.60	27.18	0.522
					1	49	1	21.88	4.60	26.48	0.445
					25	0	2	21.45	4.60	26.05	0.403
					25	12	2	21.14	4.60	25.74	0.375
					25	24	2	20.84	4.60	25.44	0.350
					50	0	2	21.59	4.60	26.19	0.416

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

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power	Gain (dBi)	EIRP (dBm)	EIRP (W)
4	15	20025	1717.5	QPSK	1	0	0	23.29	4.60	27.89	0.615
					1	37	0	23.01	4.60	27.61	0.577
					1	74	0	22.70	4.60	27.30	0.537
					36	0	1	22.40	4.60	27.00	0.501
					36	18	1	22.05	4.60	26.65	0.462
					36	35	1	21.88	4.60	26.48	0.445
					75	0	1	22.35	4.60	26.95	0.495
				16QAM	1	0	1	22.47	4.60	27.07	0.509
					1	37	1	22.43	4.60	27.03	0.505
					1	74	1	21.77	4.60	26.37	0.434
					36	0	2	21.30	4.60	25.90	0.389
					36	18	2	21.15	4.60	25.75	0.376
					36	35	2	20.73	4.60	25.33	0.341
					75	0	2	21.44	4.60	26.04	0.402
		20175	1732.5	QPSK	1	0	0	23.39	4.60	27.99	0.630
					1	37	0	22.93	4.60	27.53	0.566
					1	74	0	22.80	4.60	27.40	0.550
					36	0	1	22.50	4.60	27.10	0.513
					36	18	1	21.97	4.60	26.57	0.454
					36	35	1	21.98	4.60	26.58	0.455
					75	0	1	22.45	4.60	27.05	0.507
				16QAM	1	0	1	22.57	4.60	27.17	0.521
					1	37	1	22.53	4.60	27.13	0.516
					1	74	1	21.87	4.60	26.47	0.444
					36	0	2	21.40	4.60	26.00	0.398
					36	18	2	21.07	4.60	25.67	0.369
					36	35	2	20.83	4.60	25.43	0.349
					75	0	2	21.54	4.60	26.14	0.411
		20325	1747.5	QPSK	1	0	0	23.49	4.60	28.09	**0.644**
					1	37	0	23.05	4.60	27.65	0.582
					1	74	0	22.86	4.60	27.46	0.557
					36	0	1	22.60	4.60	27.20	0.525
					36	18	1	22.09	4.60	26.69	0.467
					36	35	1	22.04	4.60	26.64	0.461
					75	0	1	22.55	4.60	27.15	0.519
				16QAM	1	0	1	22.67	4.60	27.27	**0.533**
					1	37	1	22.63	4.60	27.23	0.528
					1	74	1	21.93	4.60	26.53	0.450
					36	0	2	21.50	4.60	26.10	0.407
					36	18	2	21.19	4.60	25.79	0.379
					36	35	2	20.89	4.60	25.49	0.354
					75	0	2	21.64	4.60	26.24	0.421

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

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power	Gain (dBi)	EIRP (dBm)	EIRP (W)
4	20	20050	1720.0	QPSK	1	0	0	23.34	4.60	27.94	0.622
					1	49	0	23.06	4.60	27.66	0.583
					1	99	0	22.75	4.60	27.35	0.543
					50	0	1	22.45	4.60	27.05	0.507
					50	24	1	22.10	4.60	26.70	0.468
					50	49	1	21.93	4.60	26.53	0.450
					100	0	1	22.40	4.60	27.00	0.501
				16QAM	1	0	1	22.52	4.60	27.12	0.515
					1	49	1	22.48	4.60	27.08	0.511
					1	99	1	21.82	4.60	26.42	0.439
					50	0	2	21.35	4.60	25.95	0.394
					50	24	2	21.20	4.60	25.80	0.380
					50	49	2	20.78	4.60	25.38	0.345
					100	0	2	21.49	4.60	26.09	0.406
		20175	1732.5	QPSK	1	0	0	23.44	4.60	28.04	0.637
					1	49	0	22.98	4.60	27.58	0.573
					1	99	0	22.85	4.60	27.45	0.556
					50	0	1	22.55	4.60	27.15	0.519
					50	24	1	22.02	4.60	26.62	0.459
					50	49	1	22.03	4.60	26.63	0.460
					100	0	1	22.50	4.60	27.10	0.513
				16QAM	1	0	1	22.62	4.60	27.22	0.527
					1	49	1	22.58	4.60	27.18	0.522
					1	99	1	21.92	4.60	26.52	0.449
					50	0	2	21.45	4.60	26.05	0.403
					50	24	2	21.12	4.60	25.72	0.373
					50	49	2	20.88	4.60	25.48	0.353
					100	0	2	21.59	4.60	26.19	0.416
		20300	1745.0	QPSK	1	0	0	23.54	4.60	28.14	**0.652**
					1	49	0	23.10	4.60	27.70	0.589
					1	99	0	22.91	4.60	27.51	0.564
					50	0	1	22.65	4.60	27.25	0.531
					50	24	1	22.14	4.60	26.74	0.472
					50	49	1	22.09	4.60	26.69	0.467
					100	0	1	22.60	4.60	27.20	0.525
				16QAM	1	0	1	22.72	4.60	27.32	**0.540**
					1	49	1	22.68	4.60	27.28	0.535
					1	99	1	21.98	4.60	26.58	0.455
					50	0	2	21.55	4.60	26.15	0.412
					50	24	2	21.24	4.60	25.84	0.384
					50	49	2	20.94	4.60	25.54	0.358
					100	0	2	21.69	4.60	26.29	0.426

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

ERP (Conducted):

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power	Gain (dBi)	ERP (dBm)	ERP (W)
12	1.4	23017	699.7	QPSK	1	0	0	23.66	3.11	24.62	0.290
					1	2	0	23.61	3.11	24.57	0.286
					1	5	0	23.56	3.11	24.52	0.283
					3	0	0	23.66	3.11	24.62	0.290
					3	1	0	23.61	3.11	24.57	0.286
					3	2	0	23.56	3.11	24.52	0.283
					6	0	1	22.72	3.11	23.68	0.233
				16QAM	1	0	1	22.84	3.11	23.80	**0.240**
					1	2	1	22.80	3.11	23.76	0.238
					1	5	1	22.63	3.11	23.59	0.229
					3	0	1	22.84	3.11	23.80	**0.240**
					3	1	1	22.80	3.11	23.76	0.238
					3	2	1	22.63	3.11	23.59	0.229
					6	0	2	21.81	3.11	22.77	0.189
		23095	707.5	QPSK	1	0	0	23.62	3.11	24.58	0.287
					1	2	0	23.51	3.11	24.47	0.280
					1	5	0	23.46	3.11	24.42	0.277
					3	0	0	23.62	3.11	24.58	0.287
					3	1	0	23.51	3.11	24.47	0.280
					3	2	0	23.46	3.11	24.42	0.277
					6	0	1	22.68	3.11	23.64	0.231
				16QAM	1	0	1	22.80	3.11	23.76	0.238
					1	2	1	22.76	3.11	23.72	0.236
					1	5	1	22.53	3.11	23.49	0.223
					3	0	1	22.80	3.11	23.76	0.238
					3	1	1	22.76	3.11	23.72	0.236
					3	2	1	22.53	3.11	23.49	0.223
					6	0	2	20.50	3.11	21.46	0.140
		23173	715.3	QPSK	1	0	0	23.66	3.11	24.62	0.290
					1	2	0	23.64	3.11	24.60	0.288
					1	5	0	23.69	3.11	24.65	**0.292**
					3	0	0	23.66	3.11	24.62	0.290
					3	1	0	23.64	3.11	24.60	0.288
					3	2	0	23.69	3.11	24.65	**0.292**
					6	0	1	22.72	3.11	23.68	0.233
				16QAM	1	0	1	22.84	3.11	23.80	**0.240**
					1	2	1	22.80	3.11	23.76	0.238
					1	5	1	22.76	3.11	23.72	0.236
					3	0	1	22.84	3.11	23.80	**0.240**
					3	1	1	22.80	3.11	23.76	0.238
					3	2	1	22.76	3.11	23.72	0.236
					6	0	2	20.60	3.11	21.56	0.143

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

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power	Gain (dBi)	ERP (dBm)	ERP (W)
12	3	23025	700.5	QPSK	1	0	0	23.71	3.11	24.67	0.293
					1	7	0	23.66	3.11	24.62	0.290
					1	14	0	23.61	3.11	24.57	0.286
					8	0	1	22.82	3.11	23.78	0.239
					8	4	1	22.70	3.11	23.66	0.232
					8	7	1	22.79	3.11	23.75	0.237
					15	0	1	22.77	3.11	23.73	0.236
				16QAM	1	0	1	22.89	3.11	23.85	**0.243**
					1	7	1	22.85	3.11	23.81	0.240
					1	14	1	22.68	3.11	23.64	0.231
					8	0	2	21.72	3.11	22.68	0.185
					8	4	2	21.80	3.11	22.76	0.189
					8	7	2	21.64	3.11	22.60	0.182
					15	0	2	21.86	3.11	22.82	0.191
		23095	707.5	QPSK	1	0	0	23.67	3.11	24.63	0.290
					1	7	0	23.56	3.11	24.52	0.283
					1	14	0	23.51	3.11	24.47	0.280
					8	0	1	22.78	3.11	23.74	0.237
					8	4	1	22.60	3.11	23.56	0.227
					8	7	1	22.69	3.11	23.65	0.232
					15	0	1	22.73	3.11	23.69	0.234
				16QAM	1	0	1	22.85	3.11	23.81	0.240
					1	7	1	22.81	3.11	23.77	0.238
					1	14	1	22.58	3.11	23.54	0.226
					8	0	2	21.68	3.11	22.64	0.184
					8	4	2	21.70	3.11	22.66	0.185
					8	7	2	21.54	3.11	22.50	0.178
					15	0	2	21.82	3.11	22.78	0.190
		23165	714.5	QPSK	1	0	0	23.71	3.11	24.67	0.293
					1	7	0	23.69	3.11	24.65	0.292
					1	14	0	23.74	3.11	24.70	**0.295**
					8	0	1	22.82	3.11	23.78	0.239
					8	4	1	22.73	3.11	23.69	0.234
					8	7	1	22.92	3.11	23.88	0.244
					15	0	1	22.77	3.11	23.73	0.236
				16QAM	1	0	1	22.89	3.11	23.85	**0.243**
					1	7	1	22.85	3.11	23.81	0.240
					1	14	1	22.81	3.11	23.77	0.238
					8	0	2	21.72	3.11	22.68	0.185
					8	4	2	21.83	3.11	22.79	0.190
					8	7	2	21.77	3.11	22.73	0.187
					15	0	2	21.86	3.11	22.82	0.191

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

Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power	Gain (dBi)	ERP (dBm)	ERP (W)
12	5	23035	701.5	QPSK	1	0	0	23.76	3.11	24.72	0.296
					1	12	0	23.71	3.11	24.67	0.293
					1	24	0	23.66	3.11	24.62	0.290
					12	0	1	22.87	3.11	23.83	0.242
					12	6	1	22.75	3.11	23.71	0.235
					12	11	1	22.84	3.11	23.80	0.240
					25	0	1	22.82	3.11	23.78	0.239
				16QAM	1	0	1	22.94	3.11	23.90	**0.245**
					1	12	1	22.90	3.11	23.86	0.243
					1	24	1	22.73	3.11	23.69	0.234
					12	0	2	21.77	3.11	22.73	0.187
					12	6	2	21.85	3.11	22.81	0.191
					12	11	2	21.69	3.11	22.65	0.184
					25	0	2	21.91	3.11	22.87	0.194
		23095	707.5	QPSK	1	0	0	23.72	3.11	24.68	0.294
					1	12	0	23.61	3.11	24.57	0.286
					1	24	0	23.56	3.11	24.52	0.283
					12	0	1	22.83	3.11	23.79	0.239
					12	6	1	22.65	3.11	23.61	0.230
					12	11	1	22.74	3.11	23.70	0.234
					25	0	1	22.78	3.11	23.74	0.237
				16QAM	1	0	1	22.90	3.11	23.86	0.243
					1	12	1	22.86	3.11	23.82	0.241
					1	24	1	22.63	3.11	23.59	0.229
					12	0	2	21.73	3.11	22.69	0.186
					12	6	2	21.75	3.11	22.71	0.187
					12	11	2	21.59	3.11	22.55	0.180
					25	0	2	21.87	3.11	22.83	0.192
		23155	713.5	QPSK	1	0	0	23.76	3.11	24.72	0.296
					1	12	0	23.74	3.11	24.70	0.295
					1	24	0	23.79	3.11	24.75	**0.299**
					12	0	1	22.87	3.11	23.83	0.242
					12	6	1	22.78	3.11	23.74	0.237
					12	11	1	22.97	3.11	23.93	0.247
					25	0	1	22.82	3.11	23.78	0.239
				16QAM	1	0	1	22.94	3.11	23.90	**0.245**
					1	12	1	22.90	3.11	23.86	0.243
					1	24	1	22.86	3.11	23.82	0.241
					12	0	2	21.77	3.11	22.73	0.187
					12	6	2	21.88	3.11	22.84	0.192
					12	11	2	21.82	3.11	22.78	0.190
					25	0	2	21.91	3.11	22.87	0.194

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

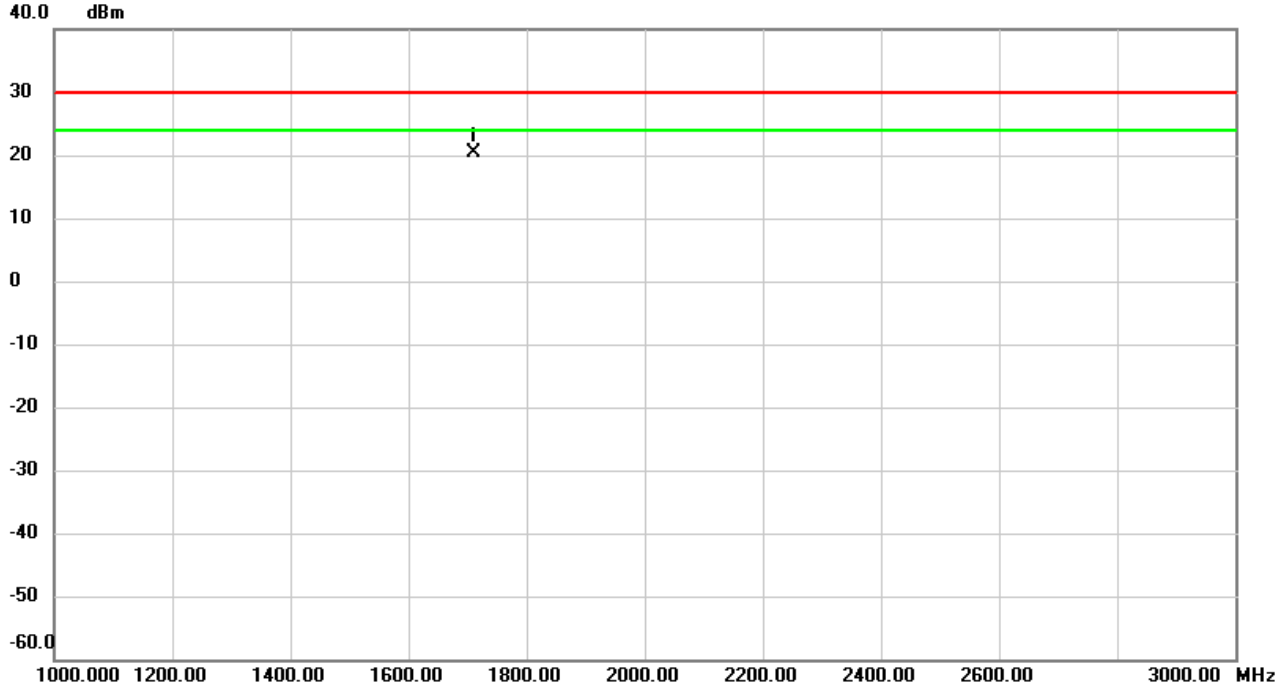
Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power	Gain (dBi)	ERP (dBm)	ERP (W)
12	10	23060	704.0	QPSK	1	0	0	23.81	3.11	24.77	0.300
					1	24	0	23.76	3.11	24.72	0.296
					1	49	0	23.71	3.11	24.67	0.293
					25	0	1	22.92	3.11	23.88	0.244
					25	12	1	22.80	3.11	23.76	0.238
					25	24	1	22.89	3.11	23.85	0.243
					50	0	1	22.87	3.11	23.83	0.242
				16QAM	1	0	1	22.99	3.11	23.95	**0.248**
					1	24	1	22.95	3.11	23.91	0.246
					1	49	1	22.78	3.11	23.74	0.237
					25	0	2	21.82	3.11	22.78	0.190
					25	12	2	21.90	3.11	22.86	0.193
					25	24	2	21.74	3.11	22.70	0.186
					50	0	2	21.96	3.11	22.92	0.196
		23095	707.5	QPSK	1	0	0	23.77	3.11	24.73	0.297
					1	24	0	23.66	3.11	24.62	0.290
					1	49	0	23.61	3.11	24.57	0.286
					25	0	1	22.88	3.11	23.84	0.242
					25	12	1	22.70	3.11	23.66	0.232
					25	24	1	22.79	3.11	23.75	0.237
					50	0	1	22.83	3.11	23.79	0.239
				16QAM	1	0	1	22.95	3.11	23.91	0.246
					1	24	1	22.91	3.11	23.87	0.244
					1	49	1	22.68	3.11	23.64	0.231
					25	0	2	21.78	3.11	22.74	0.188
					25	12	2	21.80	3.11	22.76	0.189
					25	24	2	21.64	3.11	22.60	0.182
					50	0	2	21.92	3.11	22.88	0.194
		23130	711.0	QPSK	1	0	0	23.81	3.11	24.77	0.300
					1	24	0	23.79	3.11	24.75	0.299
					1	49	0	23.84	3.11	24.80	**0.302**
					25	0	1	22.92	3.11	23.88	0.244
					25	12	1	22.83	3.11	23.79	0.239
					25	24	1	23.02	3.11	23.98	0.250
					50	0	1	22.87	3.11	23.83	0.242
				16QAM	1	0	1	22.99	3.11	23.95	**0.248**
					1	24	1	22.95	3.11	23.91	0.246
					1	49	1	22.91	3.11	23.87	0.244
					25	0	2	21.82	3.11	22.78	0.190
					25	12	2	21.93	3.11	22.89	0.195
					25	24	2	21.87	3.11	22.83	0.192
					50	0	2	21.96	3.11	22.92	0.196

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

EIRP (Radiated):

For External antenna:

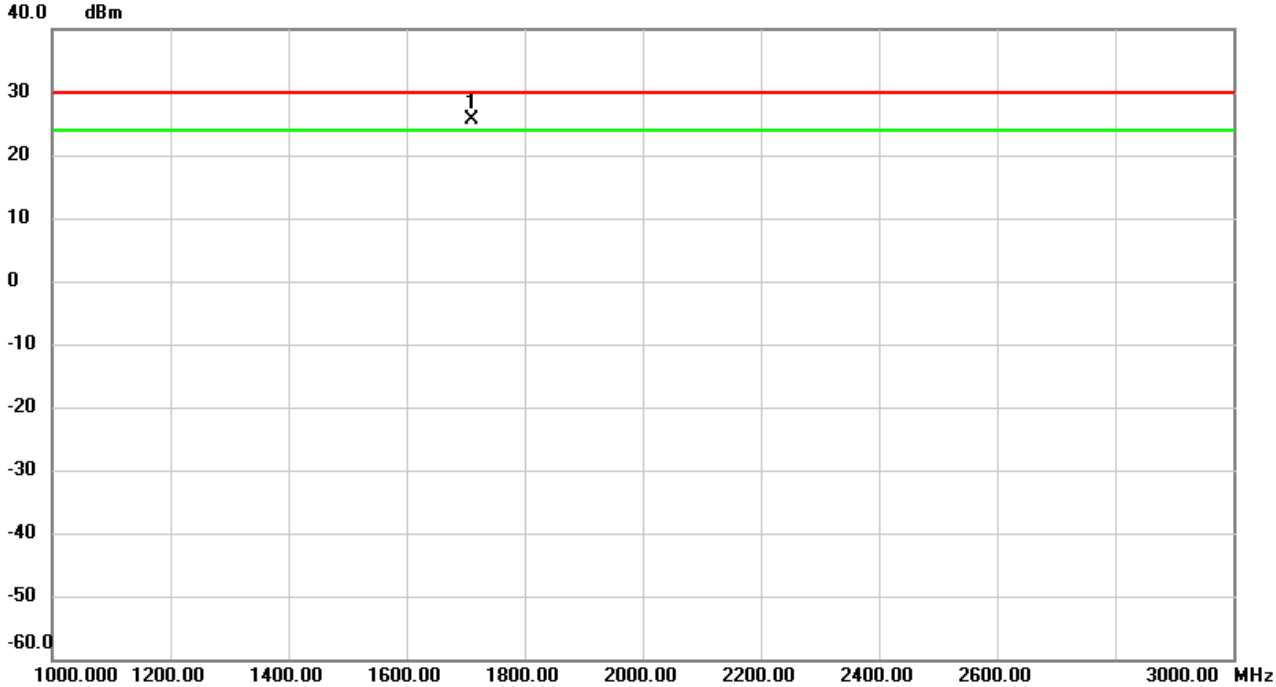
Test Mode	LTE Band 4	Test Date	2021/4/15
Test Channel	CH 20050	Polarization	Vertical
Temp	22°C	Hum.	61%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1711.400	-18.98	39.47	20.49	30.00	-9.51	peak	

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

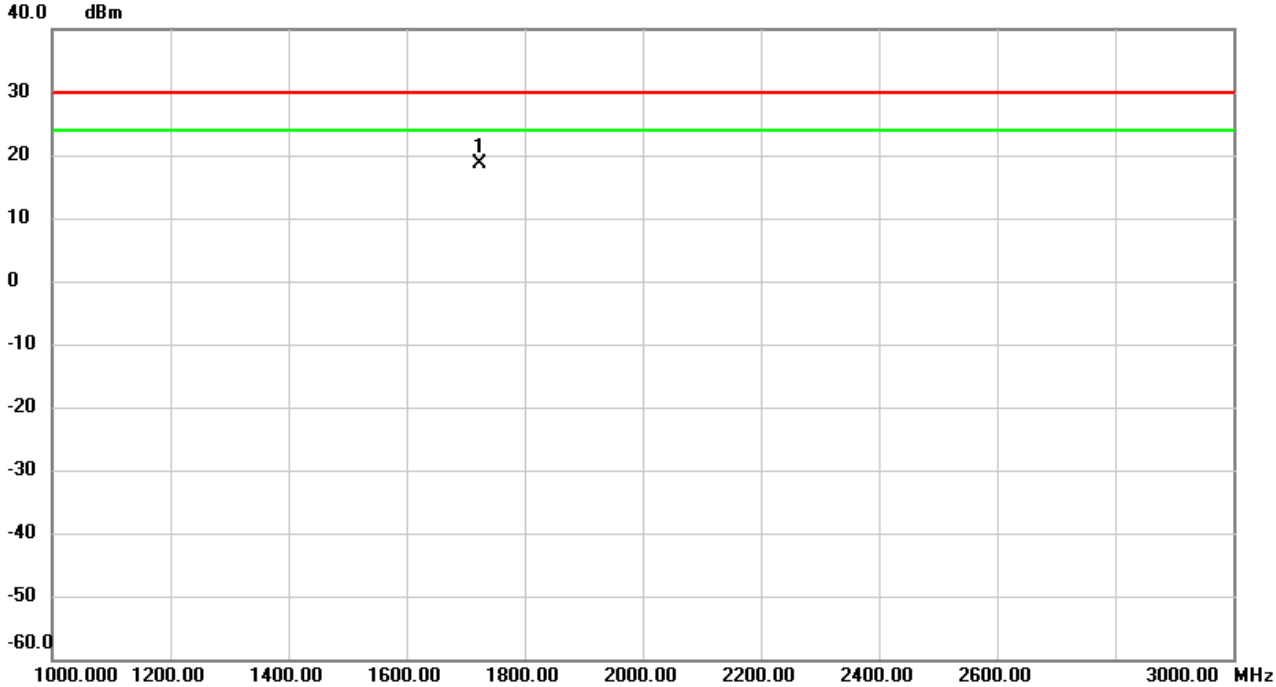
Test Mode	LTE Band 4	Test Date	2021/4/15
Test Channel	CH 20050	Polarization	Horizontal
Temp	22°C	Hum.	61%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1711.400	-14.48	40.11	25.63	30.00	-4.37	peak	

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

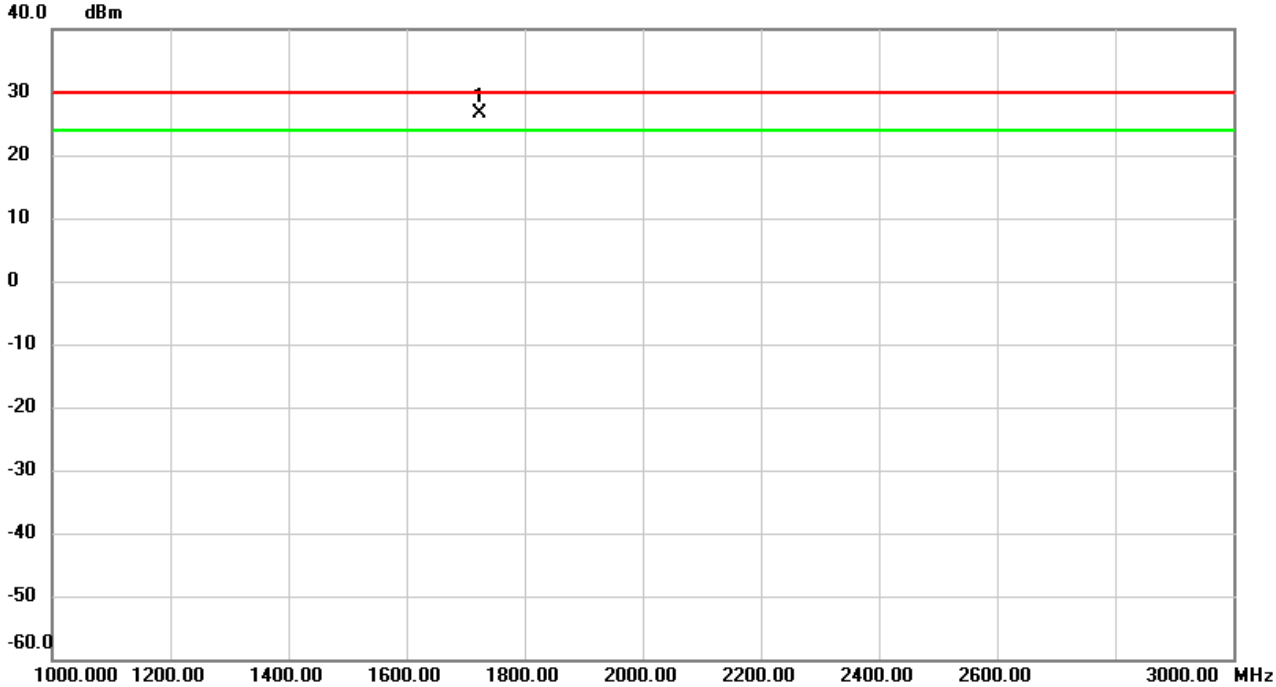
Test Mode	LTE Band 4	Test Date	2021/4/15
Test Channel	CH 20175	Polarization	Vertical
Temp	22°C	Hum.	61%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1723.933	-20.89	39.53	18.64	30.00	-11.36	peak	

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

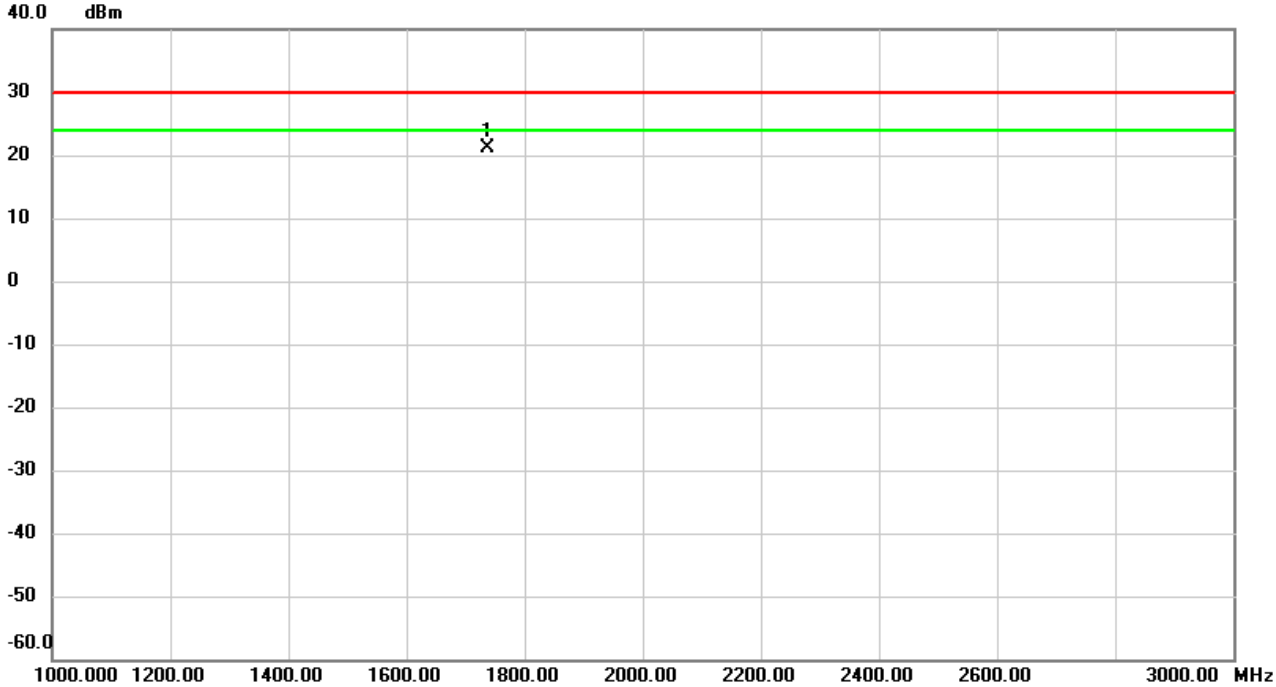
Test Mode	LTE Band 4	Test Date	2021/4/15
Test Channel	CH 20175	Polarization	Horizontal
Temp	22°C	Hum.	61%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1723.867	-13.49	40.15	26.66	30.00	-3.34	peak	

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

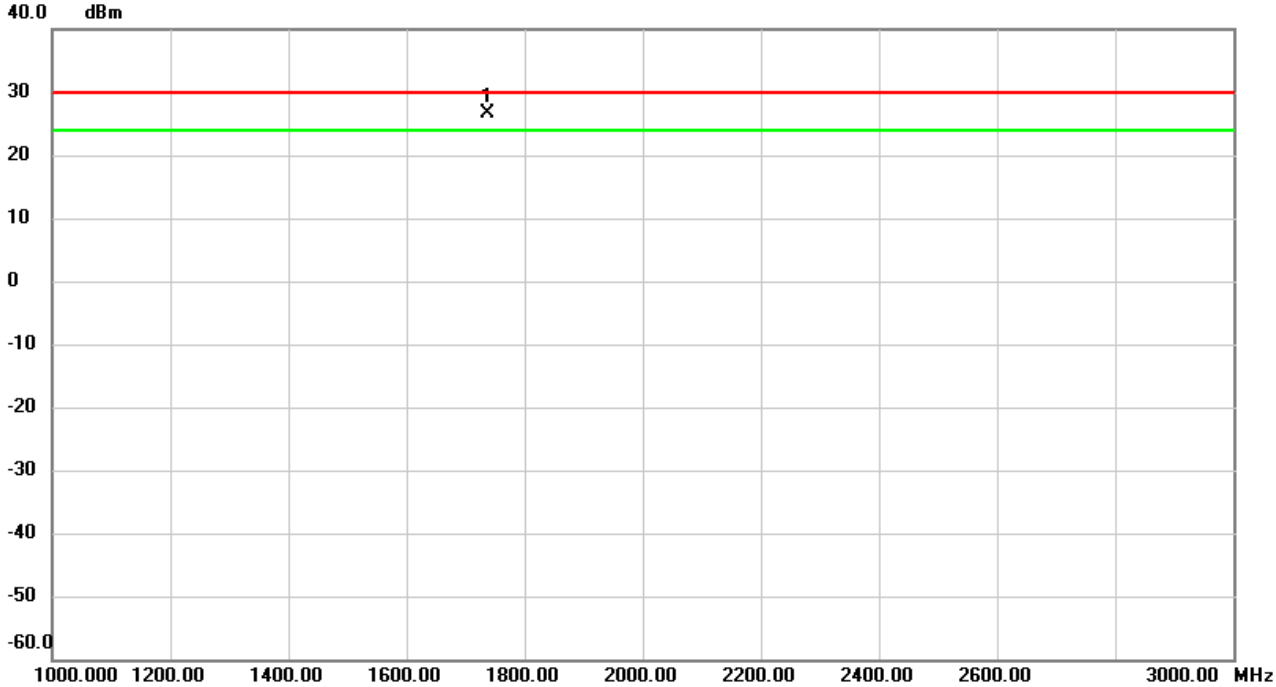
Test Mode	LTE Band 4	Test Date	2021/4/15
Test Channel	CH 20300	Polarization	Vertical
Temp	22°C	Hum.	61%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1736.400	-18.52	39.58	21.06	30.00	-8.94	peak	

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

Test Mode	LTE Band 4	Test Date	2021/4/15
Test Channel	CH 20300	Polarization	Horizontal
Temp	22°C	Hum.	61%

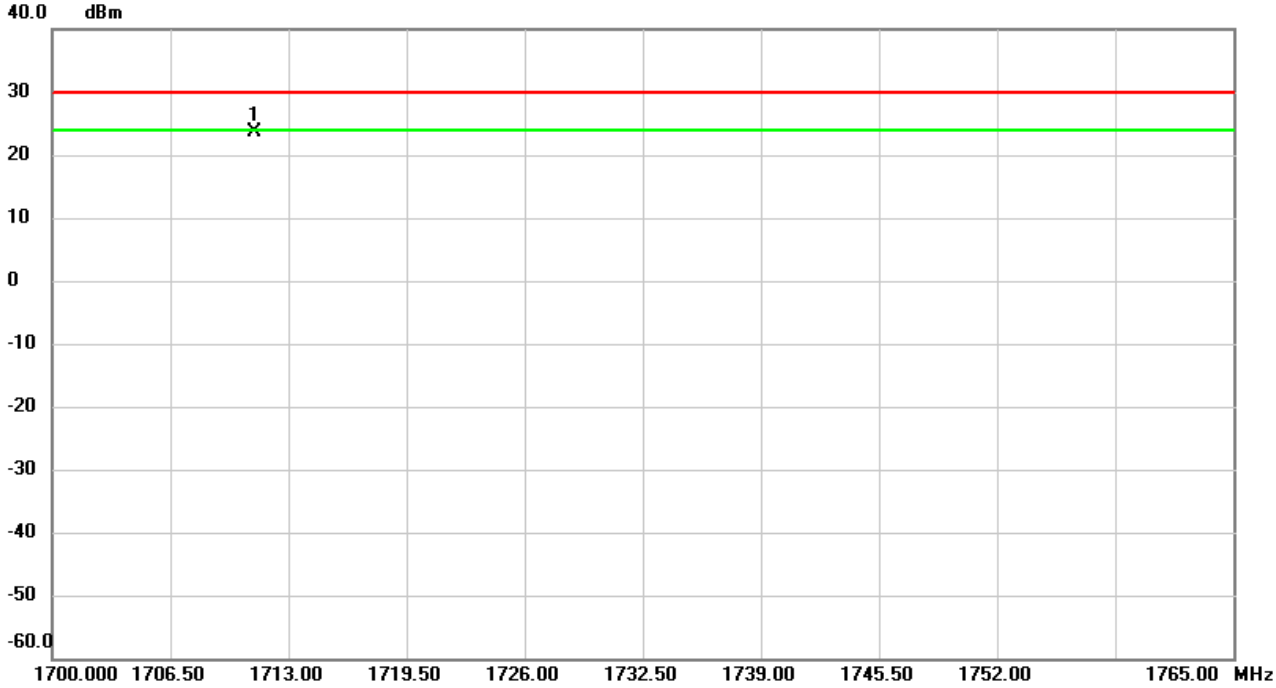


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1736.400	-13.60	40.20	26.60	30.00	-3.40	peak	

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

For Built-in antenna:

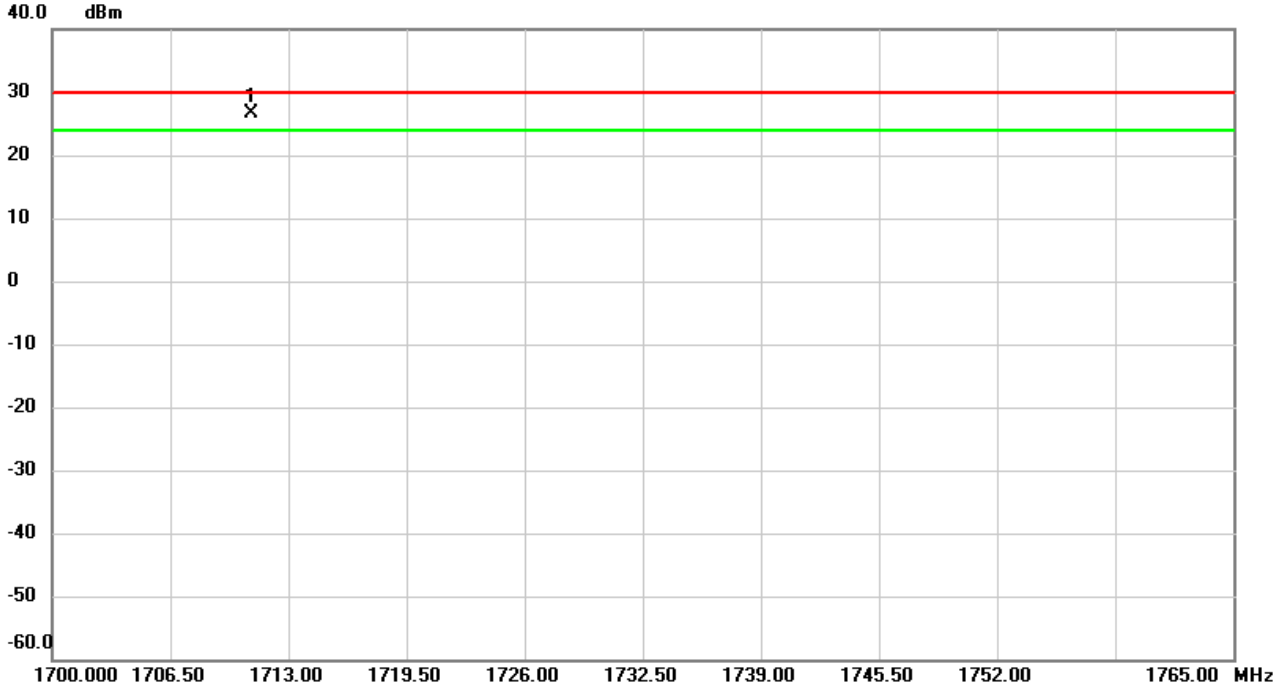
Test Mode	LTE Band 4	Test Date	2021/5/8
Test Channel	CH 20050	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1711.113	-15.84	39.47	23.63	30.00	-6.37	peak	

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

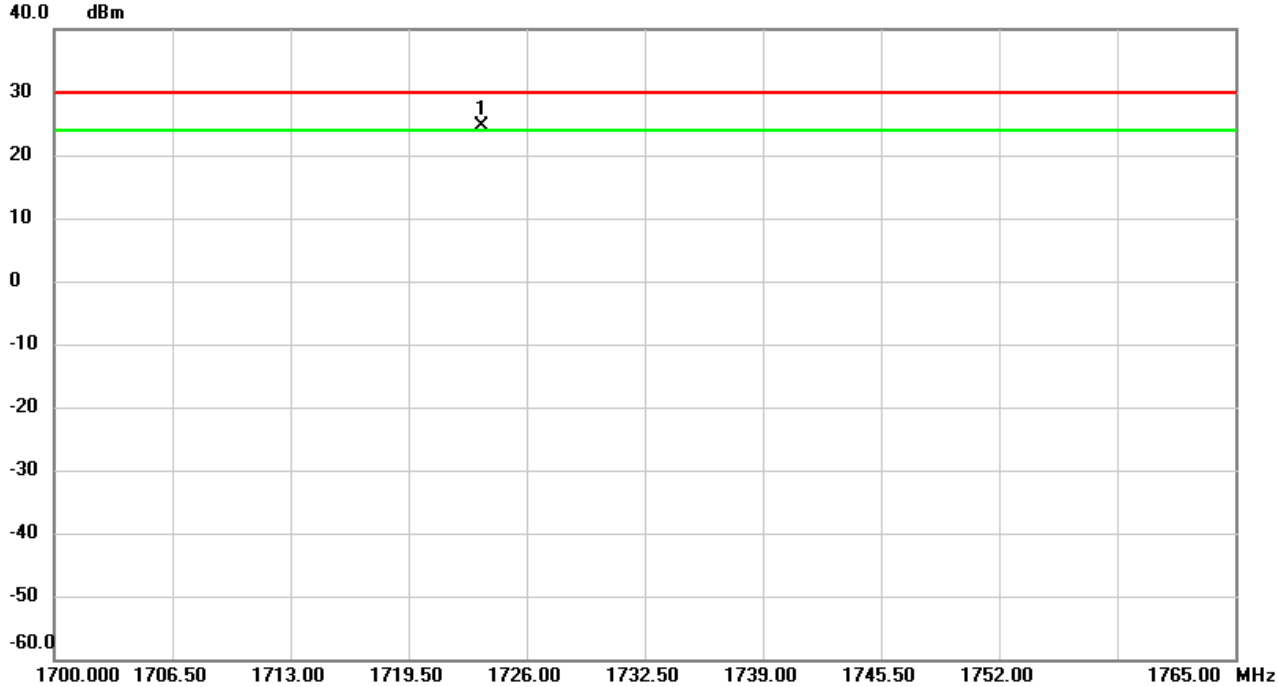
Test Mode	LTE Band 4	Test Date	2021/5/8
Test Channel	CH 20050	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1710.966	-13.57	40.11	26.54	30.00	-3.46	peak	

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

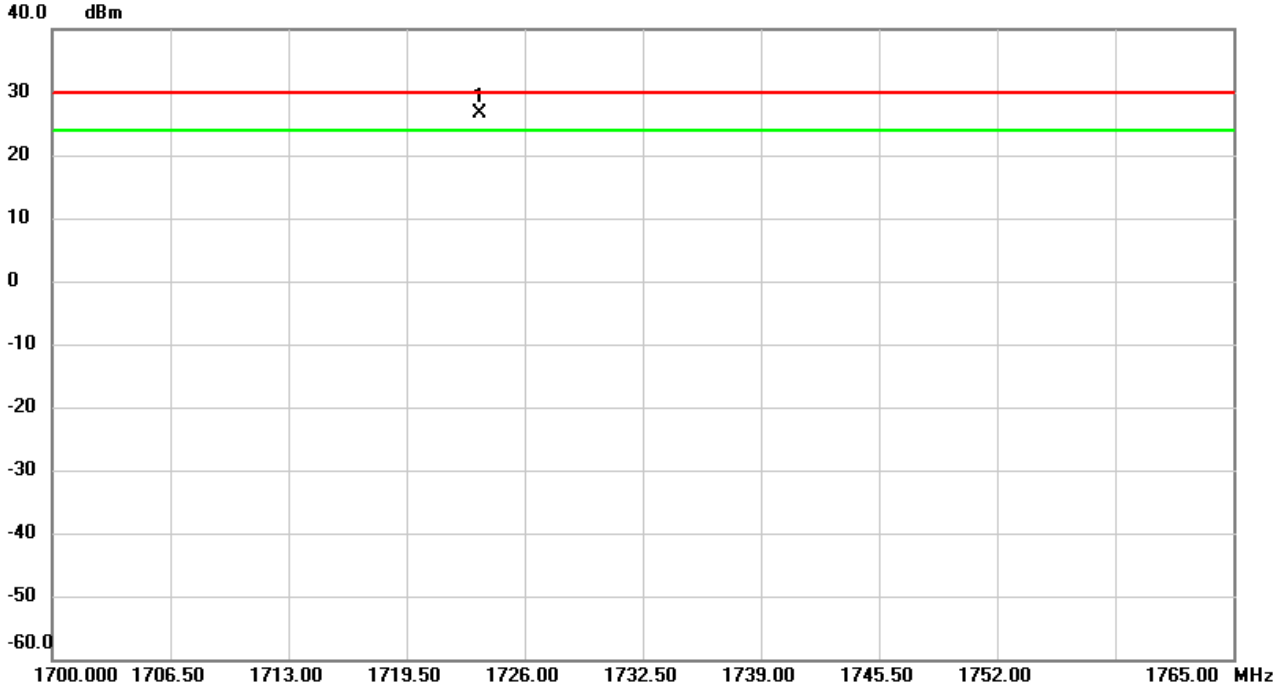
Test Mode	LTE Band 4	Test Date	2021/5/8
Test Channel	CH 20175	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1723.563	-14.98	39.53	24.55	30.00	-5.45	peak	

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

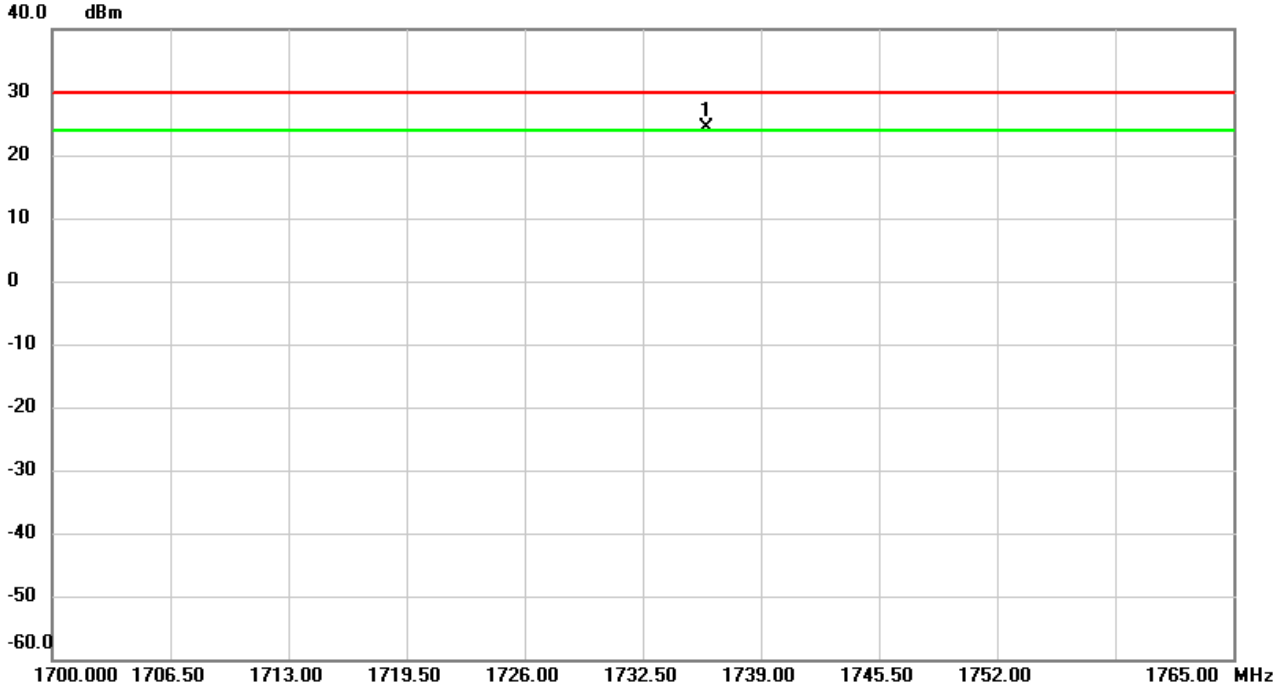
Test Mode	LTE Band 4	Test Date	2021/5/8
Test Channel	CH 20175	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1723.556	-13.42	40.15	26.73	30.00	-3.27	peak	

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

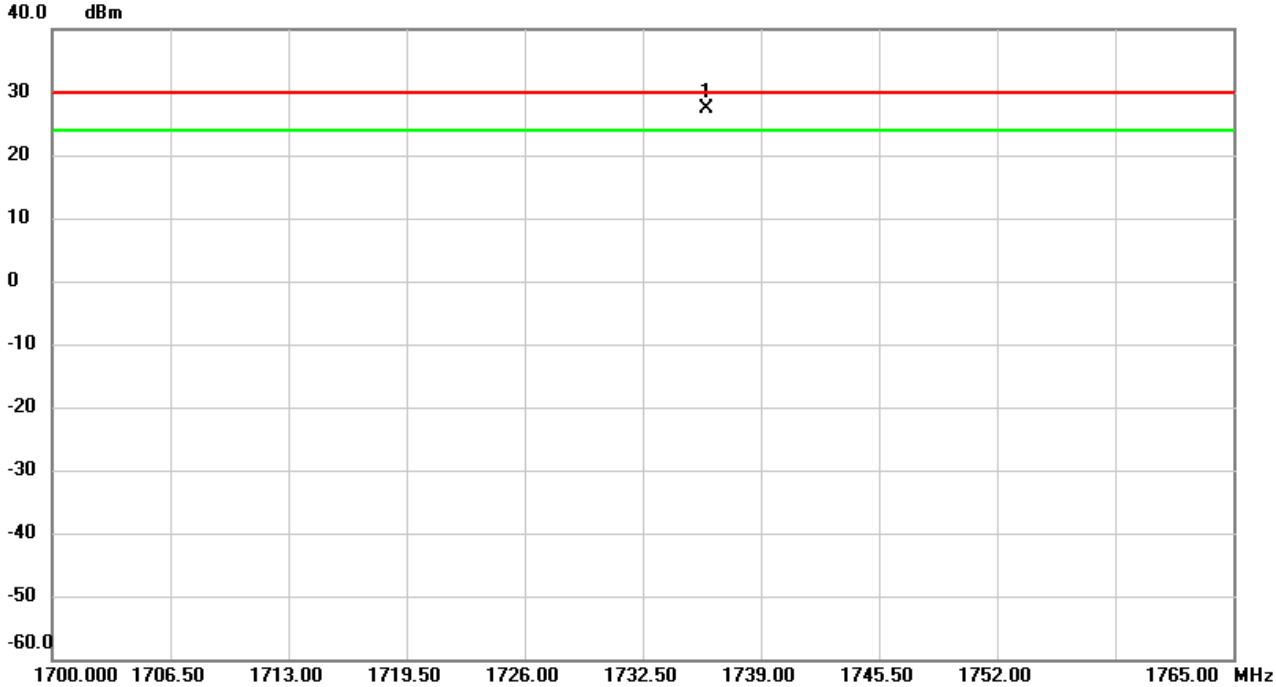
Test Mode	LTE Band 4	Test Date	2021/5/8
Test Channel	CH 20300	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1735.967	-15.13	39.58	24.45	30.00	-5.55	peak	

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

Test Mode	LTE Band 4	Test Date	2021/5/8
Test Channel	CH 20300	Polarization	Horizontal
Temp	24°C	Hum.	58%



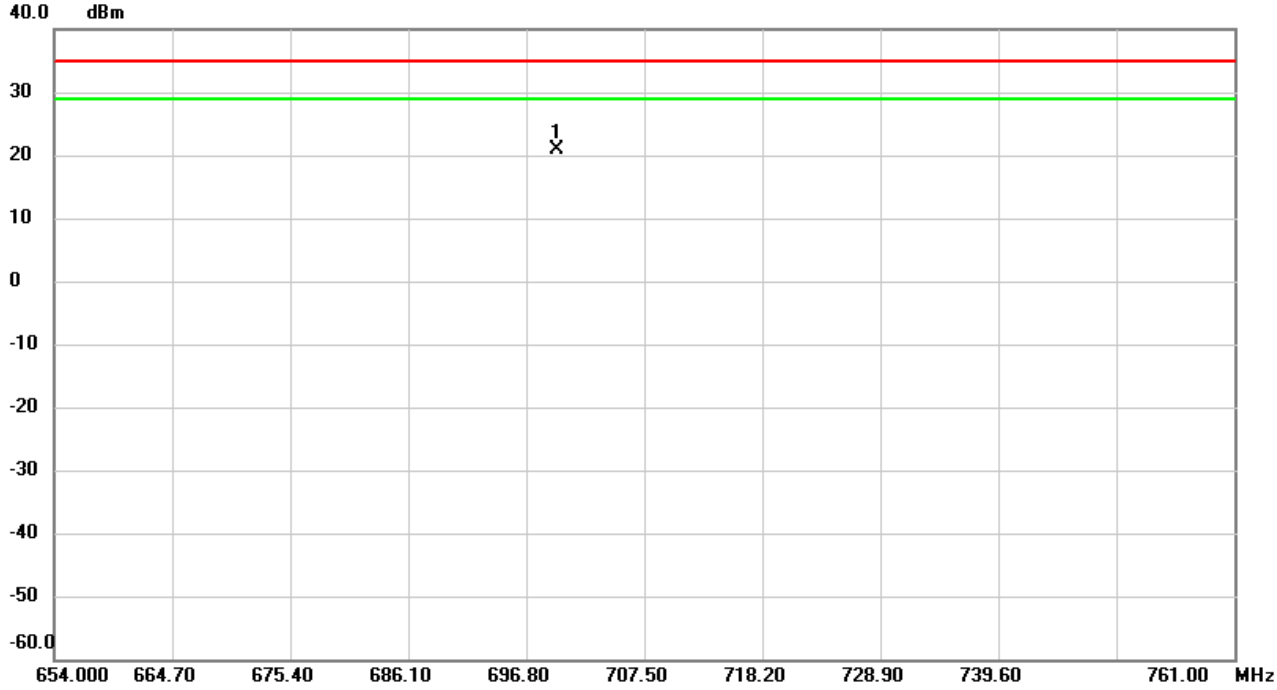
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1736.043	-12.85	40.20	27.35	30.00	-2.65	peak	

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

ERP (Radiated):

For External antenna:

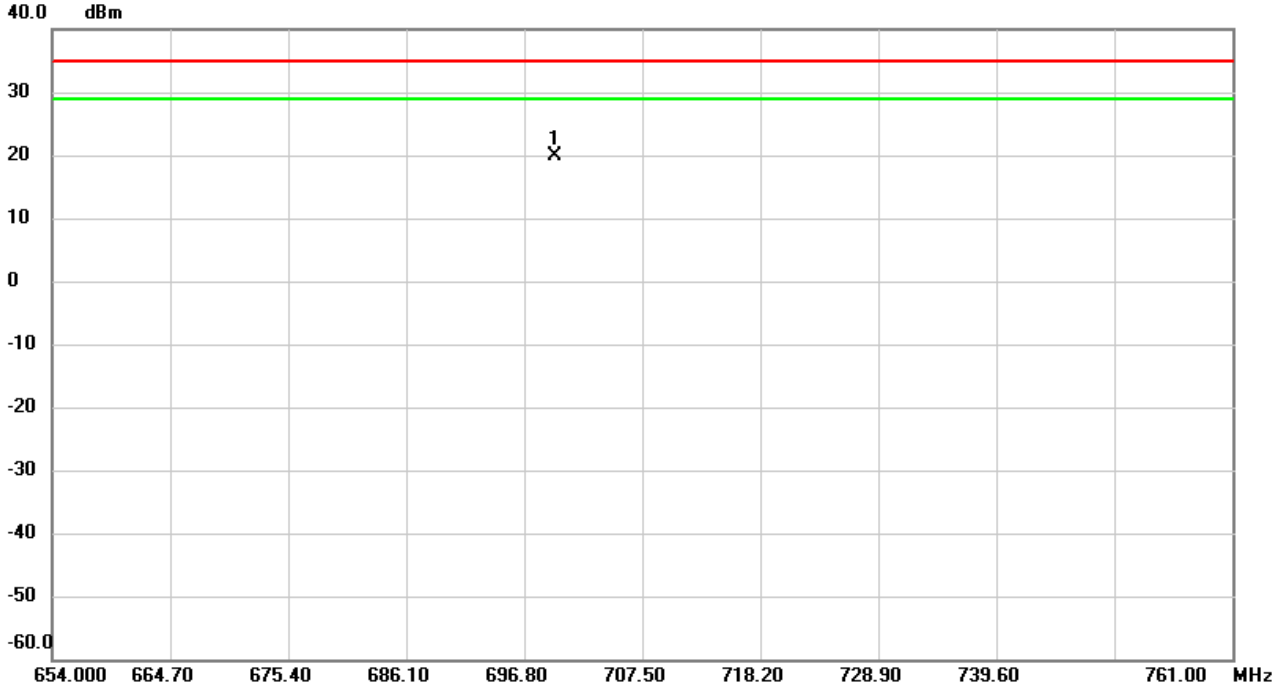
Test Mode	LTE Band 12	Test Date	2021/8/30
Test Channel	CH23060	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	699.6141	-11.68	32.55	20.87	34.77	-13.90	peak	

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

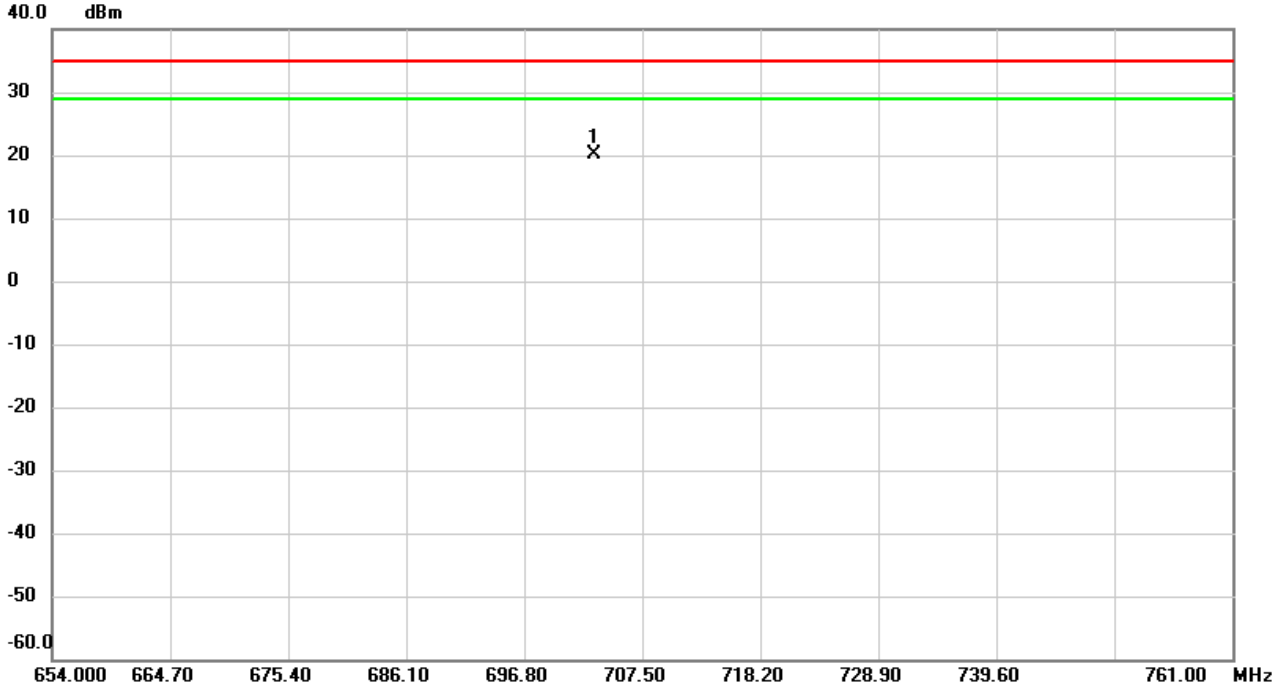
Test Mode	LTE Band 12	Test Date	2021/8/30
Test Channel	CH23060	Polarization	Horizontal
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	699.5463	-10.14	30.10	19.96	34.77	-14.81	peak	

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

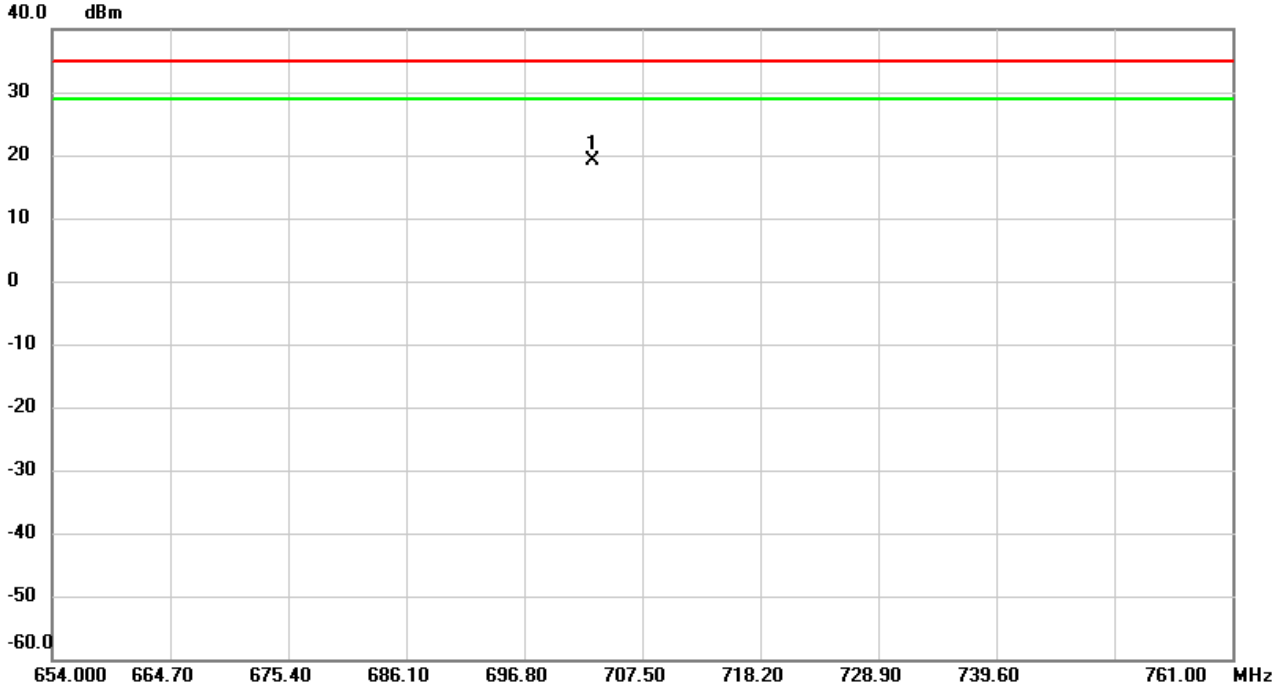
Test Mode	LTE Band 12	Test Date	2021/8/30
Test Channel	CH23095	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	703.1522	-12.53	32.61	20.08	34.77	-14.69	peak	

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

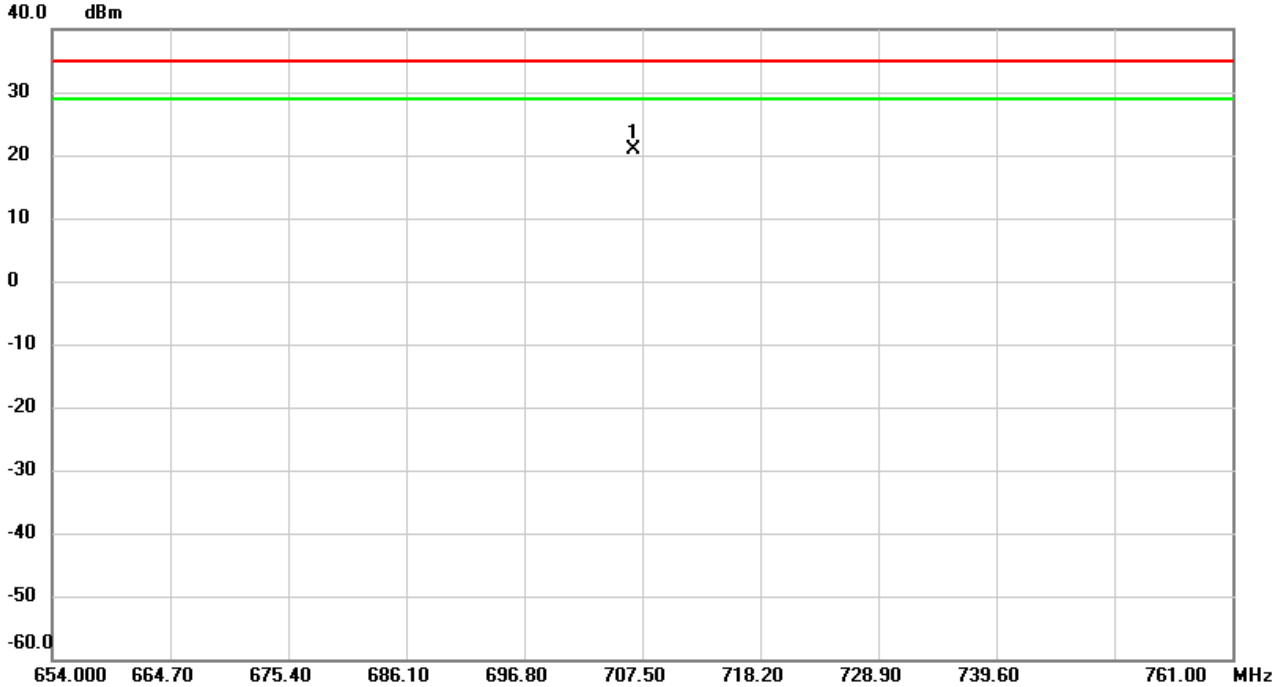
Test Mode	LTE Band 12	Test Date	2021/8/30
Test Channel	CH23095	Polarization	Horizontal
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	703.0417	-10.98	30.22	19.24	34.77	-15.53	peak	

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

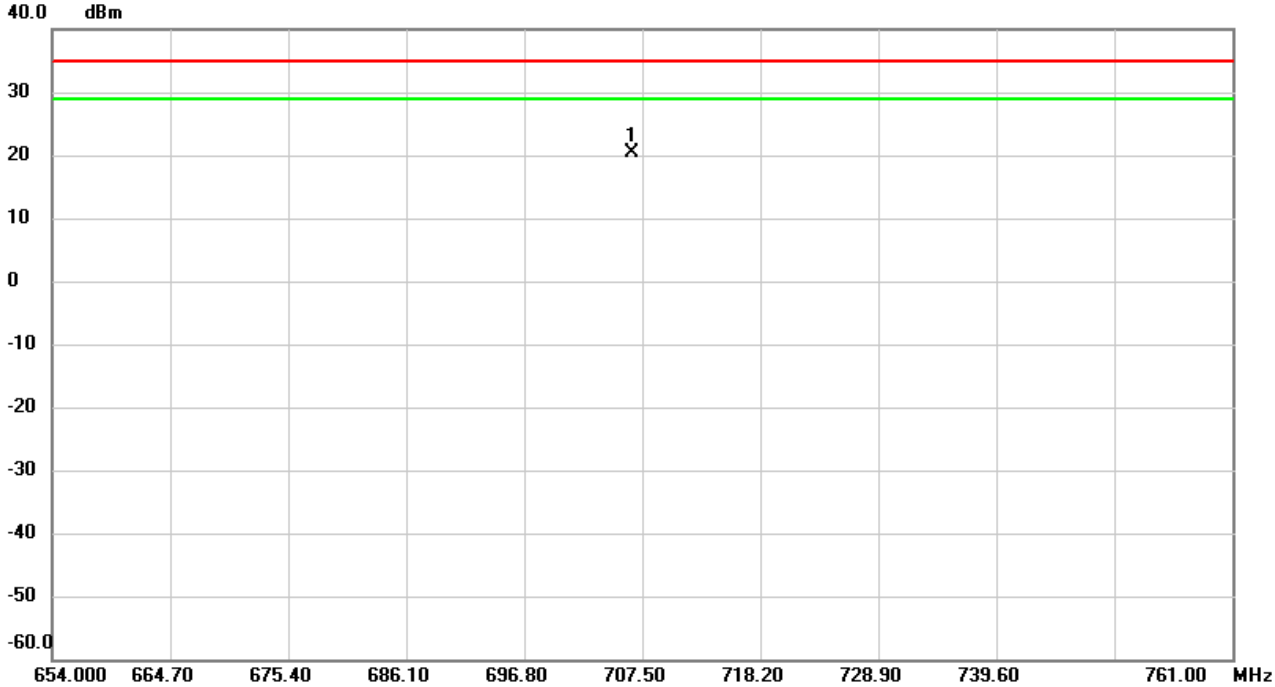
Test Mode	LTE Band 12	Test Date	2021/8/30
Test Channel	CH23130	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	706.6476	-11.74	32.69	20.95	34.77	-13.82	peak	

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

Test Mode	LTE Band 12	Test Date	2021/8/30
Test Channel	CH23130	Polarization	Horizontal
Temp	23°C	Hum.	58%

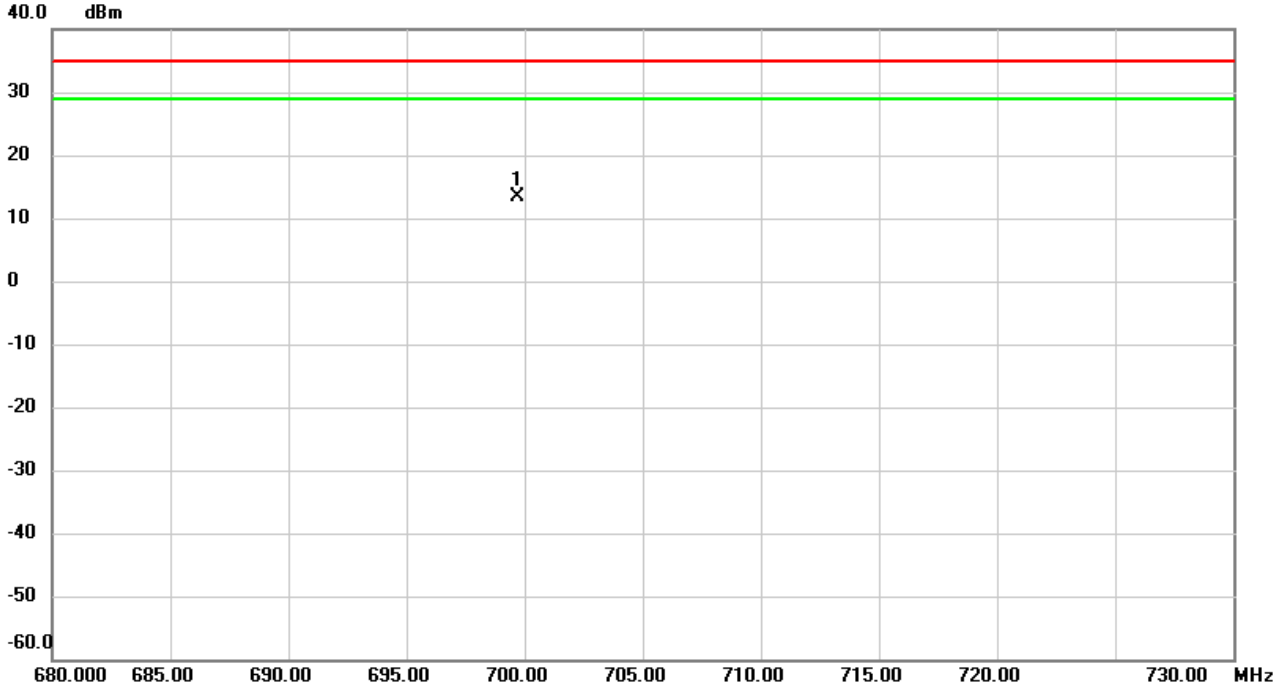


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	706.6370	-9.95	30.36	20.41	34.77	-14.36	peak	

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

For Built-in antenna:

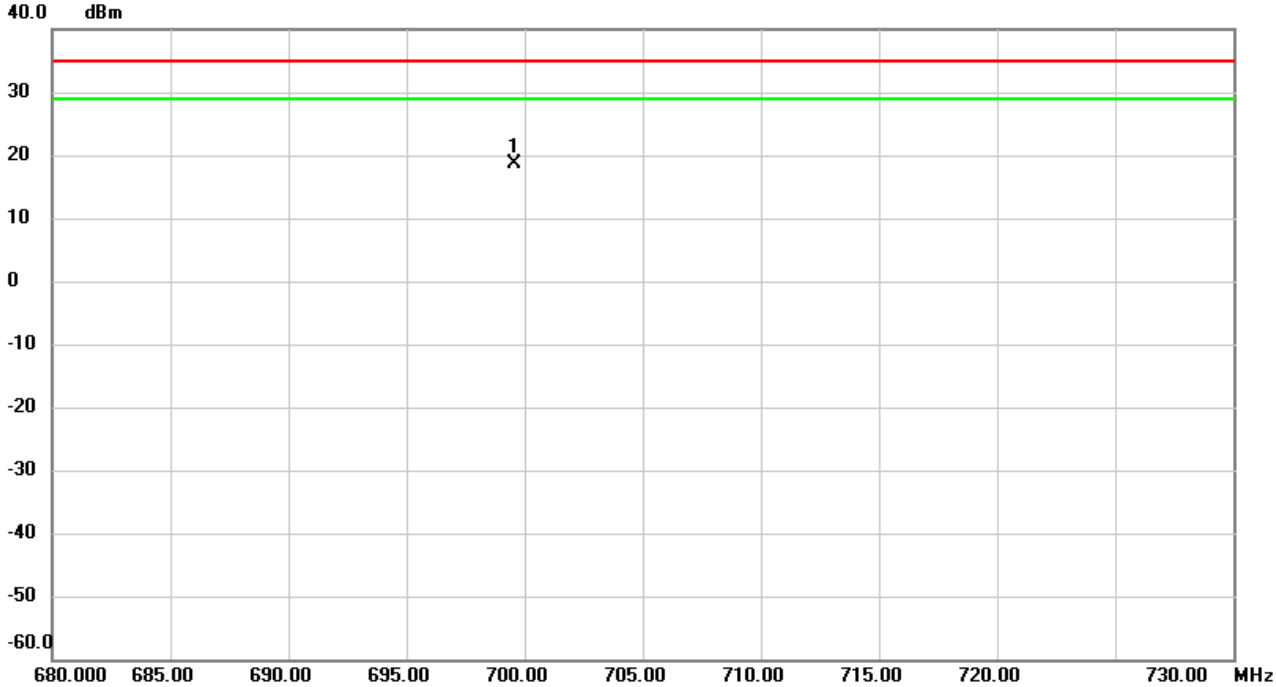
Test Mode	LTE Band 12	Test Date	2021/5/8
Test Channel	CH 23060	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	699.6717	-19.54	32.96	13.42	34.77	-21.35	peak	

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

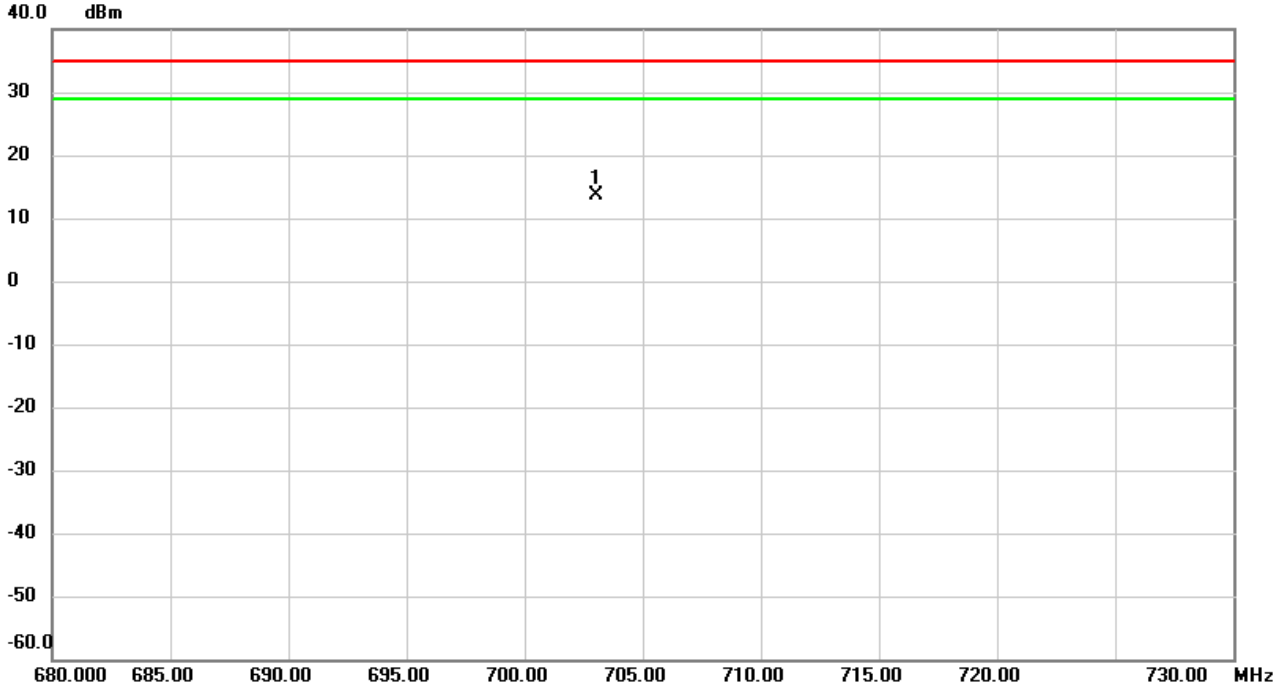
Test Mode	LTE Band 12	Test Date	2021/5/8
Test Channel	CH 23060	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	699.5915	-11.77	30.44	18.67	34.77	-16.10	peak	

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

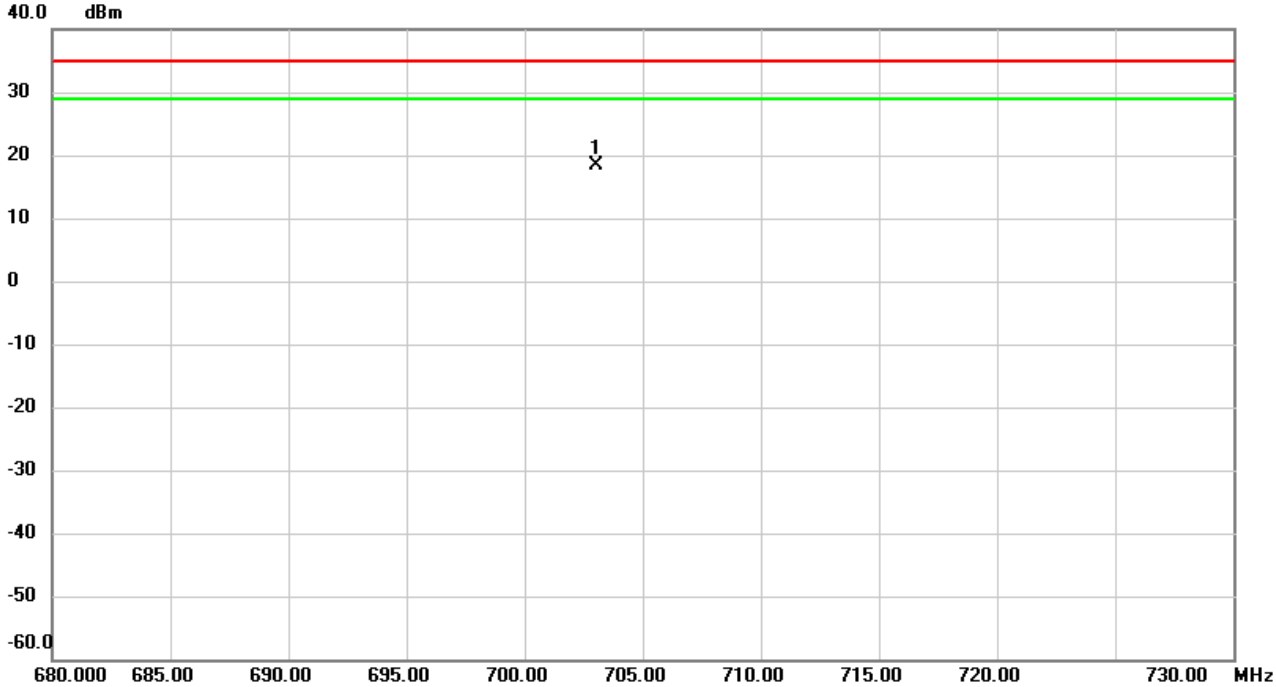
Test Mode	LTE Band 12	Test Date	2021/5/8
Test Channel	CH 23095	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	703.0517	-19.45	32.99	13.54	34.77	-21.23	peak	

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

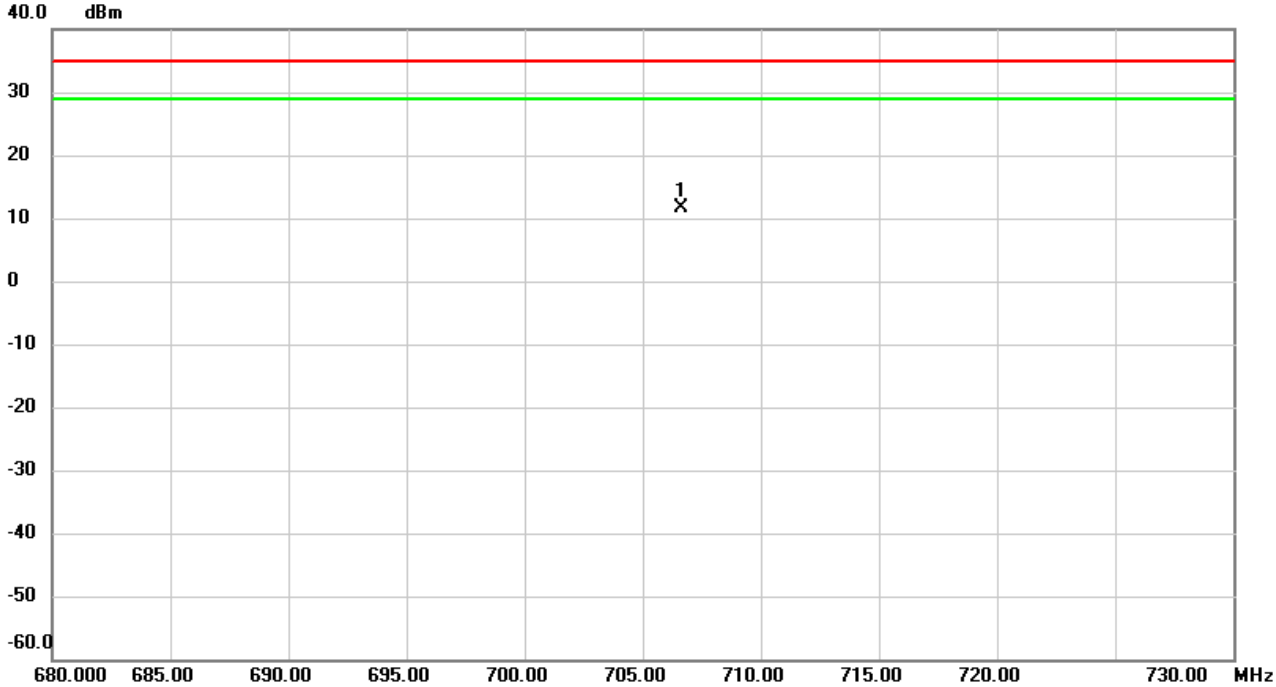
Test Mode	LTE Band 12	Test Date	2021/5/8
Test Channel	CH 23095	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	703.0183	-12.22	30.54	18.32	34.77	-16.45	peak	

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

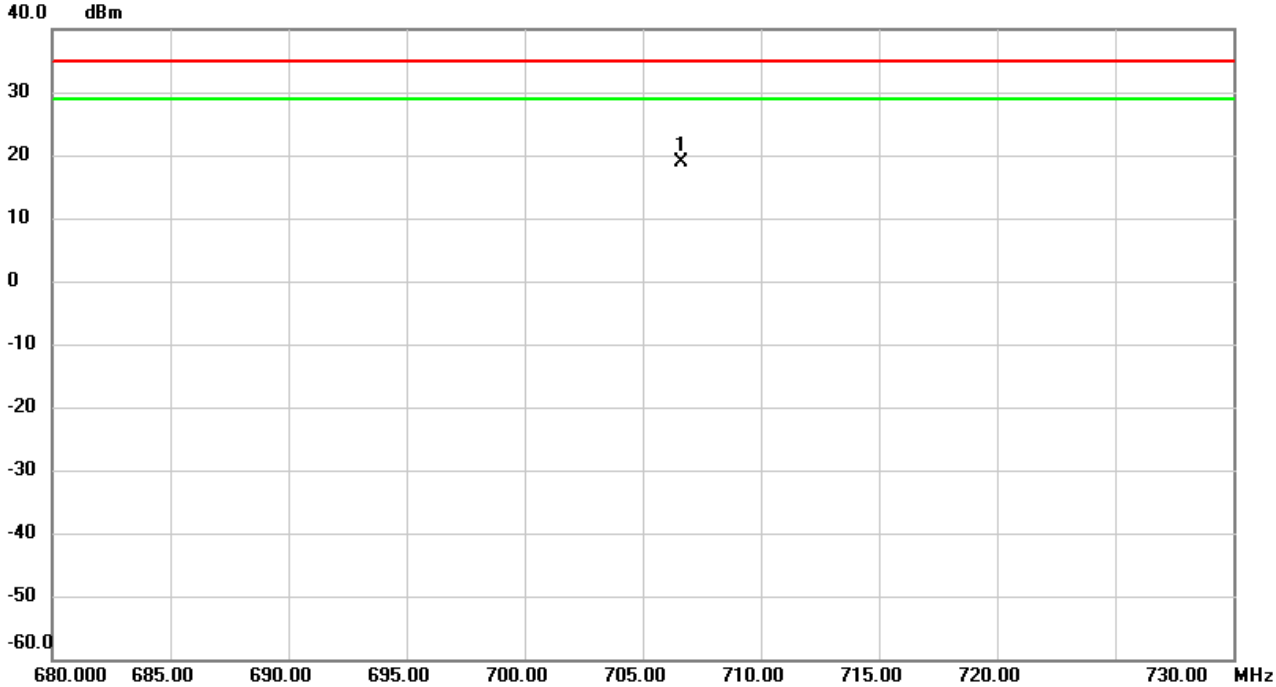
Test Mode	LTE Band 12	Test Date	2021/5/8
Test Channel	CH 23130	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	706.6000	-21.41	33.02	11.61	34.77	-23.16	peak	

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

Test Mode	LTE Band 12	Test Date	2021/5/8
Test Channel	CH 23130	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	706.6216	-11.67	30.67	19.00	34.77	-15.77	peak	

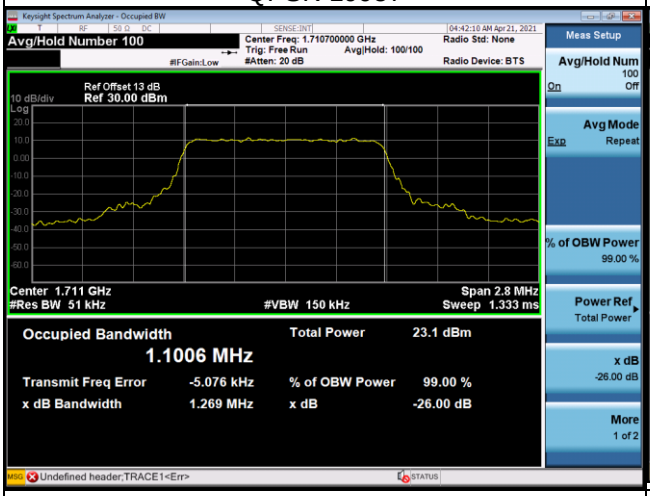
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX B OCCUPIED BANDWIDTH

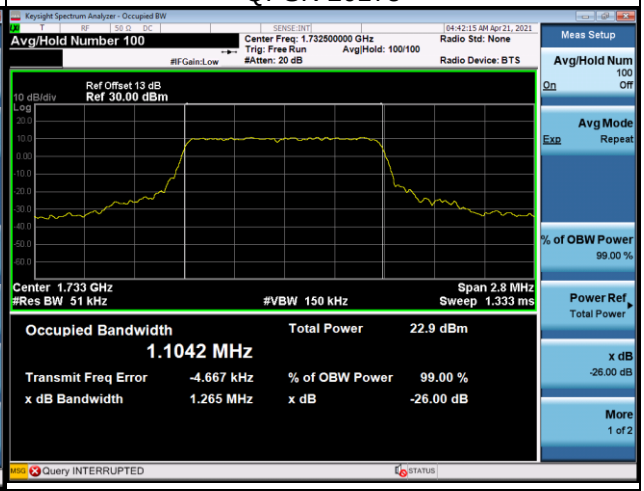
LTE Band 4_1.4M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
19957	1710.7	1.1006	19957	1710.7	1.269
20175	1732.5	1.1042	20175	1732.5	1.265
20393	1754.3	1.1010	20393	1754.3	1.288
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
19957	1710.7	1.1064	19957	1710.7	1.292
20175	1732.5	1.1042	20175	1732.5	1.279
20393	1754.3	1.1075	20393	1754.3	1.262

Spectrum Plot

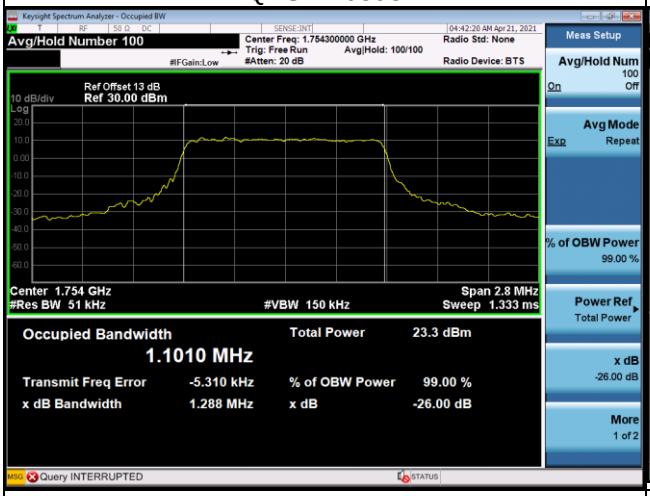
QPSK-19957



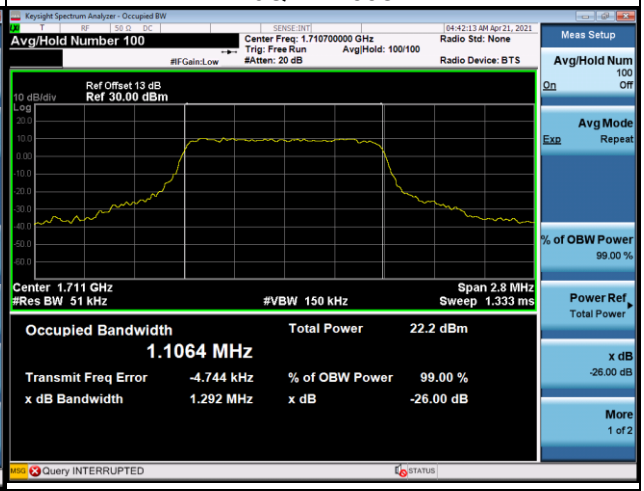
QPSK-20175



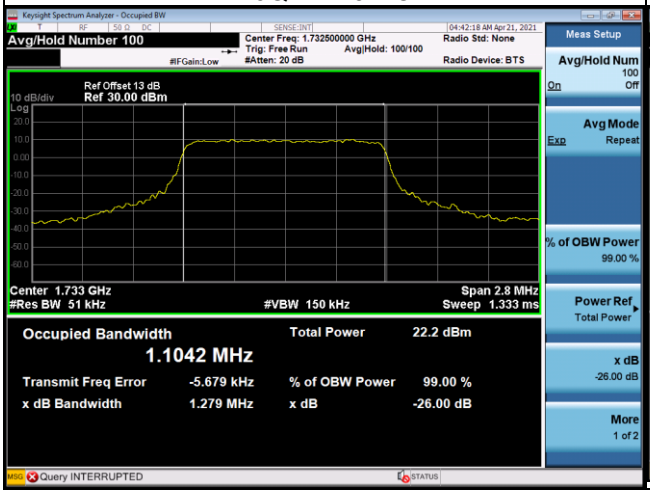
QPSK-20393



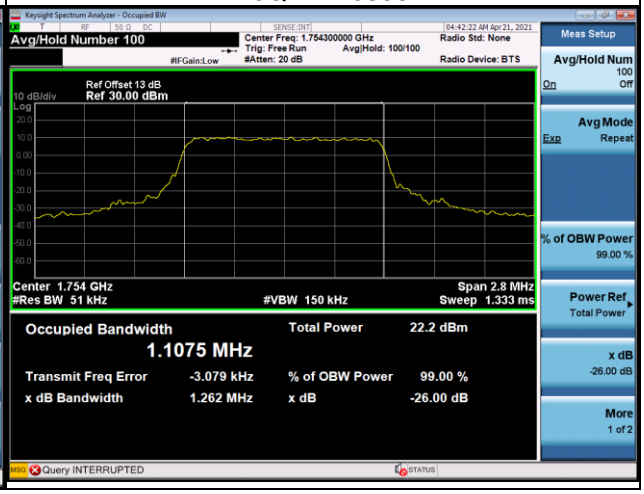
16QAM-19957



16QAM-20175



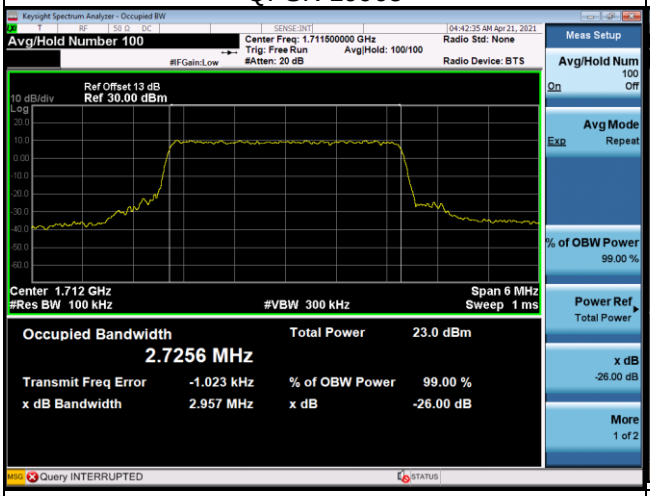
16QAM-20393



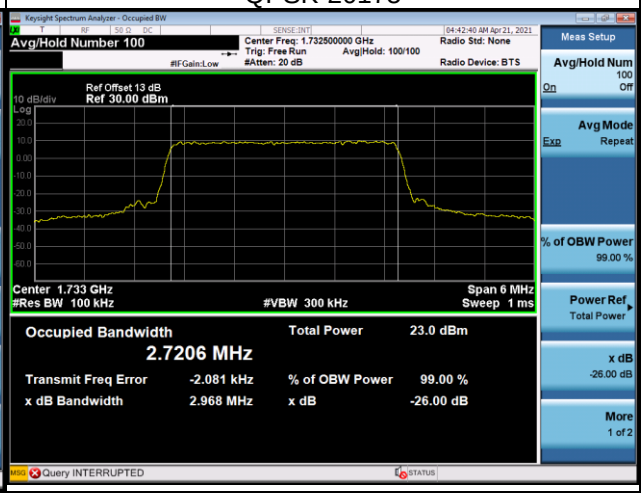
LTE Band 4_3M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
19965	1711.5	2.7256	19965	1711.5	2.957
20175	1732.5	2.7206	20175	1732.5	2.968
20385	1753.5	2.7212	20385	1753.5	2.961
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
19965	1711.5	2.7191	19965	1711.5	2.958
20175	1732.5	2.7158	20175	1732.5	2.964
20385	1753.5	2.7215	20385	1753.5	2.958

Spectrum Plot

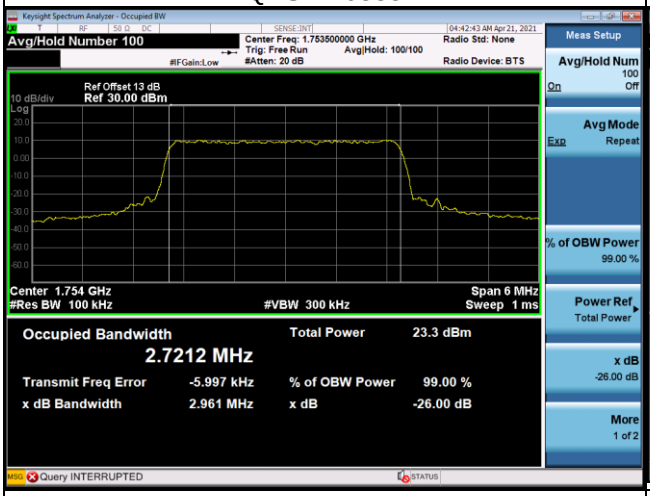
QPSK-19965



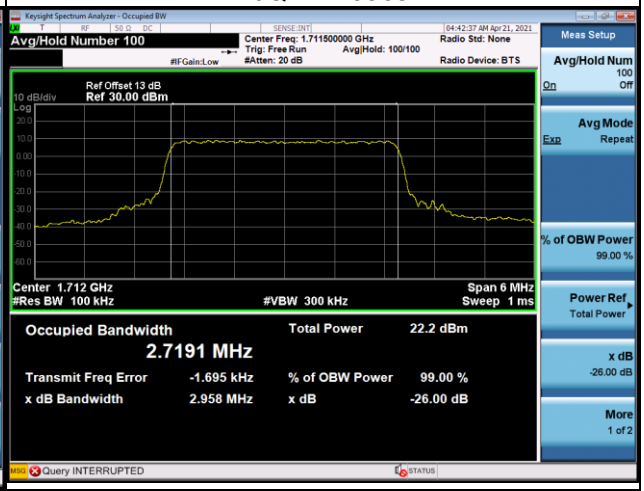
QPSK-20175



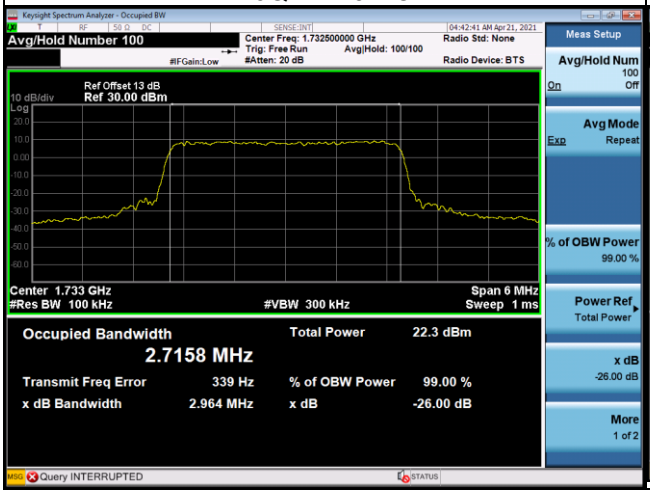
QPSK-20385



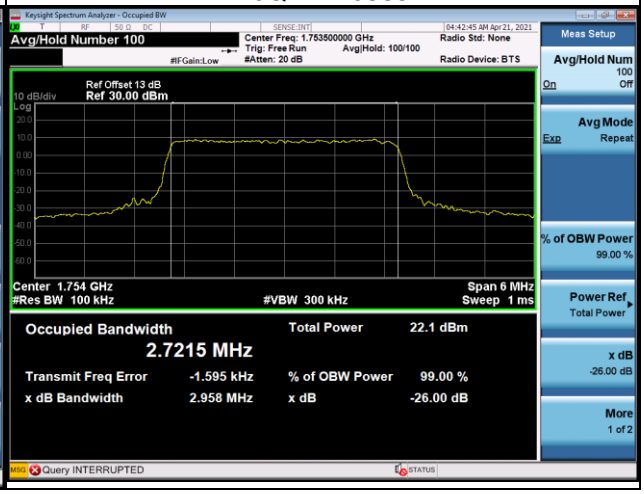
16QAM-19965



16QAM-20175



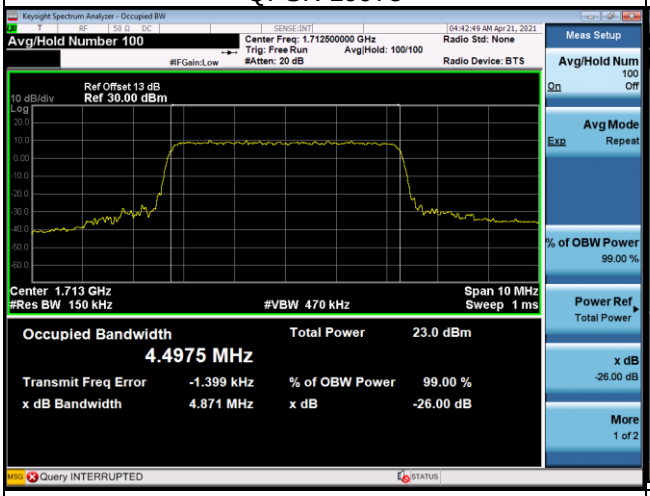
16QAM-20385



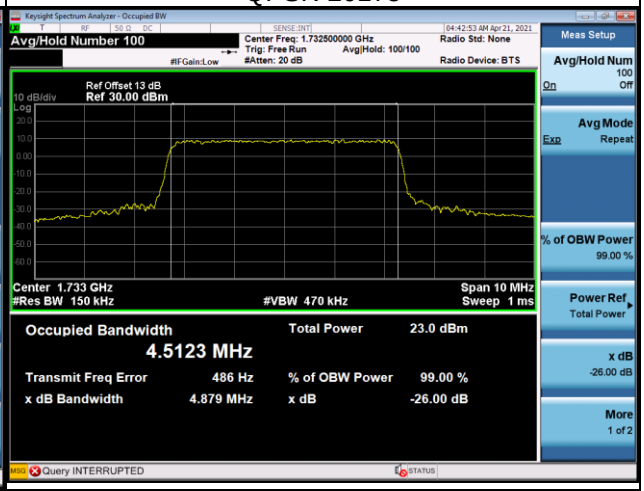
LTE Band 4_5M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
19975	1712.5	4.4975	19975	1712.5	4.871
20175	1732.5	4.5123	20175	1732.5	4.879
20375	1752.5	4.5065	20375	1752.5	4.887
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
19975	1712.5	4.4986	19975	1712.5	4.847
20175	1732.5	4.5042	20175	1732.5	4.898
20375	1752.5	4.5043	20375	1752.5	4.865

Spectrum Plot

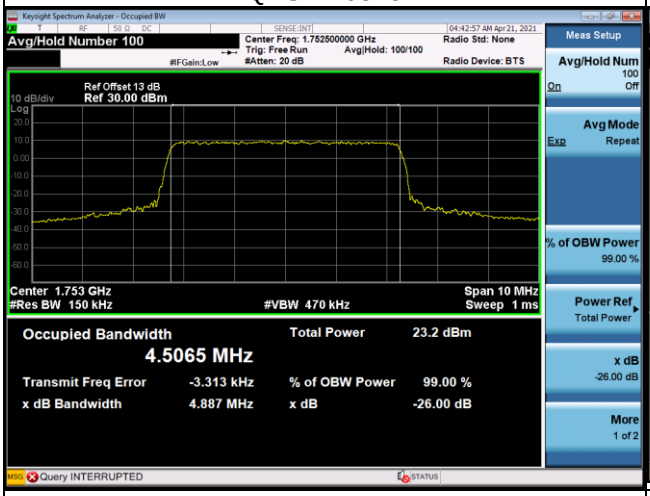
QPSK-19975



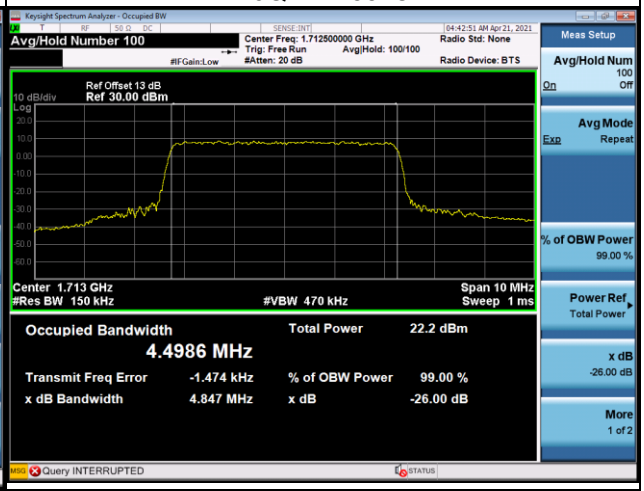
QPSK-20175



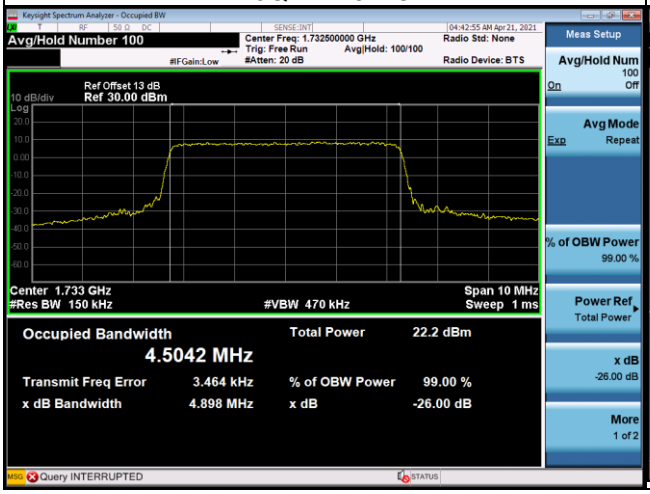
QPSK-20375



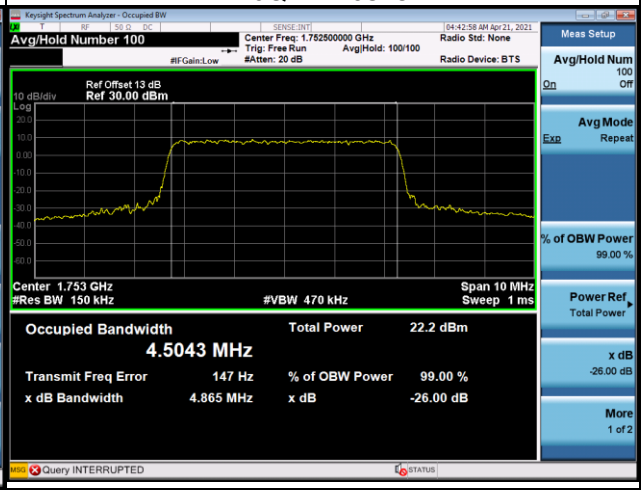
16QAM-19975



16QAM-20175



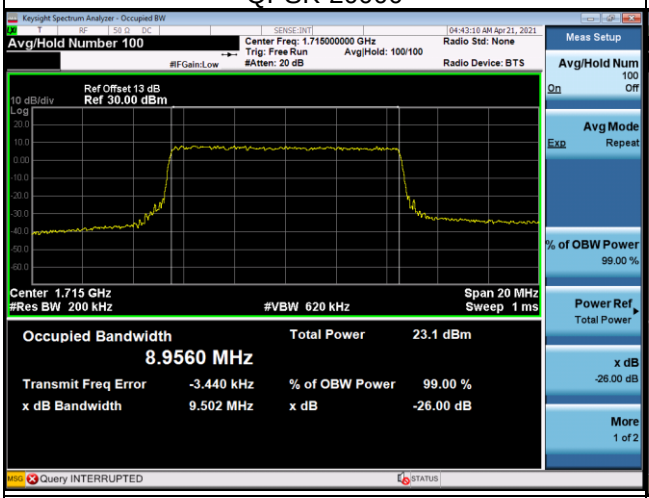
16QAM-20375



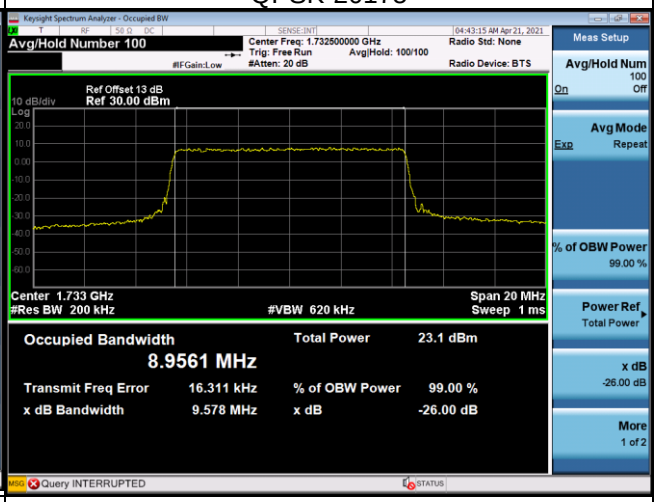
LTE Band 4_10M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20000	1715	8.9560	20000	1715	9.502
20175	1732.5	8.9561	20175	1732.5	9.578
20350	1750	8.9522	20350	1750	9.588
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20000	1715	8.9580	20000	1715	9.591
20175	1732.5	8.9480	20175	1732.5	9.546
20350	1750	8.9712	20350	1750	9.568

Spectrum Plot

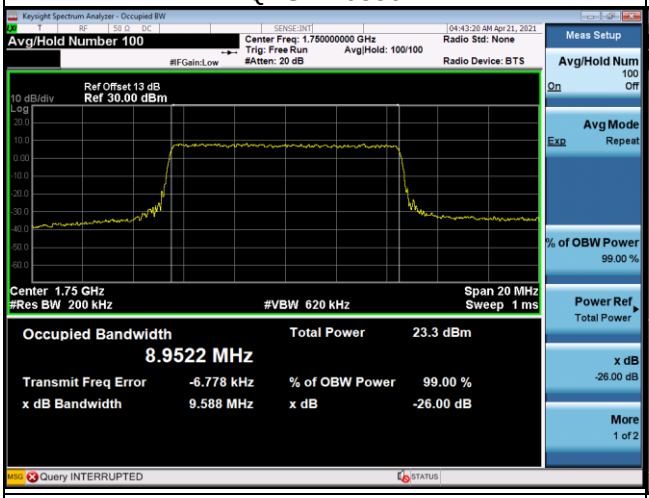
QPSK-20000



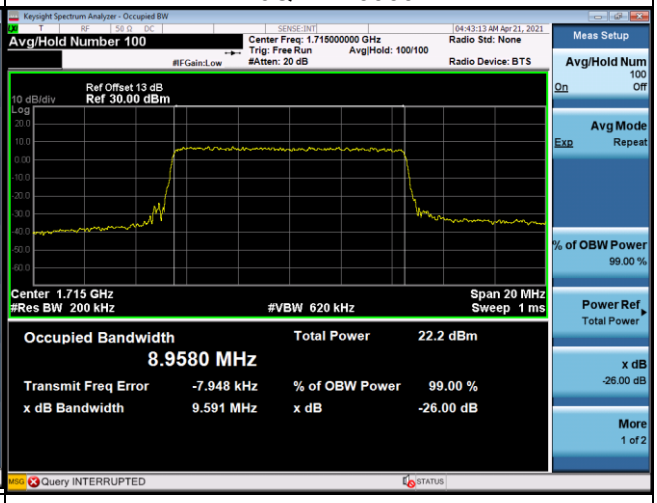
QPSK-20175



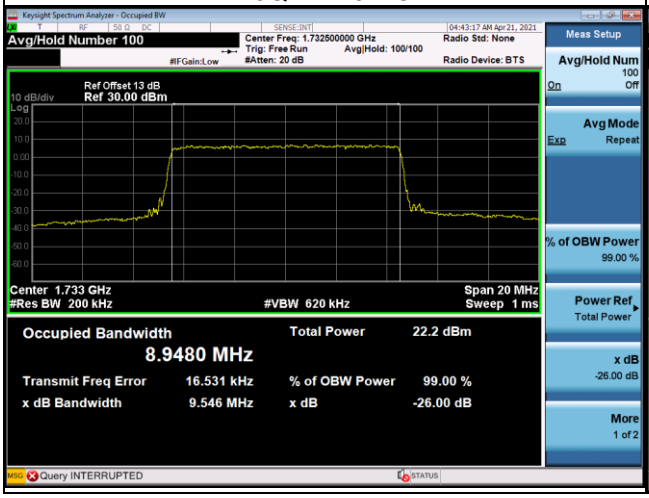
QPSK-20350



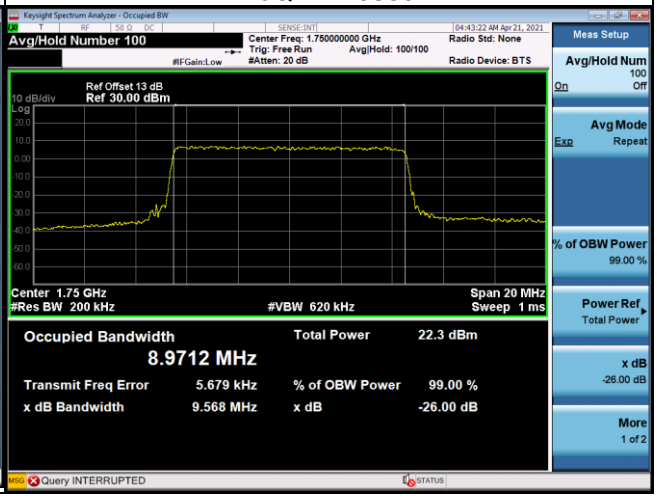
16QAM-20000



16QAM-20175



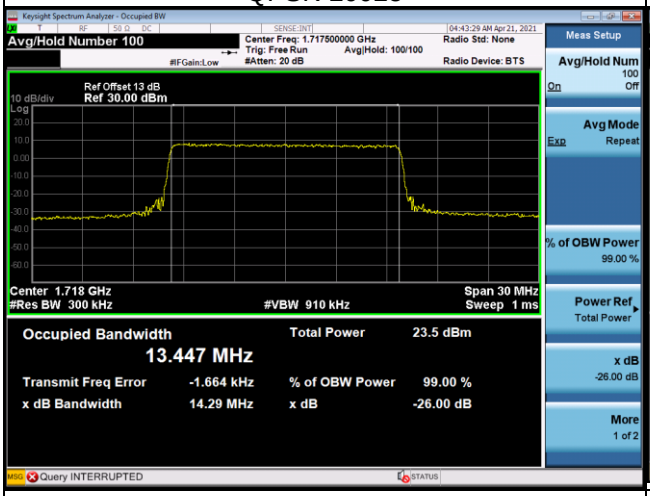
16QAM-20350



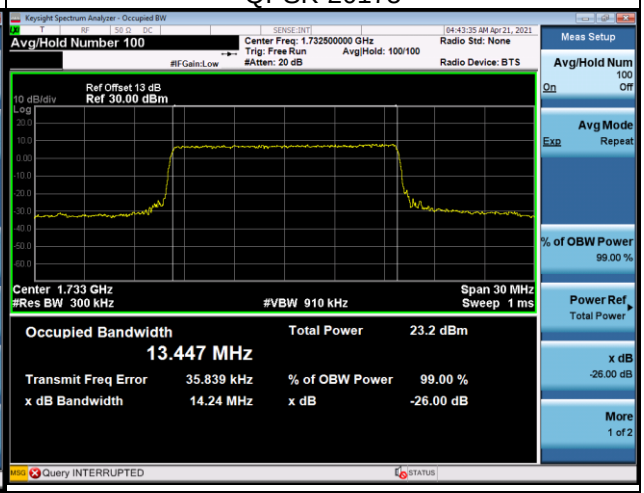
LTE Band 4_15M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20025	1717.5	13.447	20025	1717.5	14.29
20175	1732.5	13.447	20175	1732.5	14.24
20325	1747.5	13.423	20325	1747.5	14.27
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20025	1717.5	13.398	20025	1717.5	14.22
20175	1732.5	13.444	20175	1732.5	14.22
20325	1747.5	13.421	20325	1747.5	14.20

Spectrum Plot

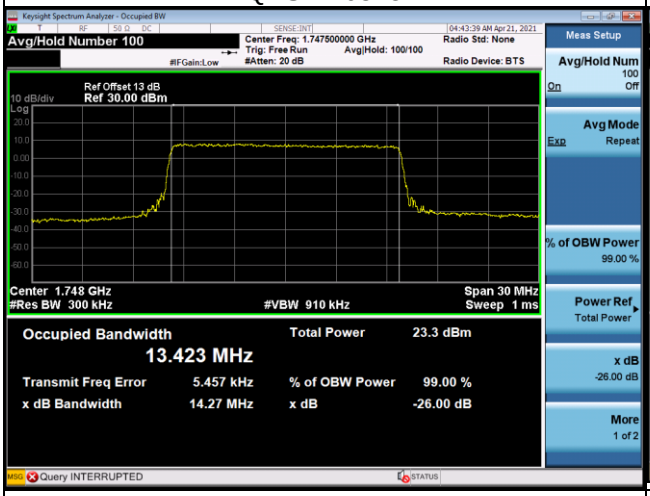
QPSK-20025



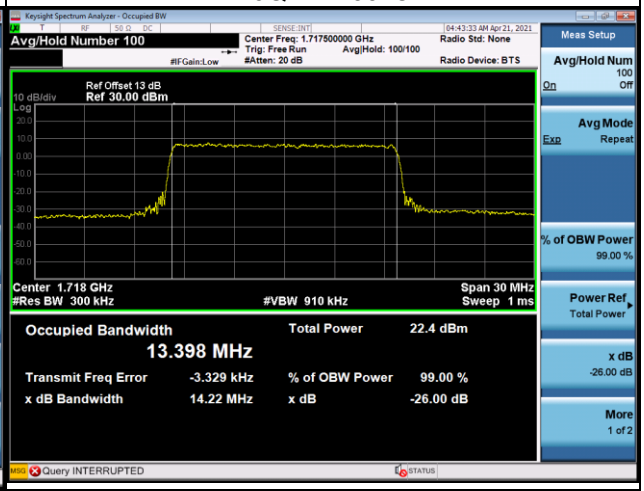
QPSK-20175



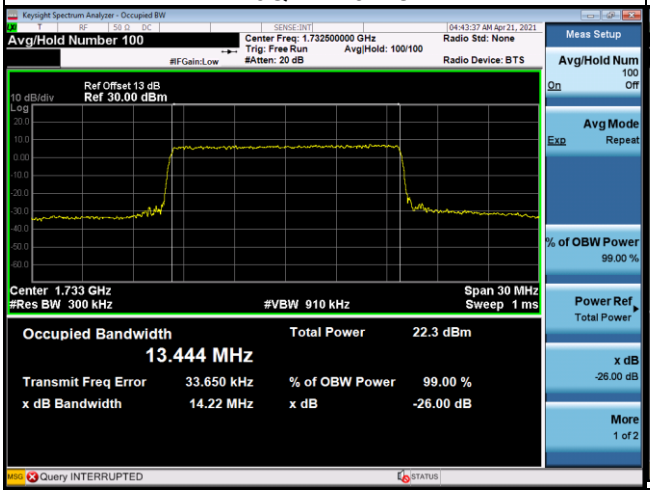
QPSK-20325



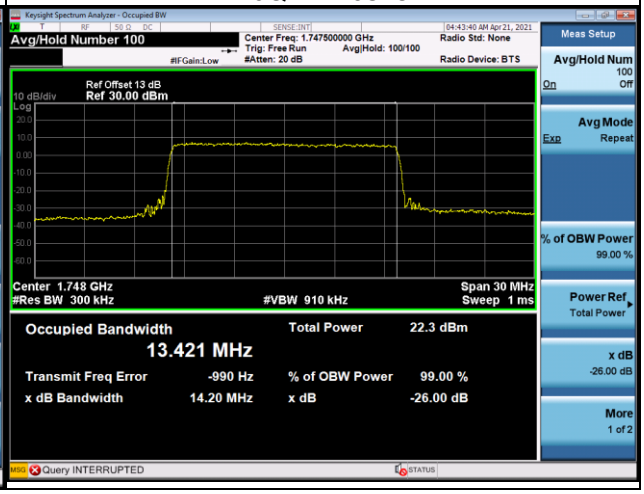
16QAM-20025



16QAM-20175



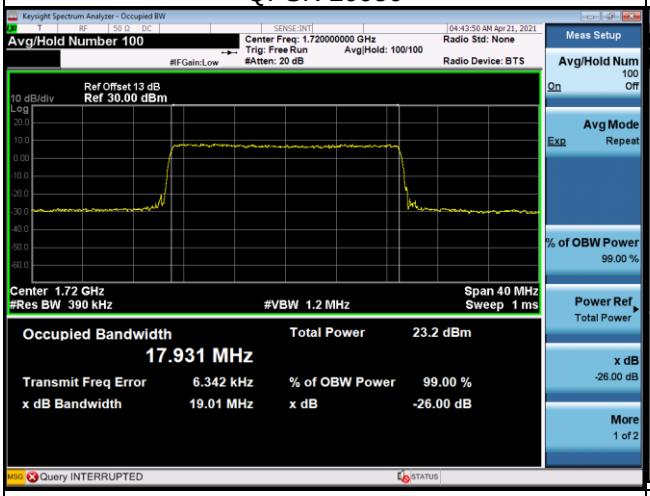
16QAM-20325



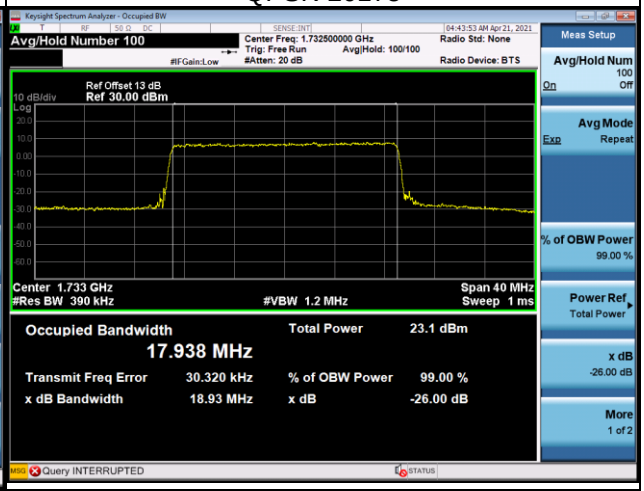
LTE Band 4_20M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20050	1720	17.931	20050	1720	19.01
20175	1732.5	17.938	20175	1732.5	18.93
20300	1745	17.905	20300	1745	18.90
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20050	1720	17.942	20050	1720	18.93
20175	1732.5	17.929	20175	1732.5	18.92
20300	1745	17.850	20300	1745	18.91

Spectrum Plot

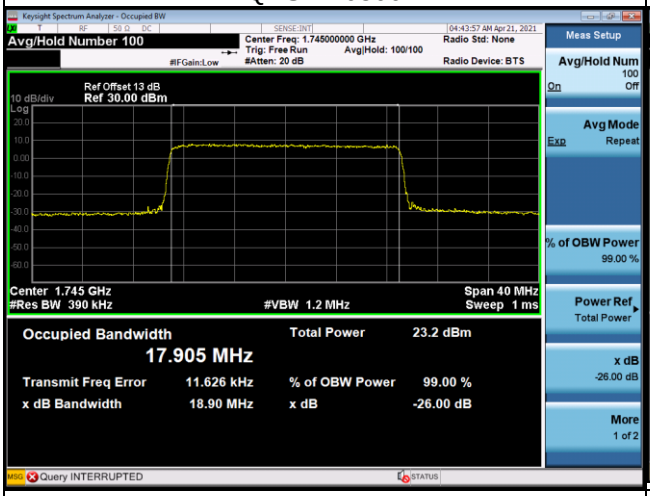
QPSK-20050



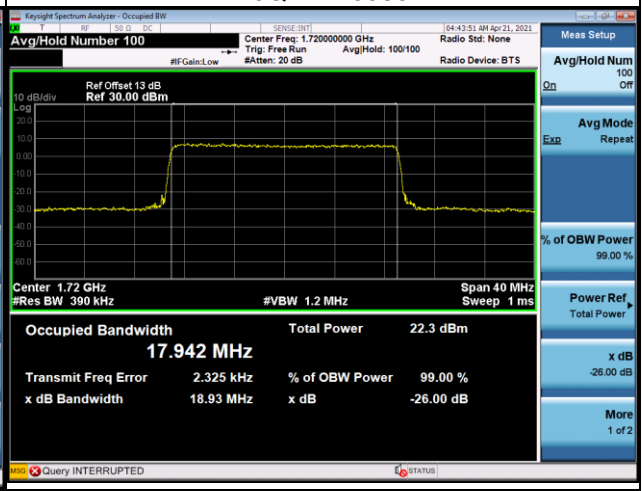
QPSK-20175



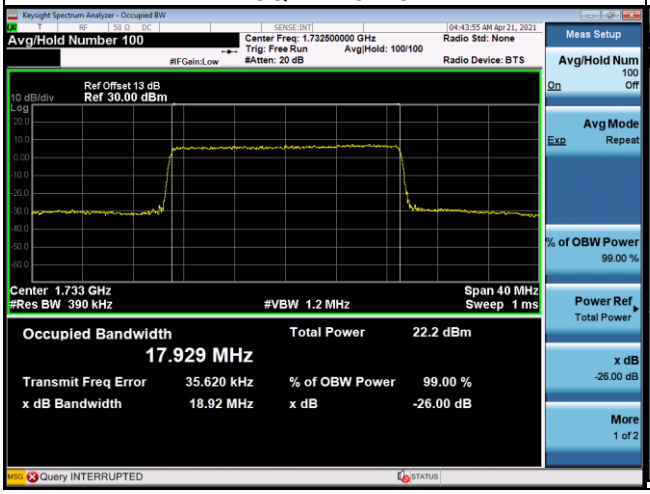
QPSK-20300



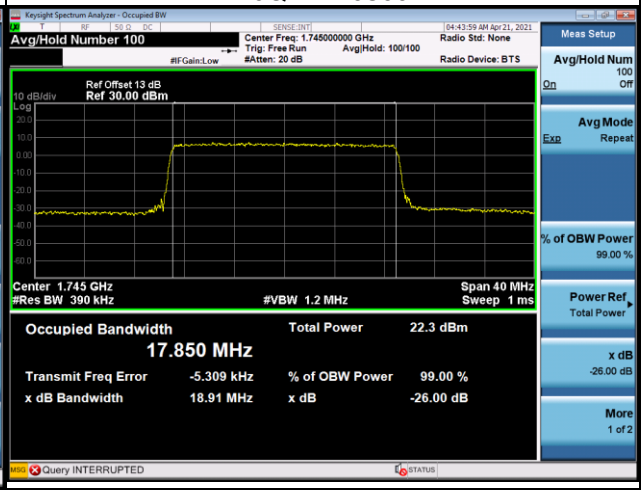
16QAM-20050



16QAM-20175



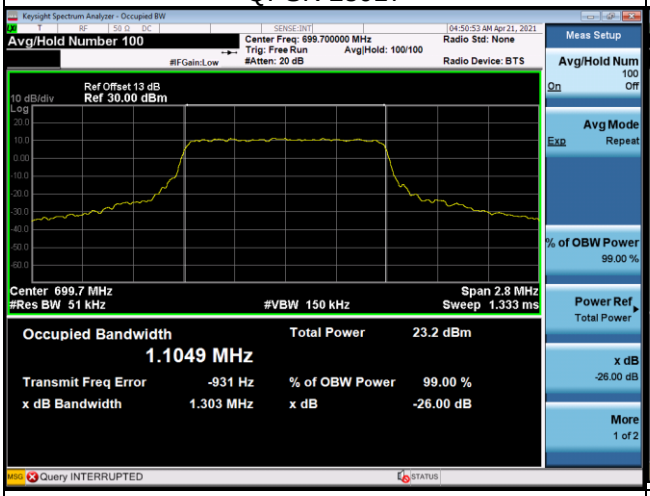
16QAM-20300



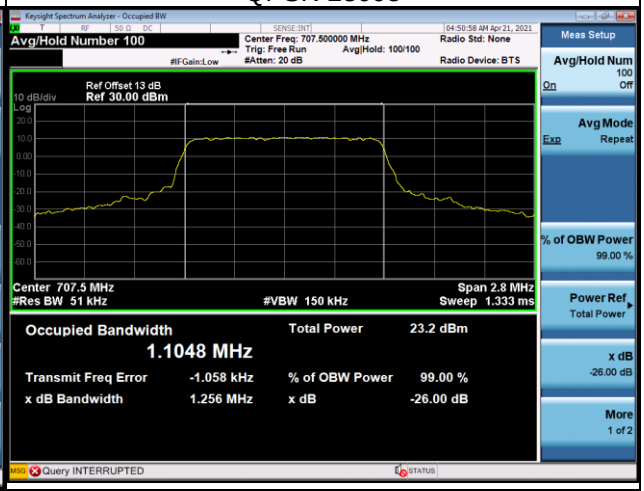
LTE Band 12_1.4M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
23017	699.7	1.1049	23017	699.7	1.303
23095	707.5	1.1048	23095	707.5	1.256
23173	715.3	1.0999	23173	715.3	1.295
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
23017	699.7	1.1055	23017	699.7	1.266
23095	707.5	1.1002	23095	707.5	1.280
23173	715.3	1.1022	23173	715.3	1.297

Spectrum Plot

QPSK-23017

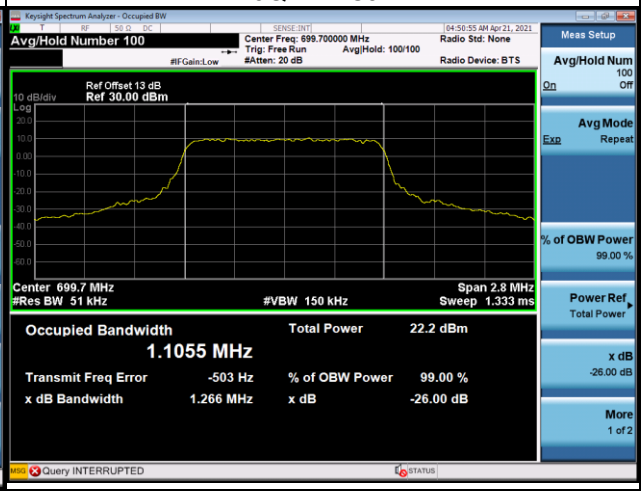


QPSK-23095

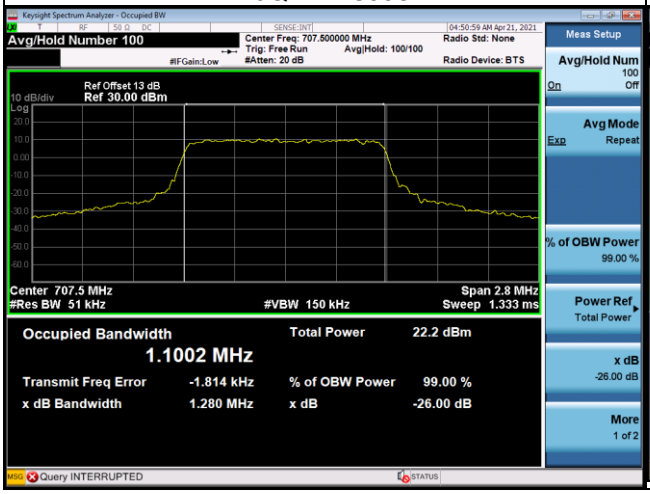


QPSK-23173

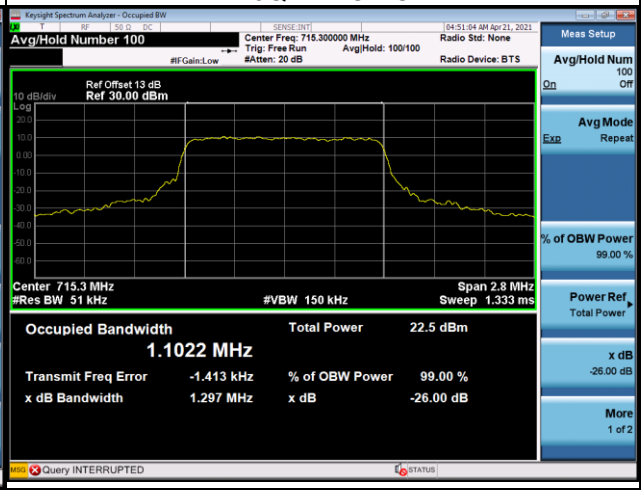
16QAM-23017



16QAM-23095



16QAM-23173



LTE Band 12_3M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
23025	700.5	2.7206	23025	700.5	2.962
23095	707.5	2.7275	23095	707.5	2.952
23165	714.5	2.7240	23165	714.5	2.957
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
23025	700.5	2.7149	23025	700.5	2.956
23095	707.5	2.7191	23095	707.5	2.966
23165	714.5	2.7223	23165	714.5	2.959