FCC Radio Test Report

FCC ID: 2AVVT-CU413UCMPS1

Report No.	:	BTL-FCCP-2-2103T126
Equipment	:	iTraMS CCU
Model Name	:	CU-41-3U-CM-PS1
Brand Name	:	Bosch
Applicant	:	Robert Bosch Engineering and Business Solutions Private Limited
Address	:	RBEI/PAC, Ban 601, Post Box No 3000 Hosur Road, Adugodi, Bengaluru, Karnataka-560030, India.
Radio Function	:	WCDMA Band V+ LTE Band 5
FCC Rule Part(s)	:	47 CRF FCC Part 22, 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 ~ 2021/8/31
Issued Date	:	2021/10/13

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

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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.

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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

REVISON 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	10
2.3	BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	12
2.4	SUPPORT UNITS	13
3	ERP TEST	14
3.1	LIMIT	14
3.2	TEST PROCEDURE	14
3.3	DEVIATION FROM TEST STANDARD	14
3.4	TEST SETUP	15
3.5	EUT OPERATING CONDITIONS	15
3.6	TEST RESULT	15
4	OCCUPIED BANDWIDTH MEASUREMENT	16
4.1	TEST PROCEDURE	16
4.2	DEVIATION FROM TEST STANDARD	16
4.3	TEST SETUP	16
4.4	TEST RESULT	16
5	CONDUCTED SPURIOUS EMISSIONS MEASUREMENT	17
5.1	LIMIT	17
5.2	TEST PROCEDURE	17
5.3	DEVIATION FROM TEST STANDARD	17
5.4	TEST SETUP	17
5.5	TEST RESULT	17
6	RADIATED SPURIOUS EMISSIONS TEST	18
6.1	LIMIT	18
6.2	TEST PROCEDURE	18
6.3	DEVIATION FROM TEST STANDARD	18
6.4	TEST SETUP	19
6.5	EUT OPERATING CONDITIONS	19
6.6	TEST RESULT	19
7	BAND EDGE MEASUREMENT	20
7.1	LIMIT	20
7.2	TEST PROCEDURE	20
7.3	DEVIATION FROM TEST STANDARD	20
7.4	TEST SETUP	20
7.5	TEST RESULT	20
8	PEAK TO AVERAGE RATIO MEASUREMENT	21
8.1	LIMIT	21
8.2	TEST PROCEDURE	21
8.3	DEVIATION FROM TEST STANDARD	21
8.4	TEST SETUP	21
8.5	TEST RESULT	21
9	FREQUENCY STABILITY MEASUREMENT	22

9.1	LIMIT	22
9.2	TEST PROCEDURE	22
9.3	DEVIATION FROM TEST STANDARD	22
9.4	TEST SETUP	22
9.5	TEST RESULT	22
10	LIST OF MEASURING EQUIPMENTS	23
11	EUT TEST PHOTO	24
12	EUT PHOTOS	24
APPENDIX A	ERP	25
APPENDIX B	OCCUPIED BANDWIDTH	55
APPENDIX C	CONDUCTED SPURIOUS EMISSION	66
APPENDIX D	RADIATED SPURIOUS EMISSIONS	72
APPENDIX E	BAND EDGE	89
APPENDIX F	PEAK TO AVERAGE RATIO	95
APPENDIX G	FREQOENCY STABILITY	101

REVISON HISTORY

Report No.	Version	Description	Issued Date
BTL-FCCP-2-2103T126	R00	Original Report.	2021/9/17
BTL-FCCP-2-2103T126	R01	Revised Typo.	2021/9/27
BTL-FCCP-2-2103T126	R02	Revised report to address TCB's comments.	2021/10/13

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	------	N/A	Note(3)
2.1046 22.913(a)(5)	Effective Radiated Power (ERP)	APPENDIX A	Pass	------
2.1049	Occupied Bandwidth	APPENDIX B	Pass	------
2.1051 22.917(a)	Conducted Spurious Emissions	APPENDIX C	Pass	------
2.1053 22.917(a)	Radiated Spurious Emissions	APPENDIX D	Pass	------
22.917(a)	Band Edge Measurements	APPENDIX E	Pass	------
-	Peak To Average Ratio	APPENDIX F	Pass	Record Only
2.1055 22.355	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

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. 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

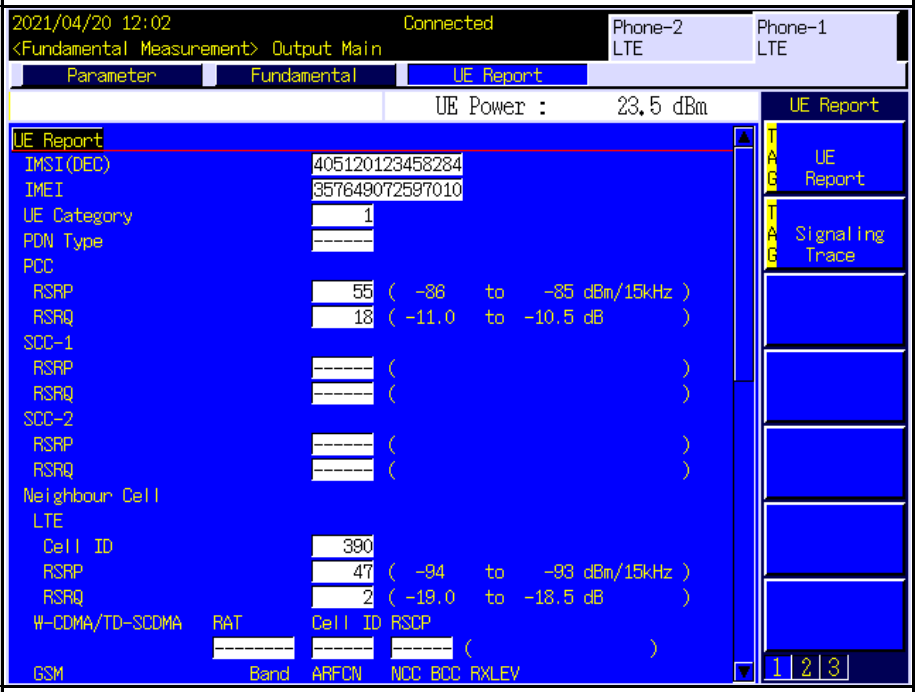
NOTE:
Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Test Voltage	Tested by
ERP (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 (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) WCDMA / V / 824 ~ 849 / 869 ~ 894 LTE / 5 / 824 ~ 849 / 869 ~ 894
Maximum ERP	WCDMA Band V: 0.160 W LTE Band 5 (1.4 MHz, QPSK): 0.200 W LTE Band 5 (1.4 MHz, 16QAM): 0.165 W LTE Band 5 (3 MHz, QPSK): 0.202 W LTE Band 5 (3 MHz, 16QAM): 0.167 W LTE Band 5 (5 MHz, QPSK): 0.204 W LTE Band 5 (5 MHz, 16QAM): 0.169 W LTE Band 5 (10 MHz, QPSK): 0.207 W LTE Band 5 (10 MHz, 16QAM): 0.171 W
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) Channel List:

WCDMA Band V				
Test Frequency ID	UARFCN	Frequency of Uplink (MHz)	UARFCN	Frequency of Downlink (MHz)
Low Range	4132	826.4	4357	871.4
Mid Range	4183	836.6	4408	881.5
High Range	4233	846.6	4458	891.6

LTE Band 5					
Test Frequency ID	Bandwidth (MHz)	N_{UL}	Frequency of Uplink (MHz)	N_{DL}	Frequency of Downlink (MHz)
Low Range	1.4	20407	824.7	2407	869.7
	3	20415	825.5	2415	870.5
	5	20425	826.5	2425	871.5
	10	20450	829	2450	874
Mid Range	1.4/3/5/10	20525	836.5	2525	881.5
High Range	1.4	20643	848.3	2643	893.3
	3	20635	847.5	2635	892.5
	5	20625	846.5	2625	891.5
	10	20600	844	2600	889

(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	1.29	WCDMA Band V
					1.29	LTE Band 5
		TG.08.0723	N/A	Fakra Code D	1.82	RX only

Group II:

Antenna	Manufacture	Part No.	Type	Connector	Gain (dBi)	Note
Built-in antenna	BOSCH	N/A	N/A	Integrated (Through Hole)	-0.6	WCDMA Band V
					-0.6	LTE Band 5

Group III:

Antenna	Manufacture	Part No.	Type	Connector	Gain (dBi)	Note
External antenna	taoglas antenna solutions	MA240.LBI.001	N/A	SMA(M)	0.98	WCDMA Band V
					0.98	LTE Band 5

Note: The EUT includes two groups of external antennas, for Radiated test items only the worst case MA240.LBI.001 antenna is recorded.

2.2 TEST MODES

WCDMA BAND V MODE			
Test Item	Available Channel	Tested Channel	Mode
ERP	4132 to 4233	4132, 4183, 4233	WCDMA, HSDPA, HSUPA
Occupied Bandwidth	4132 to 4233	4132, 4183, 4233	WCDMA
Conducted Spurious Emissions	4132 to 4233	4183	WCDMA
Radiated Spurious Emissions	4132 to 4233	4183	WCDMA
Band Edge	4132 to 4233	4132, 4233	WCDMA
Peak to Average Ratio	4132 to 4233	4132, 4183, 4233	WCDMA
Frequency Stability	4132 to 4233	4183	WCDMA

LTE BAND 5 MODE					
Test Item	Available Channel	Tested Channel	Channel Bandwidth	Modulation	Mode
ERP	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK, 16QAM,64QAM	1RB/3RB/6RB
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK, 16QAM,64QAM	1RB/8RB/15RB
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK, 16QAM,64QAM	1RB/12RB/25RB
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK, 16QAM,64QAM	1RB/25RB/50RB
Occupied Bandwidth	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK, 16QAM,64QAM	6RB
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK, 16QAM,64QAM	15RB
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK, 16QAM,64QAM	25RB
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK, 16QAM,64QAM	50RB
Conducted Spurious Emissions	20407 to 20643	20525	1.4MHz	QPSK	1RB
	20425 to 20625	20525	5MHz	QPSK	1RB
	20450 to 20600	20525	10MHz	QPSK	1RB
Radiated Spurious Emissions	20407 to 20643	20525	1.4MHz	QPSK	1RB
	20425 to 20625	20525	5MHz	QPSK	1RB
	20450 to 20600	20525	10MHz	QPSK	1RB
Band Edge	20407 to 20643	20407, 20643	1.4MHz	QPSK	1RB/6RB
	20415 to 20635	20415, 20635	3MHz	QPSK	1RB/15RB
	20425 to 20625	20425, 20625	5MHz	QPSK	1RB/25RB
	20450 to 20600	20450, 20600	10MHz	QPSK	1RB/50RB
Peak To Average Ratio	20407 to 20643	20407, 20525, 20643	1.4MHz	QPSK, 16QAM,64QAM	1RB
	20415 to 20635	20415, 20525, 20635	3MHz	QPSK, 16QAM,64QAM	1RB
	20425 to 20625	20425, 20525, 20625	5MHz	QPSK, 16QAM,64QAM	1RB
	20450 to 20600	20450, 20525, 20600	10MHz	QPSK, 16QAM,64QAM	1RB

Frequency Stability	20407 to 20643	20525	1.4MHz	QPSK	1RB
	20415 to 20635	20525	3MHz	QPSK	1RB
	20425 to 20625	20525	5MHz	QPSK	1RB
	20450 to 20600	20525	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.

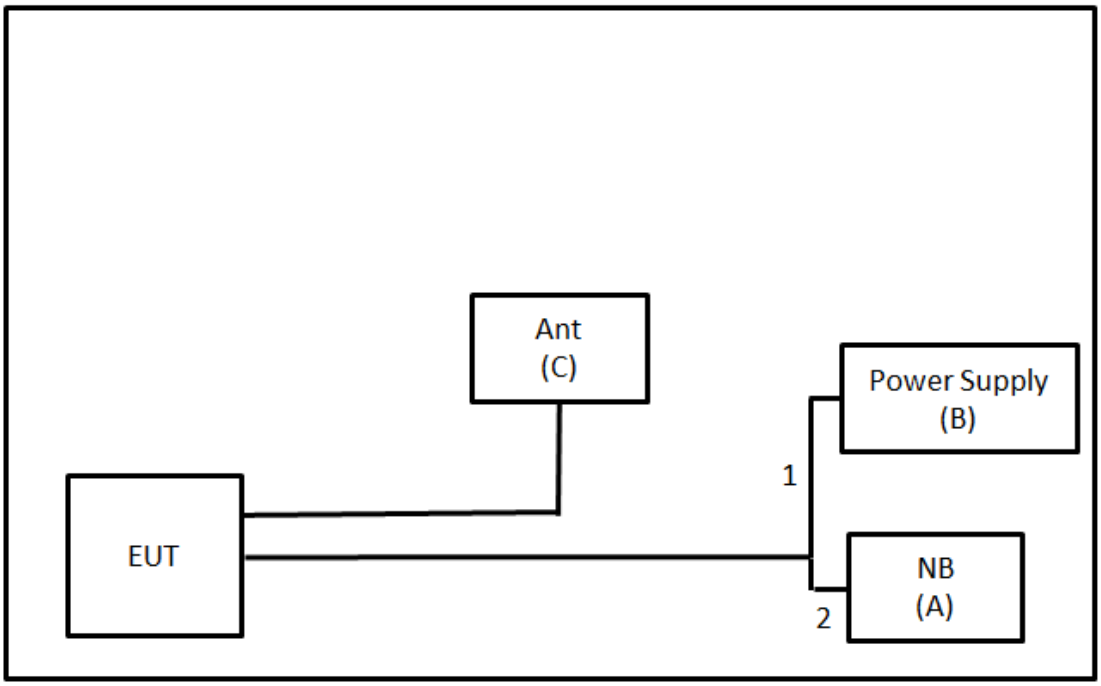
Test Item	External antenna		Built-in antenna	
	WCDMA	LTE	WCDMA	LTE
Radiated Spurious Emissions (below 1G)	X axis	Z axis	Z axis	Y axis
Radiated Spurious Emissions (above 1G)	X axis	Z axis	Z axis	Z axis

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

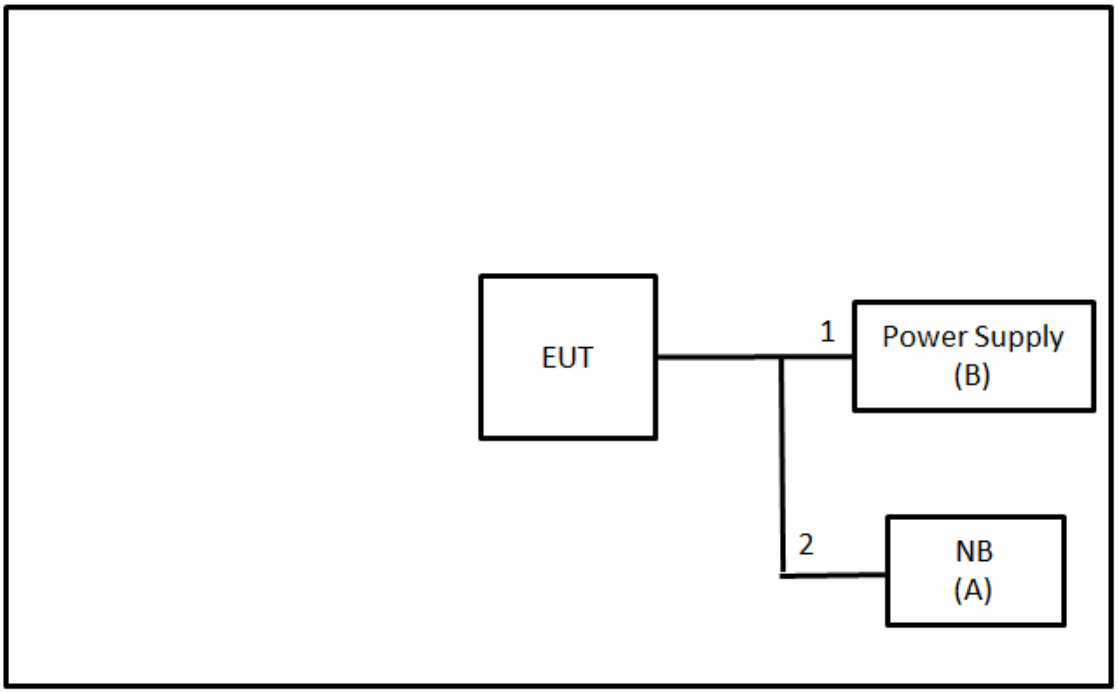
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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 TEST

3.1 LIMIT

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts (38.45 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	-	38.45	=	-33.85

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 WCDMA and 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:

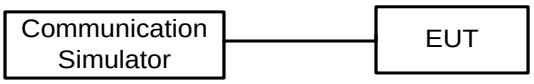
a. Substitution method is used for E.I.R.P measurement. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 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

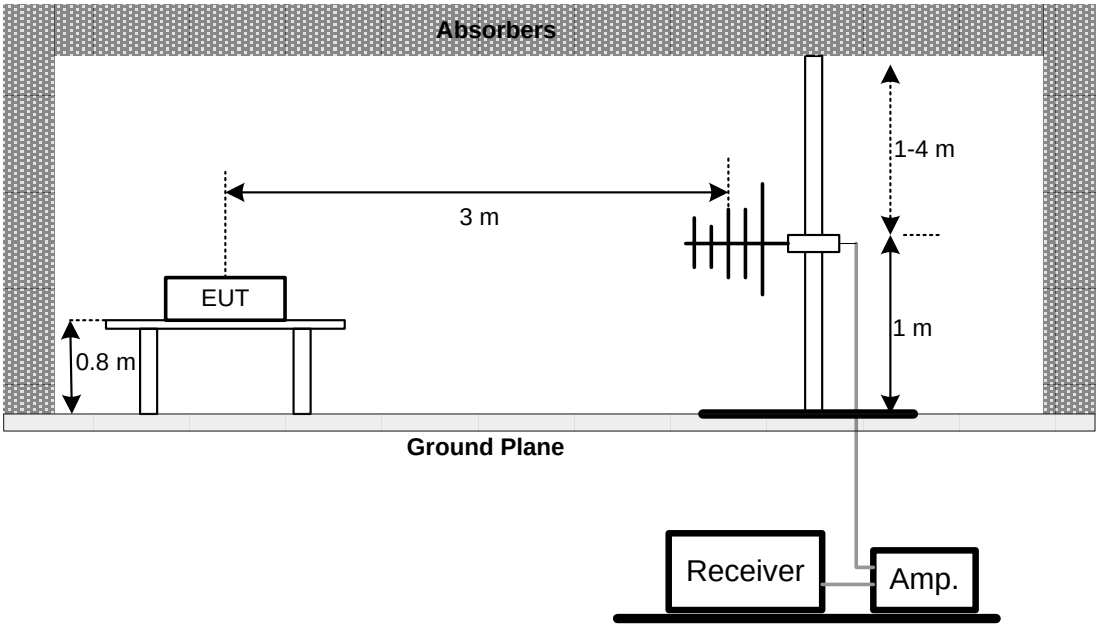
No deviation.

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

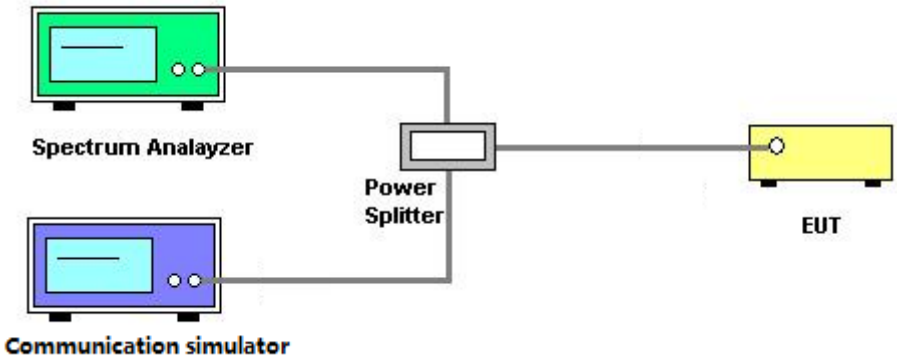
The testing follows FCC KDB 971168 v03r01 Section 4.

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.

5.2 TEST PROCEDURE

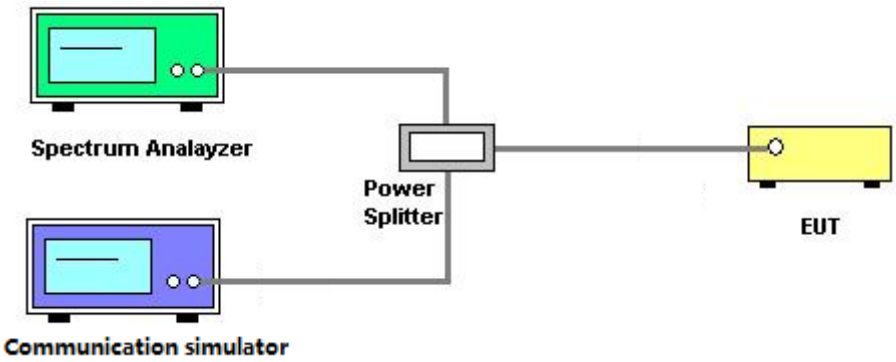
The testing follows FCC KDB 971168 v03r01 Section 6.

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.

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.

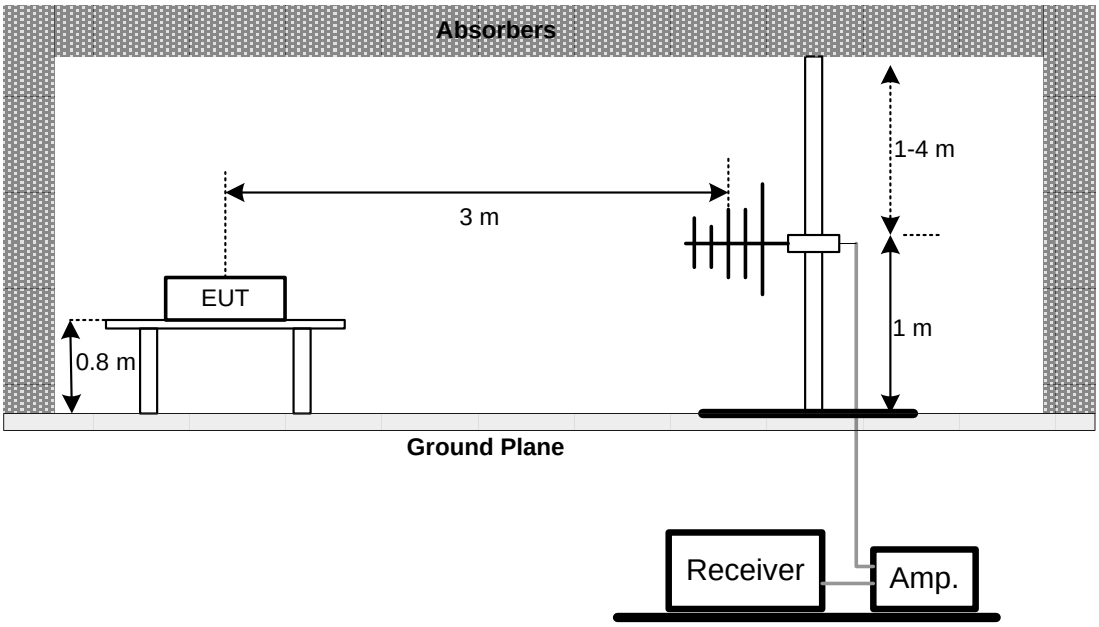
a. In the semi-anechoic chamber, EUT placed on the 0.8m height of Turn Table, rotated the table around 360 degrees to search the maximum radiation power and receiver antenna shall be rotated vertical and horizontal polarization and moved height from 1m to 4m to find the maximum polar radiated power.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

6.3 DEVIATION FROM TEST STANDARD

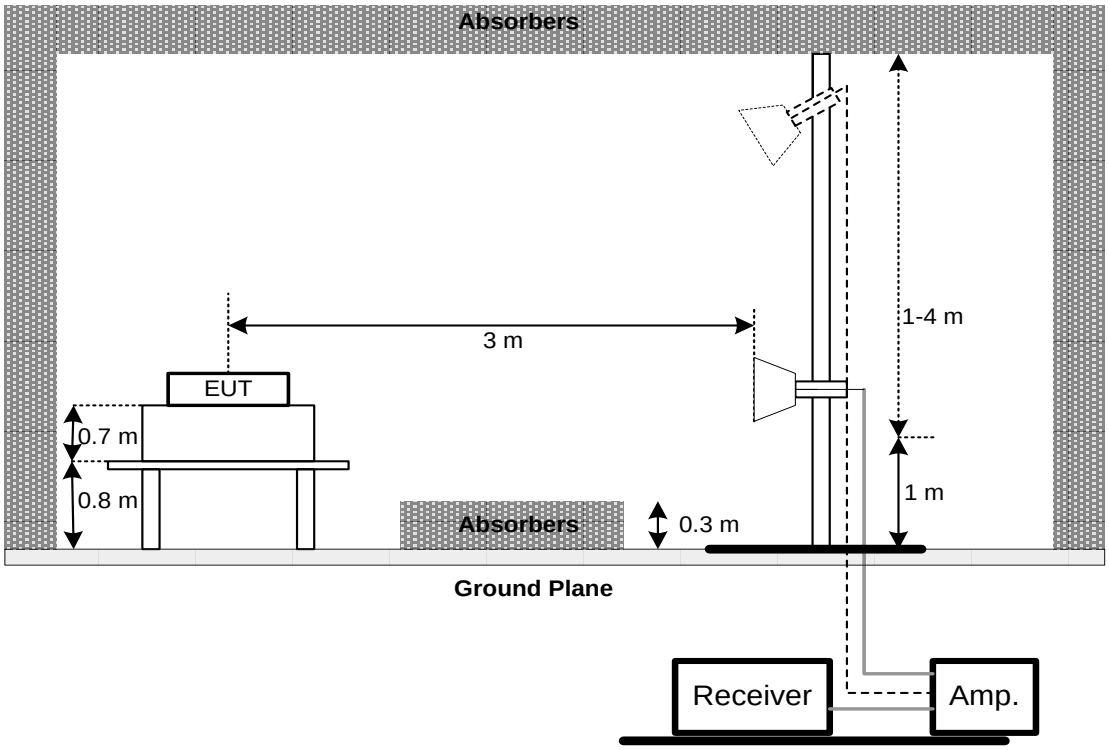
No deviation.

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

A 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. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

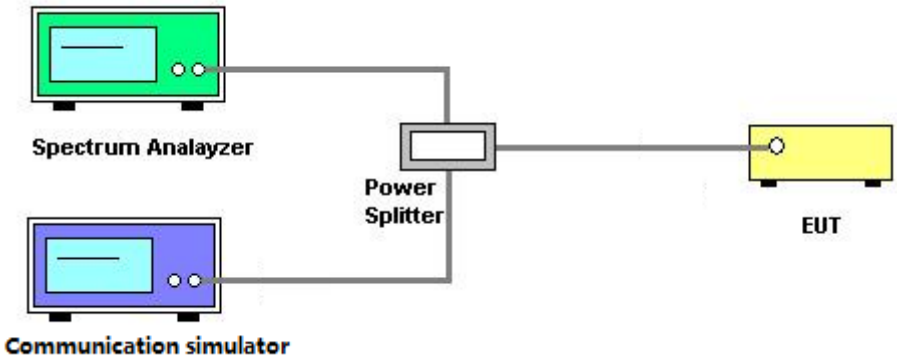
7.2 TEST PROCEDURE

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

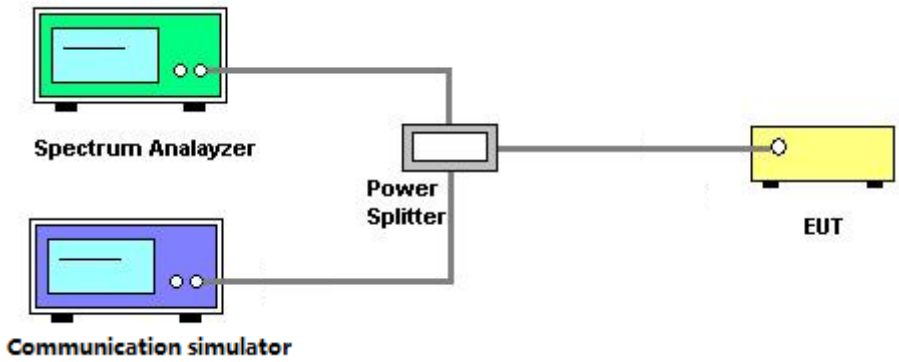
The testing follows FCC KDB 971168 v03r01 Section 5.7.

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

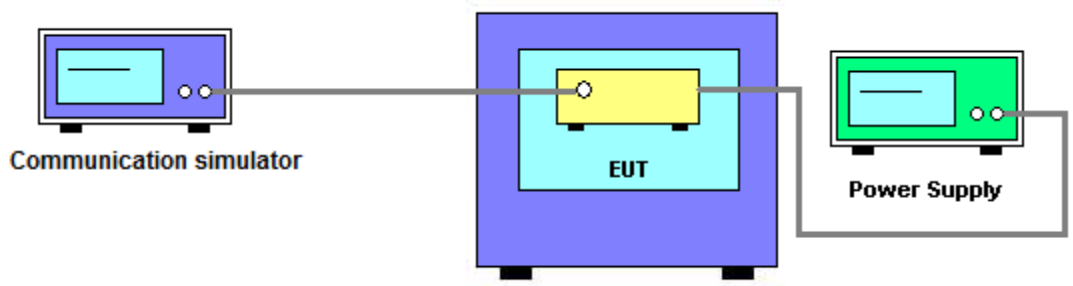
The testing follows FCC KDB 971168 v03r01 Section 9.

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-2103T126-FCCP-2 (APPENDIX-TEST PHOTOS).

12 EUT PHOTOS

Please refer to document Appendix No.: EP-2103T126-1 (APPENDIX-EUT PHOTOS).

APPENDIX A ERP

ERP (Conducted):

Band	UL/DL Channel No.	Frequency(MHz)	Average power(dBm	Gain (dBi)	ERP (dBm)	ERP (W)
WCDMA Band V	4132/4357	826.4	21.63	1.29	20.77	0.119
	4183/4408	836.6	22.67	1.29	21.81	**0.152**
	4233/4458	846.6	22.43	1.29	21.57	0.144

Band	Sub-test	UL/DL Channel	Frequency(MHz)	Average power(dBm)	Gain (dBi)	ERP (dBm)	ERP (W)
HSDPA Band V	1	4132/4357	826.4	21.64	1.29	20.78	0.120
		4183/4408	836.6	22.63	1.29	21.77	0.150
		4233/4458	846.6	22.87	1.29	22.01	**0.159**
	2	4132/4357	826.4	21.19	1.29	20.33	0.108
		4183/4408	836.6	22.18	1.29	21.32	0.136
		4233/4458	846.6	22.42	1.29	21.56	0.143
	3	4132/4357	826.4	20.69	1.29	19.83	0.096
		4183/4408	836.6	21.68	1.29	20.82	0.121
		4233/4458	846.6	21.92	1.29	21.06	0.128
	4	4132/4357	826.4	20.74	1.29	19.88	0.097
		4183/4408	836.6	21.73	1.29	20.87	0.122
		4233/4458	846.6	21.97	1.29	21.11	0.129

Band	Sub-test	UL/DL Channel	Frequency(MHz)	Average power(dBm)	Gain (dBi)	ERP (dBm)	ERP (W)
HSUPA Band V	1	4132/4357	826.4	21.68	1.29	20.82	0.121
		4183/4408	836.6	22.67	1.29	21.81	0.152
		4233/4458	846.6	22.91	1.29	22.05	**0.160**
	2	4132/4357	826.4	19.80	1.29	18.94	0.078
		4183/4408	836.6	20.79	1.29	19.93	0.098
		4233/4458	846.6	21.03	1.29	20.17	0.104
	3	4132/4357	826.4	20.80	1.29	19.94	0.099
		4183/4408	836.6	21.79	1.29	20.93	0.124
		4233/4458	846.6	22.03	1.29	21.17	0.131
	4	4132/4357	826.4	19.82	1.29	18.96	0.079
		4183/4408	836.6	20.81	1.29	19.95	0.099
		4233/4458	846.6	21.05	1.29	20.19	0.104
	5	4132/4357	826.4	21.59	1.29	20.73	0.118
		4183/4408	836.6	22.58	1.29	21.72	0.149
		4233/4458	846.6	22.82	1.29	21.96	0.157

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)
5	1.4	20407	824.7	QPSK	1	0	0	23.76	1.29	22.90	0.195
					1	2	0	23.75	1.29	22.89	0.195
					1	5	0	23.66	1.29	22.80	0.191
					3	0	0	23.76	1.29	22.90	0.195
					3	1	0	23.75	1.29	22.89	0.195
					3	2	0	23.66	1.29	22.80	0.191
					6	0	1	22.82	1.29	21.96	0.157
				16QAM	1	0	1	22.94	1.29	22.08	0.161
					1	2	1	22.90	1.29	22.04	0.160
					1	5	1	22.73	1.29	21.87	0.154
					3	0	1	22.94	1.29	22.08	0.161
					3	1	1	22.90	1.29	22.04	0.160
					3	2	1	22.73	1.29	21.87	0.154
					6	0	2	21.91	1.29	21.05	0.127
		20525	836.5	QPSK	1	0	0	23.83	1.29	22.97	0.198
					1	2	0	23.70	1.29	22.84	0.192
					1	5	0	23.61	1.29	22.75	0.188
					3	0	0	23.83	1.29	22.97	0.198
					3	1	0	23.70	1.29	22.84	0.192
					3	2	0	23.61	1.29	22.75	0.188
					6	0	1	22.89	1.29	22.03	0.160
				16QAM	1	0	1	23.01	1.29	22.15	0.164
					1	2	1	22.97	1.29	22.11	0.163
					1	5	1	22.68	1.29	21.82	0.152
					3	0	1	23.01	1.29	22.15	0.164
					3	1	1	22.97	1.29	22.11	0.163
					3	2	1	22.68	1.29	21.82	0.152
					6	0	2	20.50	1.29	19.64	0.092
		20642	848.2	QPSK	1	0	0	23.86	1.29	23.00	**0.200**
					1	2	0	23.67	1.29	22.81	0.191
					1	5	0	23.58	1.29	22.72	0.187
					3	0	0	23.86	1.29	23.00	**0.200**
					3	1	0	23.67	1.29	22.81	0.191
					3	2	0	23.58	1.29	22.72	0.187
					6	0	1	22.92	1.29	22.06	0.161
				16QAM	1	0	1	23.04	1.29	22.18	**0.165**
					1	2	1	23.00	1.29	22.14	0.164
					1	5	1	22.65	1.29	21.79	0.151
					3	0	1	23.04	1.29	22.18	**0.165**
					3	1	1	23.00	1.29	22.14	0.164
					3	2	1	22.65	1.29	21.79	0.151
					6	0	2	20.60	1.29	19.74	0.094

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)
5	3	20415	825.5	QPSK	1	0	0	23.81	1.29	22.95	0.197
					1	7	0	23.80	1.29	22.94	0.197
					1	14	0	23.71	1.29	22.85	0.193
					8	0	1	22.92	1.29	22.06	0.161
					8	4	1	22.84	1.29	21.98	0.158
					8	7	1	22.89	1.29	22.03	0.160
					15	0	1	22.87	1.29	22.01	0.159
				16QAM	1	0	1	22.99	1.29	22.13	0.163
					1	7	1	22.95	1.29	22.09	0.162
					1	14	1	22.78	1.29	21.92	0.156
					8	0	2	21.82	1.29	20.96	0.125
					8	4	2	21.94	1.29	21.08	0.128
					8	7	2	21.74	1.29	20.88	0.122
					15	0	2	21.96	1.29	21.10	0.129
		20525	836.5	QPSK	1	0	0	23.88	1.29	23.02	0.200
					1	7	0	23.75	1.29	22.89	0.195
					1	14	0	23.66	1.29	22.80	0.191
					8	0	1	22.99	1.29	22.13	0.163
					8	4	1	22.79	1.29	21.93	0.156
					8	7	1	22.84	1.29	21.98	0.158
					15	0	1	22.94	1.29	22.08	0.161
				16QAM	1	0	1	23.06	1.29	22.20	0.166
					1	7	1	23.02	1.29	22.16	0.164
					1	14	1	22.73	1.29	21.87	0.154
					8	0	2	21.89	1.29	21.03	0.127
					8	4	2	21.89	1.29	21.03	0.127
					8	7	2	21.69	1.29	20.83	0.121
					15	0	2	22.03	1.29	21.17	0.131
		20634	847.4	QPSK	1	0	0	23.91	1.29	23.05	**0.202**
					1	7	0	23.72	1.29	22.86	0.193
					1	14	0	23.63	1.29	22.77	0.189
					8	0	1	23.02	1.29	22.16	0.164
					8	4	1	22.76	1.29	21.90	0.155
					8	7	1	22.81	1.29	21.95	0.157
					15	0	1	22.97	1.29	22.11	0.163
				16QAM	1	0	1	23.09	1.29	22.23	**0.167**
					1	7	1	23.05	1.29	22.19	0.166
					1	14	1	22.70	1.29	21.84	0.153
					8	0	2	21.92	1.29	21.06	0.128
					8	4	2	21.86	1.29	21.00	0.126
					8	7	2	21.66	1.29	20.80	0.120
					15	0	2	22.06	1.29	21.20	0.132

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)
5	5	20425	826.5	QPSK	1	0	0	23.86	1.29	23.00	0.200
					1	12	0	23.85	1.29	22.99	0.199
					1	24	0	23.76	1.29	22.90	0.195
					12	0	1	22.97	1.29	22.11	0.163
					12	6	1	22.89	1.29	22.03	0.160
					12	11	1	22.94	1.29	22.08	0.161
					25	0	1	22.92	1.29	22.06	0.161
				16QAM	1	0	1	23.04	1.29	22.18	0.165
					1	12	1	23.00	1.29	22.14	0.164
					1	24	1	22.83	1.29	21.97	0.157
					12	0	2	21.87	1.29	21.01	0.126
					12	6	2	21.99	1.29	21.13	0.130
					12	11	2	21.79	1.29	20.93	0.124
					25	0	2	22.01	1.29	21.15	0.130
		20525	836.5	QPSK	1	0	0	23.93	1.29	23.07	0.203
					1	12	0	23.80	1.29	22.94	0.197
					1	24	0	23.71	1.29	22.85	0.193
					12	0	1	23.04	1.29	22.18	0.165
					12	6	1	22.84	1.29	21.98	0.158
					12	11	1	22.89	1.29	22.03	0.160
					25	0	1	22.99	1.29	22.13	0.163
				16QAM	1	0	1	23.11	1.29	22.25	0.168
					1	12	1	23.07	1.29	22.21	0.166
					1	24	1	22.78	1.29	21.92	0.156
					12	0	2	21.94	1.29	21.08	0.128
					12	6	2	21.94	1.29	21.08	0.128
					12	11	2	21.74	1.29	20.88	0.122
					25	0	2	22.08	1.29	21.22	0.132
		20625	846.5	QPSK	1	0	0	23.96	1.29	23.10	**0.204**
					1	12	0	23.77	1.29	22.91	0.195
					1	24	0	23.68	1.29	22.82	0.191
					12	0	1	23.07	1.29	22.21	0.166
					12	6	1	22.81	1.29	21.95	0.157
					12	11	1	22.86	1.29	22.00	0.158
					25	0	1	23.02	1.29	22.16	0.164
				16QAM	1	0	1	23.14	1.29	22.28	**0.169**
					1	12	1	23.10	1.29	22.24	0.167
					1	24	1	22.75	1.29	21.89	0.155
					12	0	2	21.97	1.29	21.11	0.129
					12	6	2	21.91	1.29	21.05	0.127
					12	11	2	21.71	1.29	20.85	0.122
					25	0	2	22.11	1.29	21.25	0.133

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.

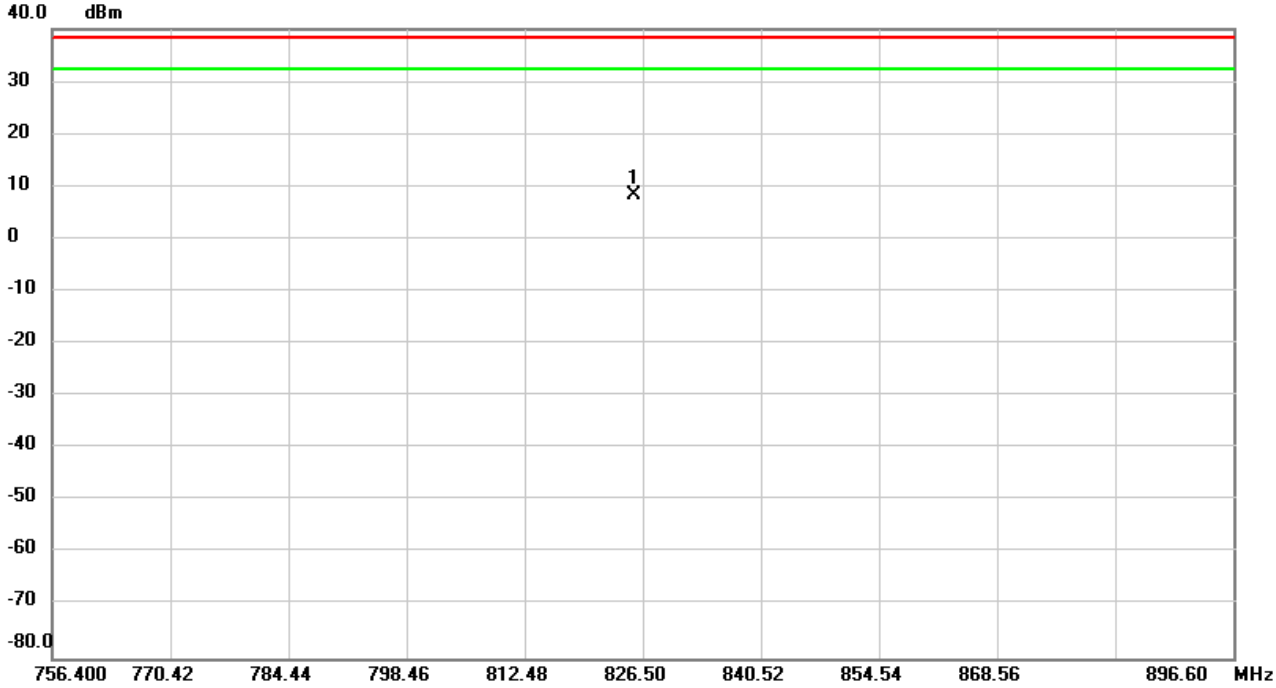
Band	BW (MHz)	Channel	Frequency (MHz)	Mode	UL RB Allocation	UL RB Offset	MPR	Average power	Gain (dBi)	ERP (dBm)	ERP (W)
5	10	20450	829.0	QPSK	1	0	0	23.91	1.29	23.05	0.202
					1	24	0	23.90	1.29	23.04	0.201
					1	49	0	23.81	1.29	22.95	0.197
					25	0	1	23.02	1.29	22.16	0.164
					25	12	1	22.94	1.29	22.08	0.161
					25	24	1	22.99	1.29	22.13	0.163
					50	0	1	22.97	1.29	22.11	0.163
				16QAM	1	0	1	23.09	1.29	22.23	0.167
					1	24	1	23.05	1.29	22.19	0.166
					1	49	1	22.88	1.29	22.02	0.159
					25	0	2	21.92	1.29	21.06	0.128
					25	12	2	22.04	1.29	21.18	0.131
					25	24	2	21.84	1.29	20.98	0.125
					50	0	2	22.06	1.29	21.20	0.132
		20525	836.5	QPSK	1	0	0	23.98	1.29	23.12	0.205
					1	24	0	23.85	1.29	22.99	0.199
					1	49	0	23.76	1.29	22.90	0.195
					25	0	1	23.09	1.29	22.23	0.167
					25	12	1	22.89	1.29	22.03	0.160
					25	24	1	22.94	1.29	22.08	0.161
					50	0	1	23.04	1.29	22.18	0.165
				16QAM	1	0	1	23.16	1.29	22.30	0.170
					1	24	1	23.12	1.29	22.26	0.168
					1	49	1	22.83	1.29	21.97	0.157
					25	0	2	21.99	1.29	21.13	0.130
					25	12	2	21.99	1.29	21.13	0.130
					25	24	2	21.79	1.29	20.93	0.124
					50	0	2	22.13	1.29	21.27	0.134
		20600	844.0	QPSK	1	0	0	24.01	1.29	23.15	**0.207**
					1	24	0	23.82	1.29	22.96	0.198
					1	49	0	23.73	1.29	22.87	0.194
					25	0	1	23.12	1.29	22.26	0.168
					25	12	1	22.86	1.29	22.00	0.158
					25	24	1	22.91	1.29	22.05	0.160
					50	0	1	23.07	1.29	22.21	0.166
				16QAM	1	0	1	23.19	1.29	22.33	**0.171**
					1	24	1	23.15	1.29	22.29	0.169
					1	49	1	22.80	1.29	21.94	0.156
					25	0	2	22.02	1.29	21.16	0.131
					25	12	2	21.96	1.29	21.10	0.129
					25	24	2	21.76	1.29	20.90	0.123
					50	0	2	22.16	1.29	21.30	0.135

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 (Radiated):

For External antenna:

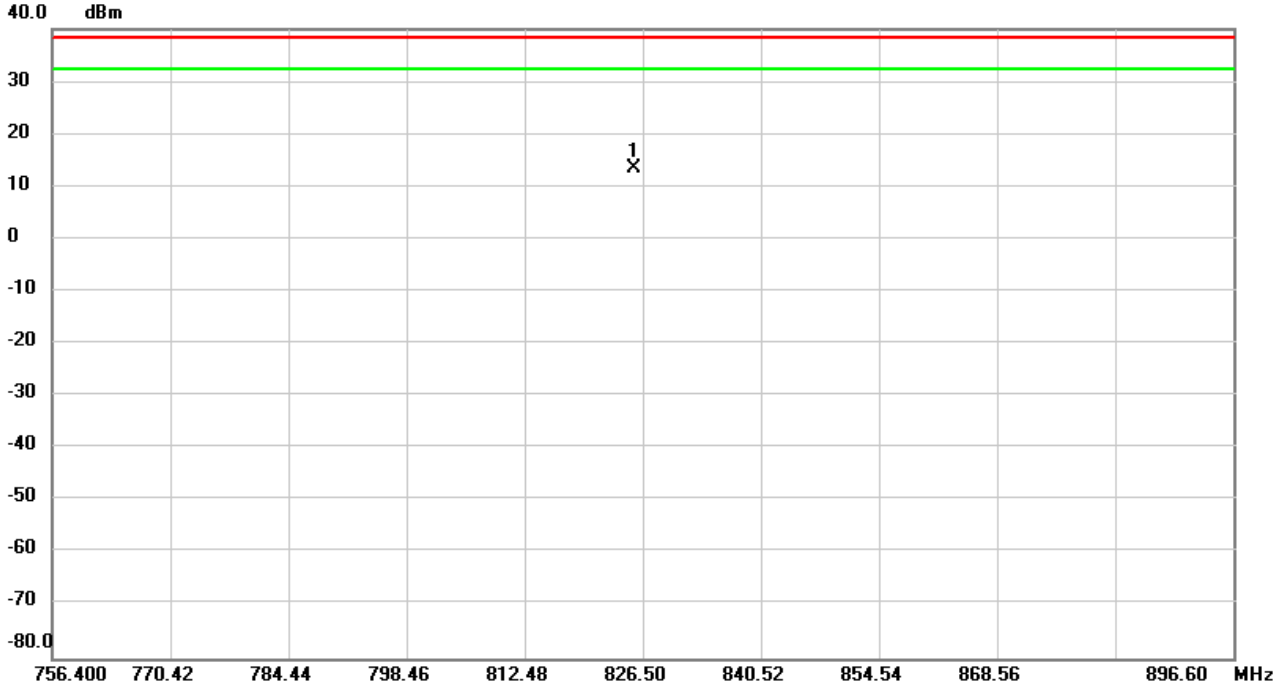
Test Mode	Band V	Test Date	2021/8/30
Test Channel	CH4357	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	825.3831	-25.65	34.02	8.37	38.45	-30.08	peak	

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

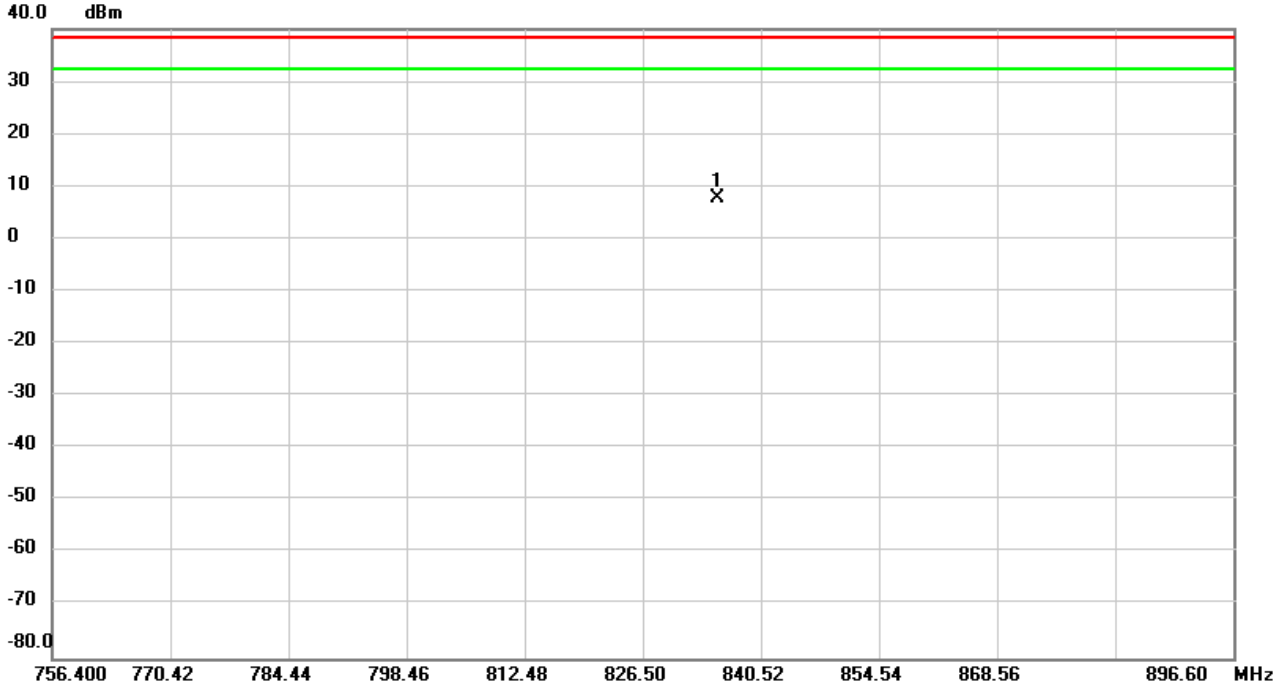
Test Mode	Band V	Test Date	2021/8/30
Test Channel	CH4357	Polarization	Horizontal
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	825.5513	-20.02	33.53	13.51	38.45	-24.94	peak	

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

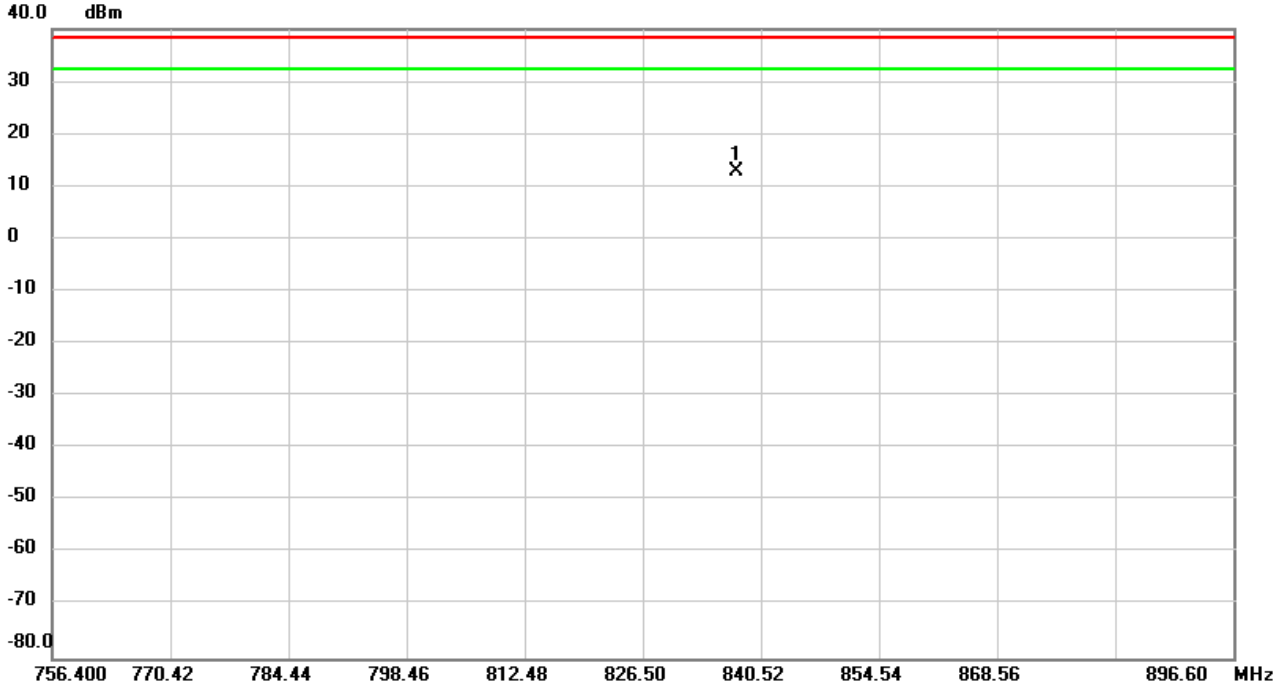
Test Mode	Band V	Test Date	2021/8/30
Test Channel	CH4407	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	835.4261	-26.01	33.89	7.88	38.45	-30.57	peak	

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

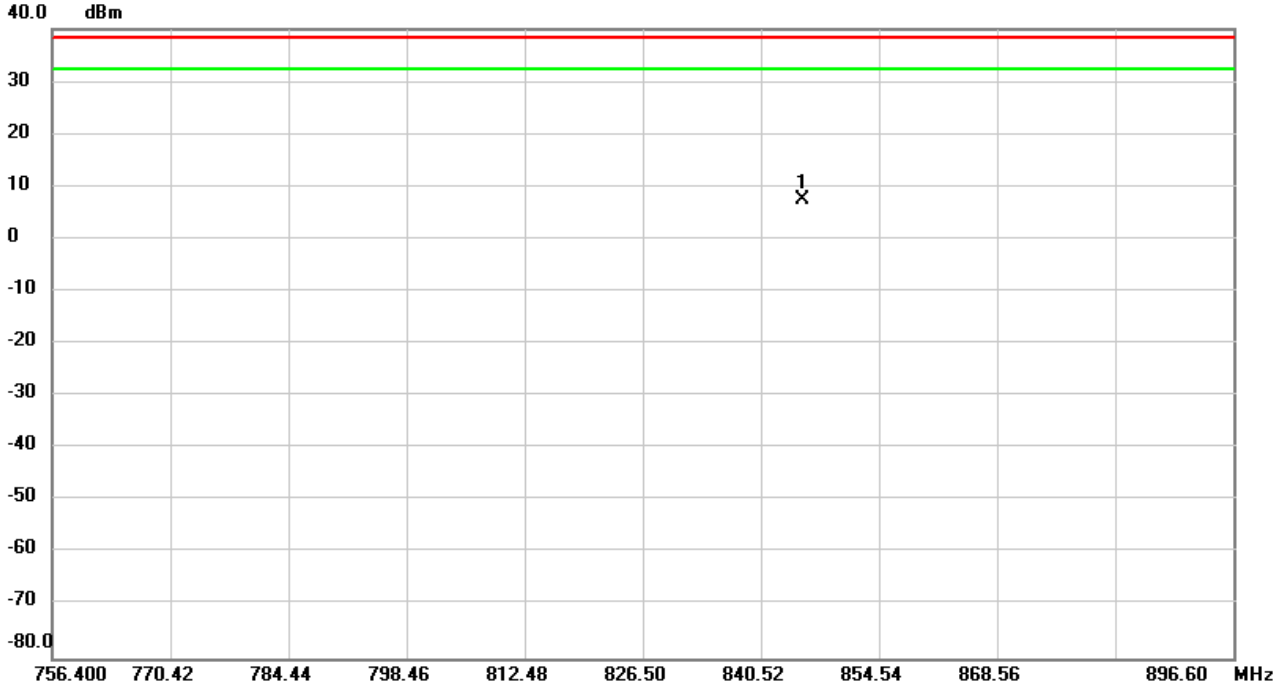
Test Mode	Band V	Test Date	2021/8/30
Test Channel	CH4407	Polarization	Horizontal
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	837.6833	-20.48	33.22	12.74	38.45	-25.71	peak	

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

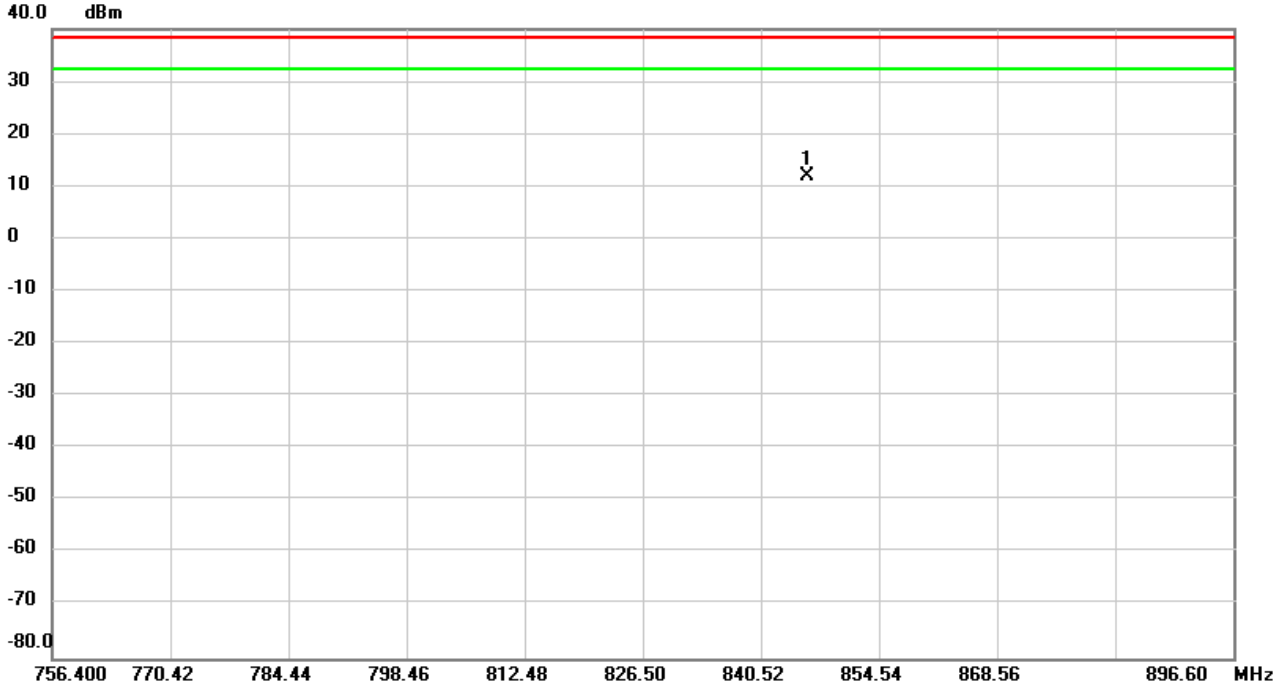
Test Mode	Band V	Test Date	2021/8/30
Test Channel	CH4458	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	845.5672	-26.31	33.77	7.46	38.45	-30.99	peak	

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

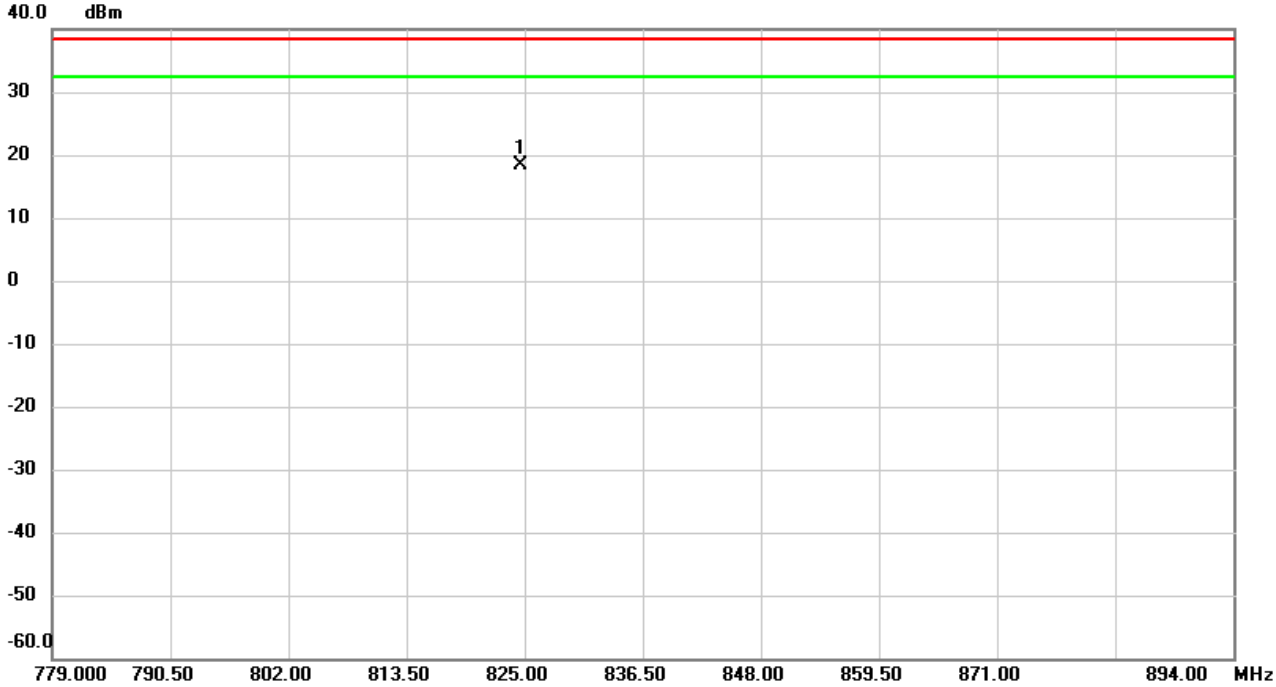
Test Mode	Band V	Test Date	2021/8/30
Test Channel	CH4458	Polarization	Horizontal
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	845.9411	-20.91	33.00	12.09	38.45	-26.36	peak	

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

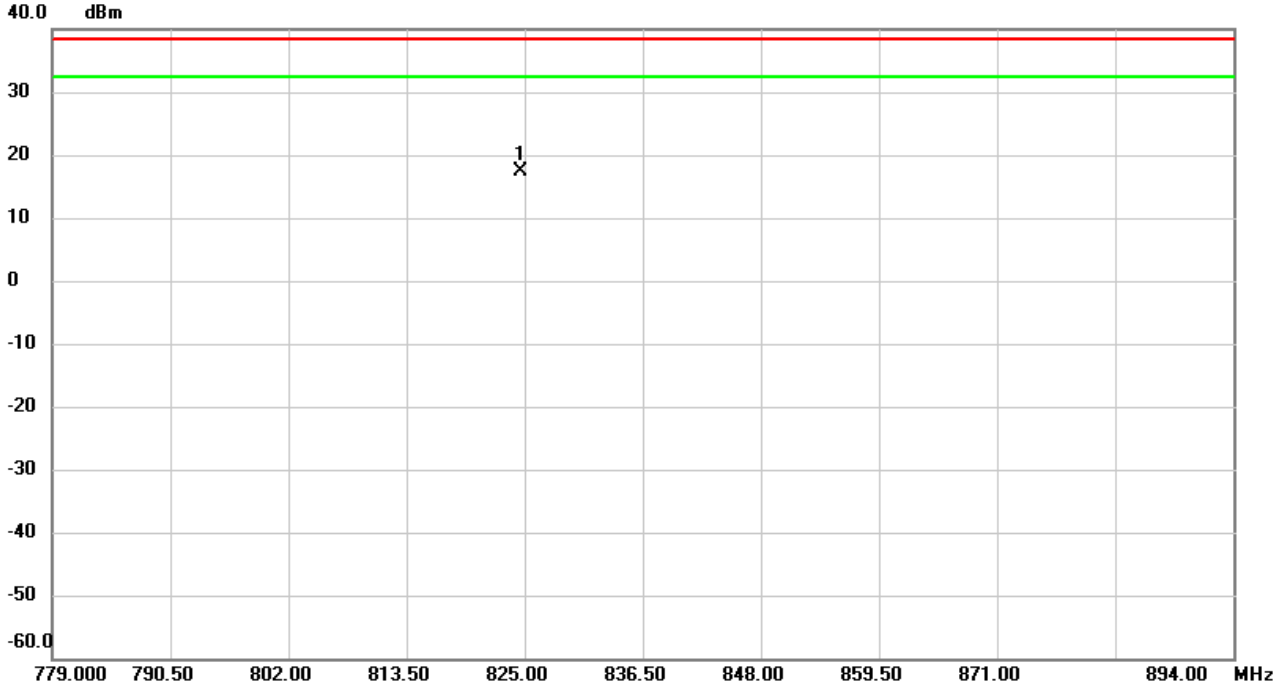
Test Mode	LTE Band 5	Test Date	2021/8/30
Test Channel	CH20450	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	824.6396	-15.75	34.02	18.27	38.45	-20.18	peak	

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

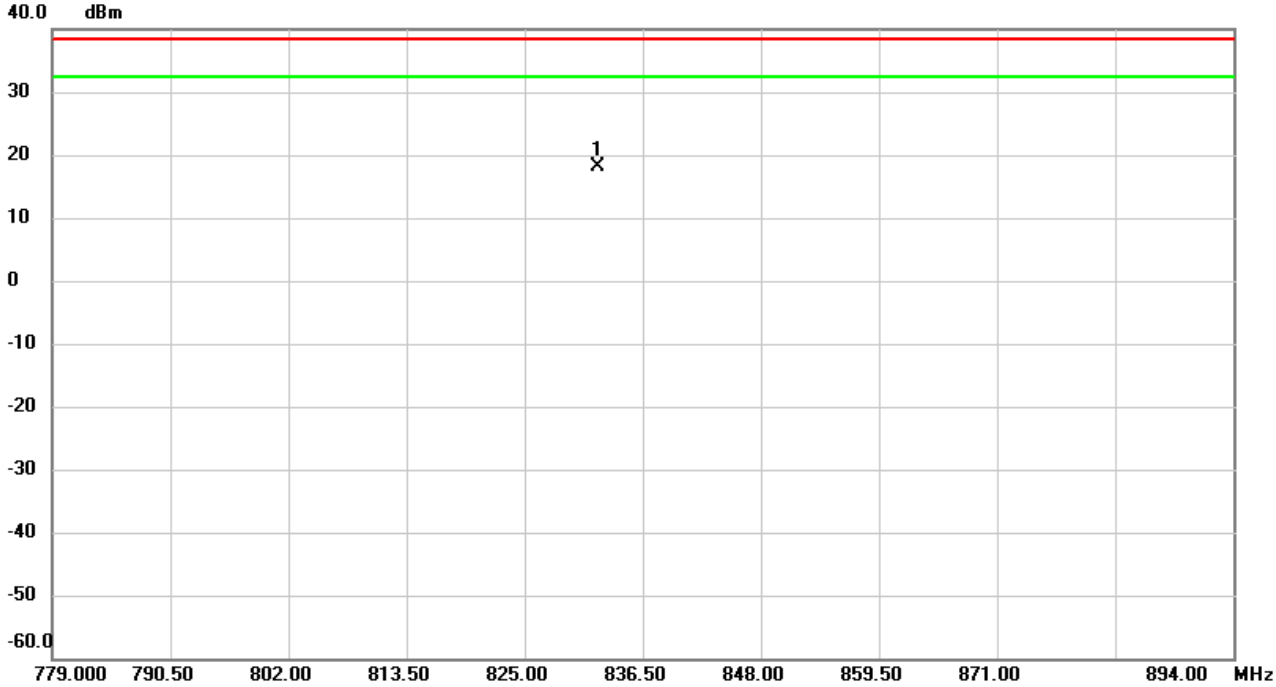
Test Mode	LTE Band 5	Test Date	2021/8/30
Test Channel	CH20450	Polarization	Horizontal
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	824.5898	-16.07	33.55	17.48	38.45	-20.97	peak	

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

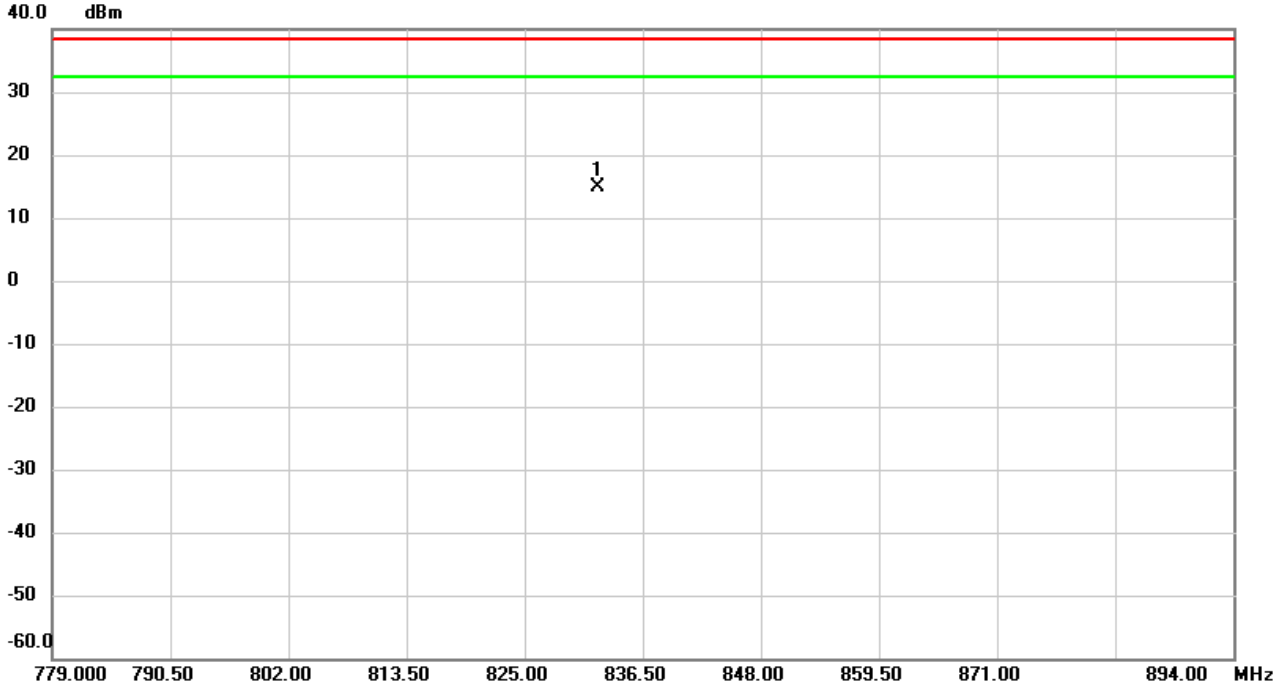
Test Mode	LTE Band 5	Test Date	2021/8/30
Test Channel	CH20525	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	832.0878	-15.84	33.93	18.09	38.45	-20.36	peak	

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

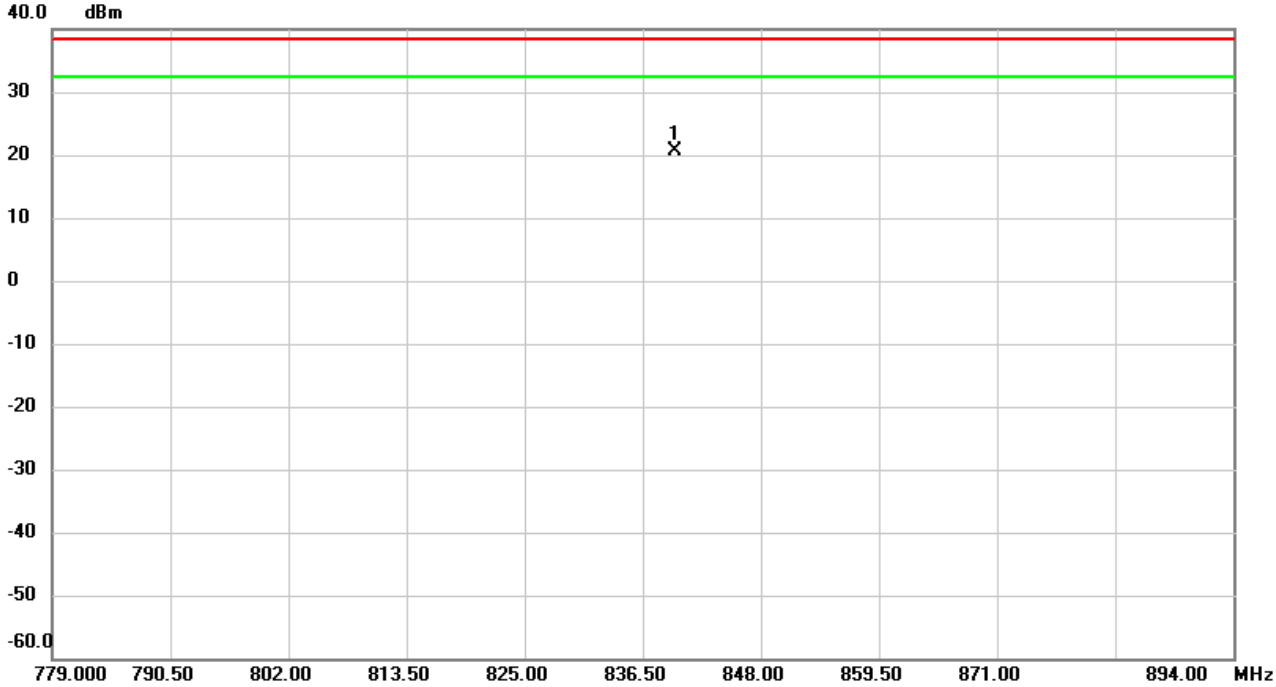
Test Mode	LTE Band 5	Test Date	2021/8/30
Test Channel	CH20525	Polarization	Horizontal
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	832.0993	-18.59	33.36	14.77	38.45	-23.68	peak	

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

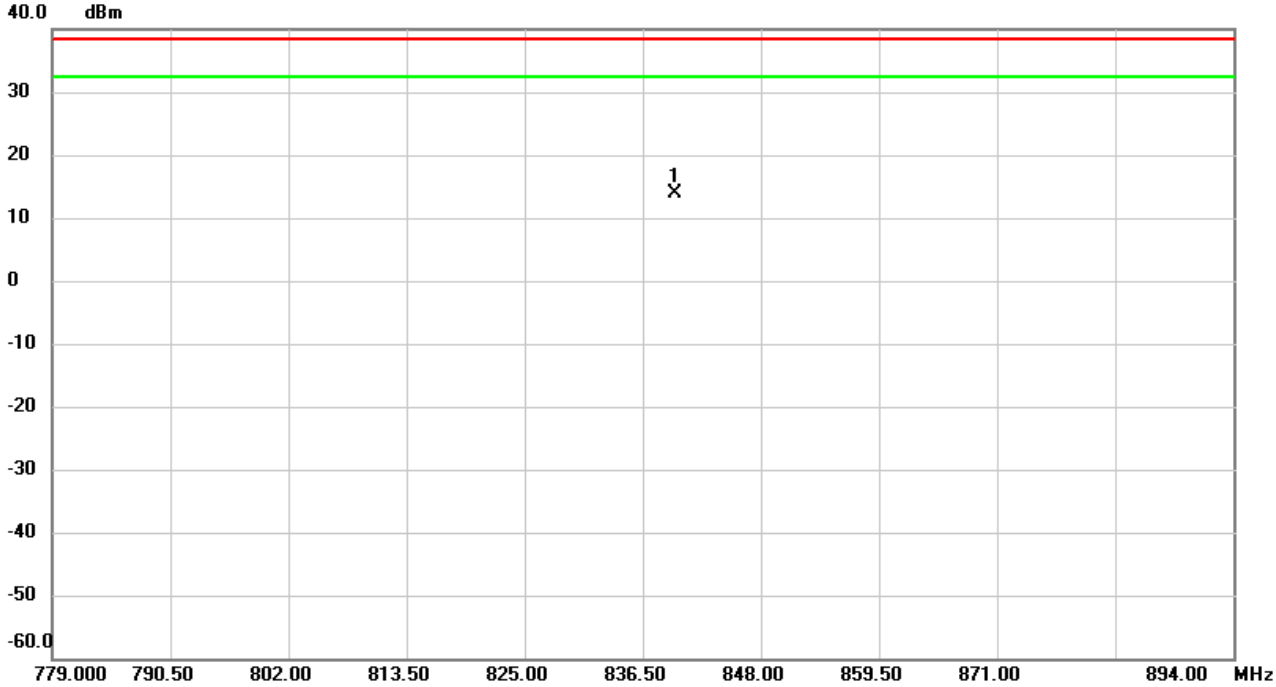
Test Mode	LTE Band 5	Test Date	2021/8/30
Test Channel	CH20600	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	839.6088	-13.19	33.84	20.65	38.45	-17.80	peak	

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

Test Mode	LTE Band 5	Test Date	2021/8/30
Test Channel	CH20600	Polarization	Horizontal
Temp	23°C	Hum.	58%

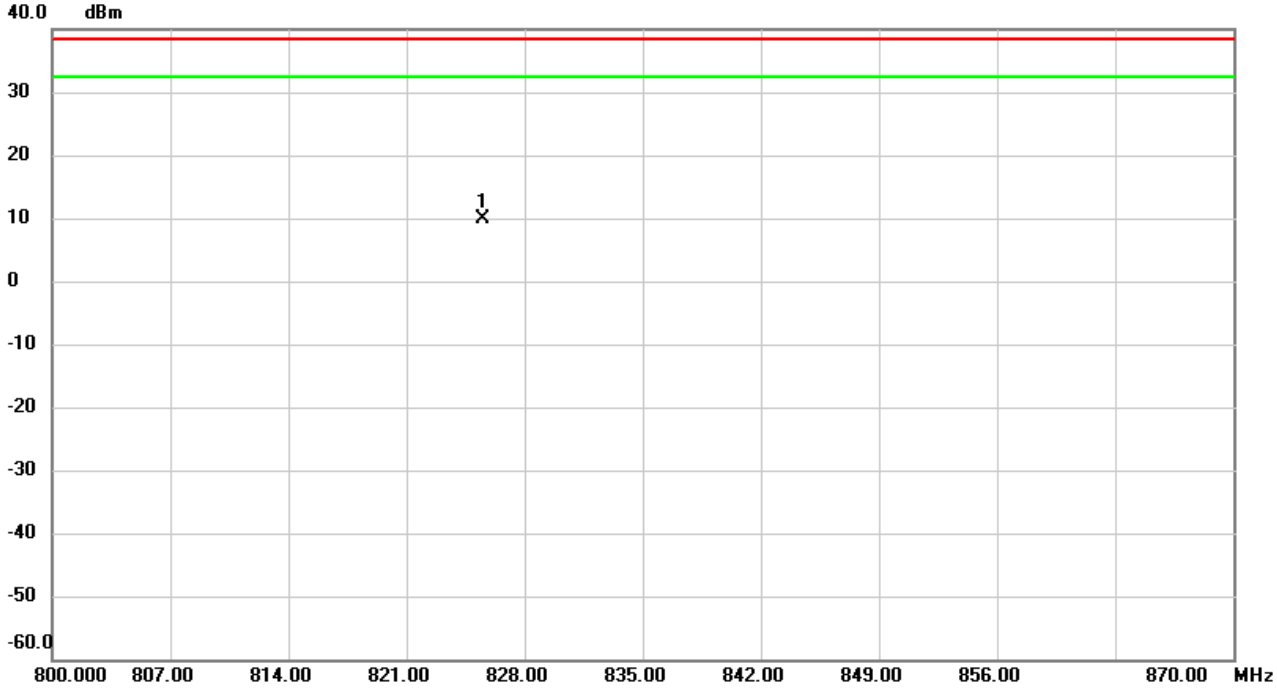


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	839.6050	-19.20	33.17	13.97	38.45	-24.48	peak	

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

For Built-in antenna:

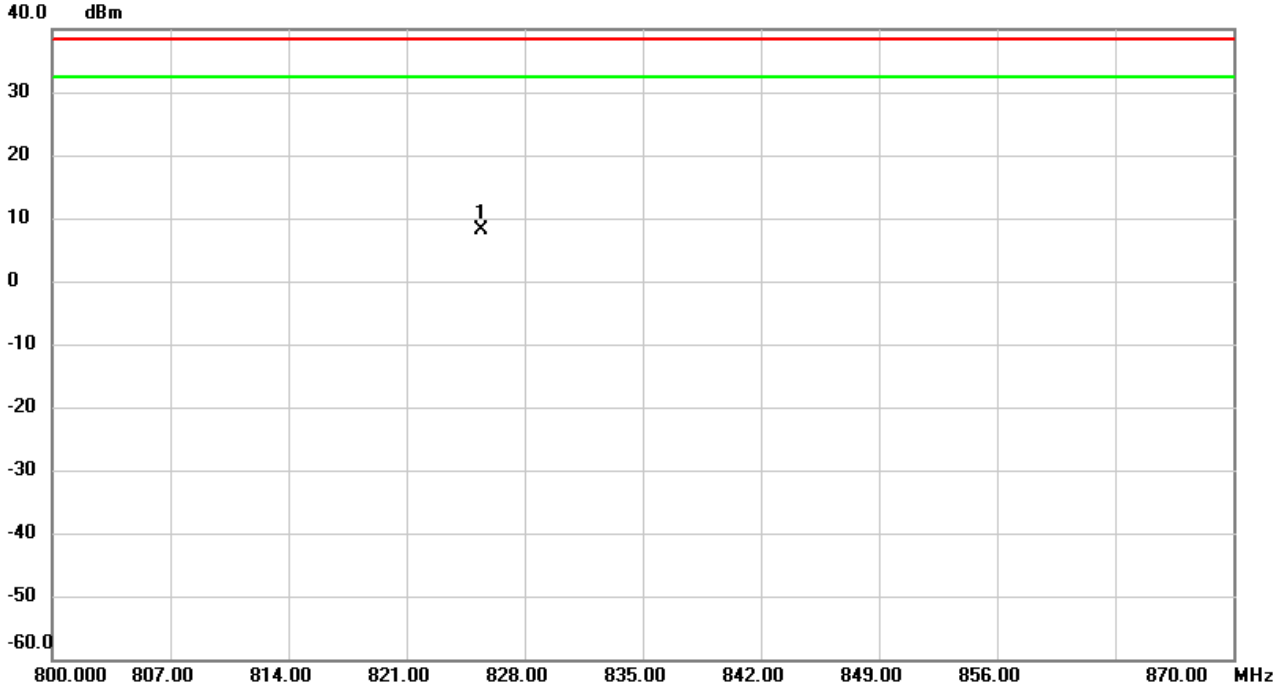
Test Mode	WCDMA Band V	Test Date	2021/5/8
Test Channel	CH 4357	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	825.5383	-24.47	34.26	9.79	38.45	-28.66	peak	

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

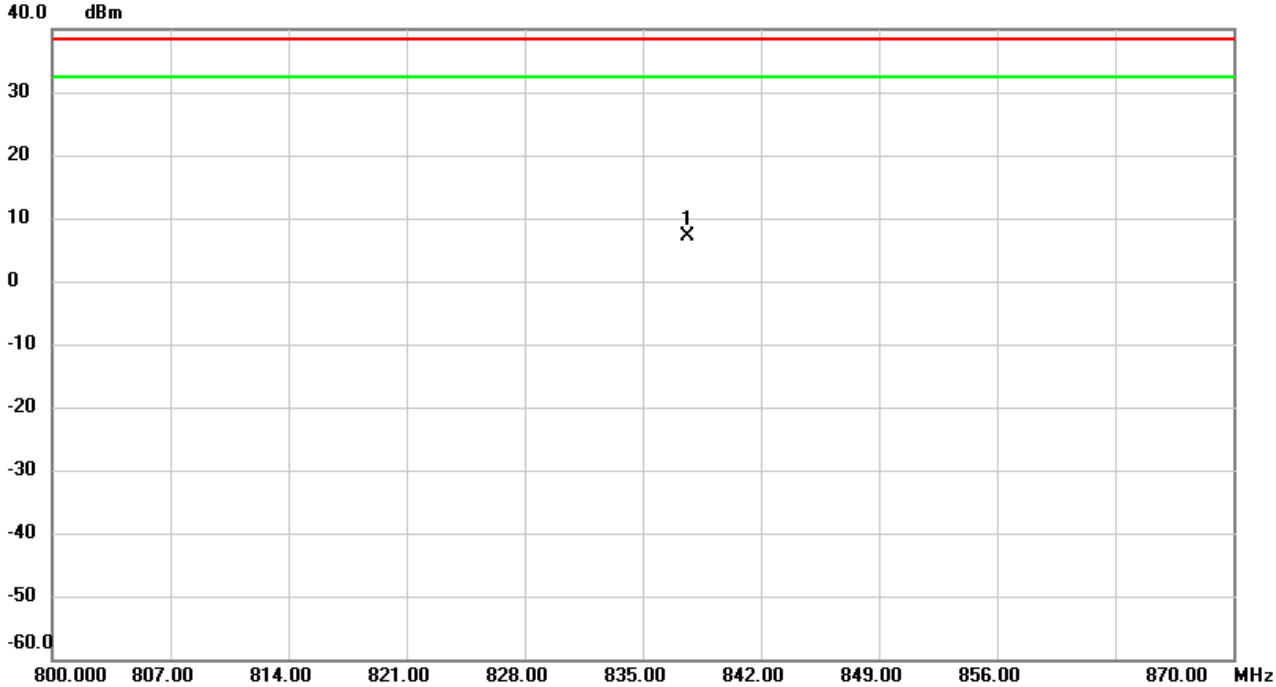
Test Mode	WCDMA Band V	Test Date	2021/5/8
Test Channel	CH 4357	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	825.4777	-25.40	33.55	8.15	38.45	-30.30	peak	

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

Test Mode	WCDMA Band V	Test Date	2021/5/8
Test Channel	CH 4407	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	*	837.6297	-27.22	34.23	7.01	38.45	-31.44	peak	

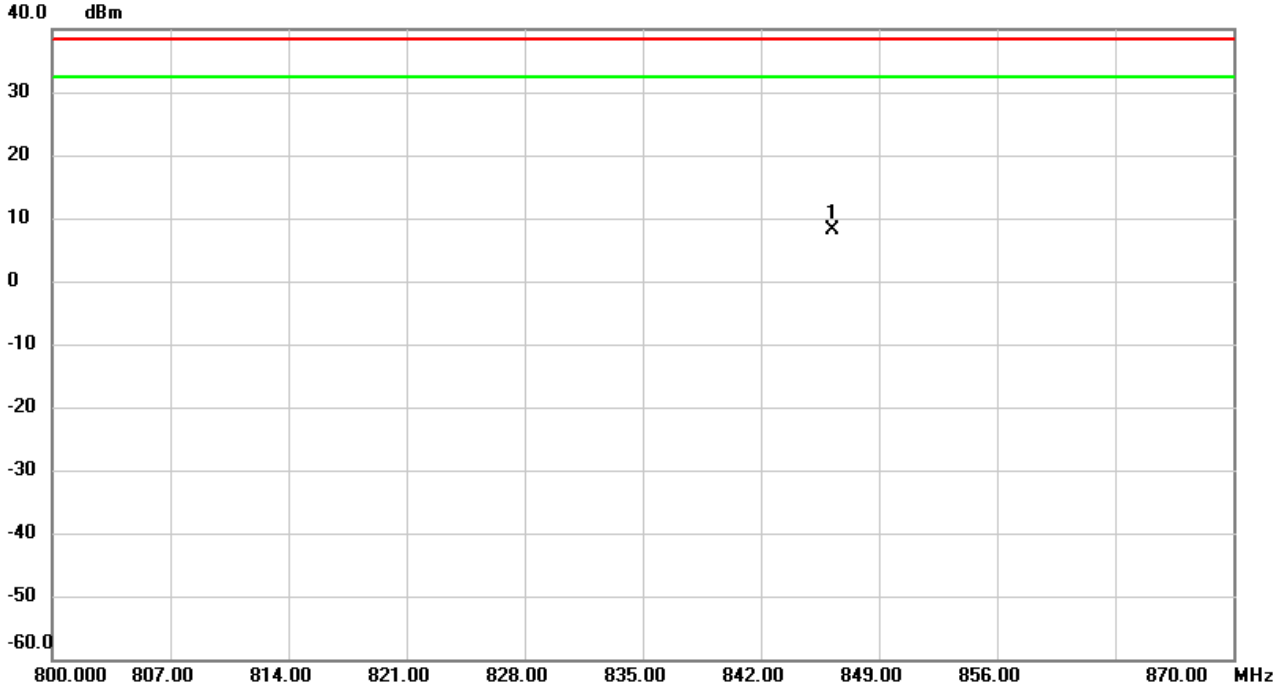
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	WCDMA Band V	Test Date	2021/5/8
Test Channel	CH 4407	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	*	838.0310	-26.58	33.52	6.94	38.45	-31.51	peak	

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

Test Mode	WCDMA Band V	Test Date	2021/5/8
Test Channel	CH 4458	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	*	846.2863	-26.01	34.20	8.19	38.45	-30.26	peak	

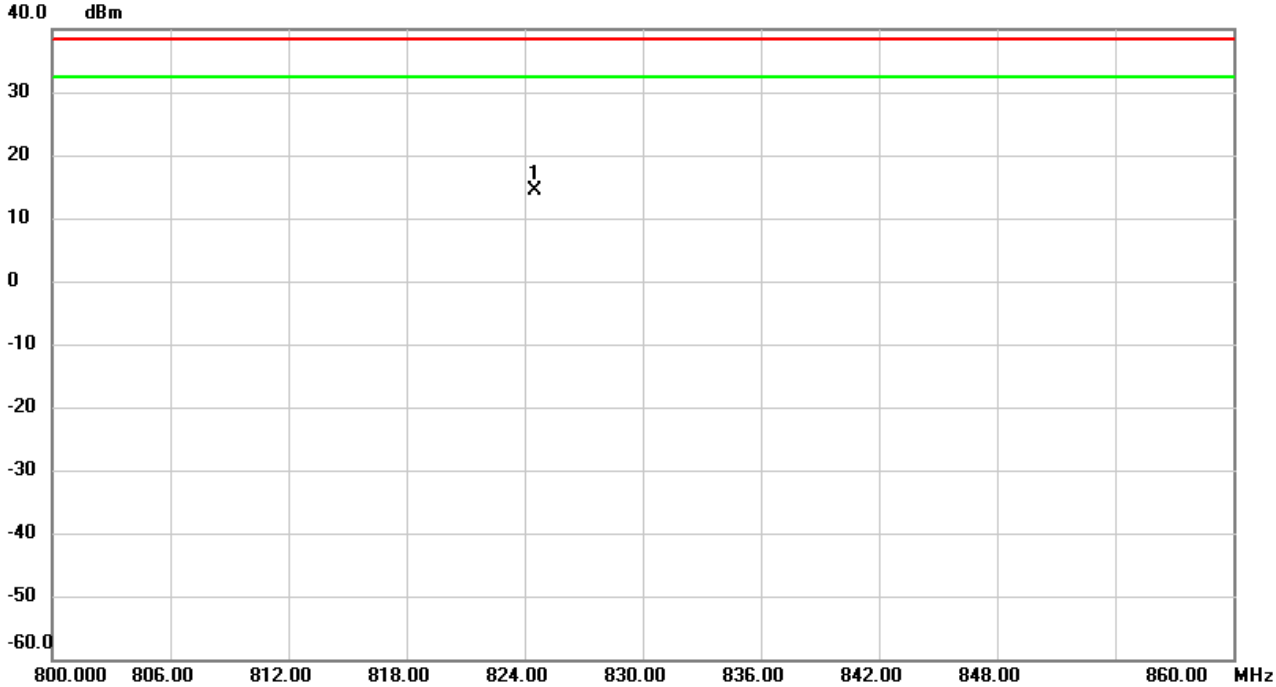
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	WCDMA Band V	Test Date	2021/5/8
Test Channel	CH 4458	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	*	845.4160	-25.35	33.50	8.15	38.45	-30.30	peak	

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

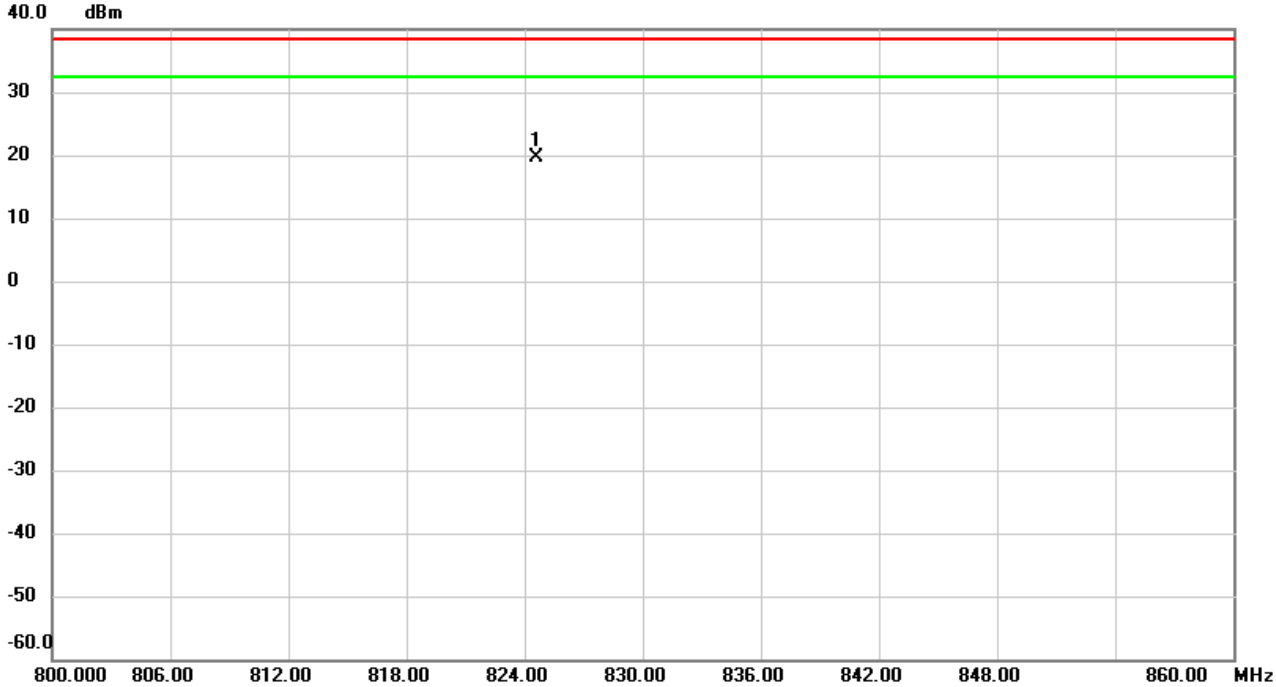
Test Mode	LTE Band 5	Test Date	2021/5/8
Test Channel	CH 20450	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	824.5480	-19.80	34.27	14.47	38.45	-23.98	peak	

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

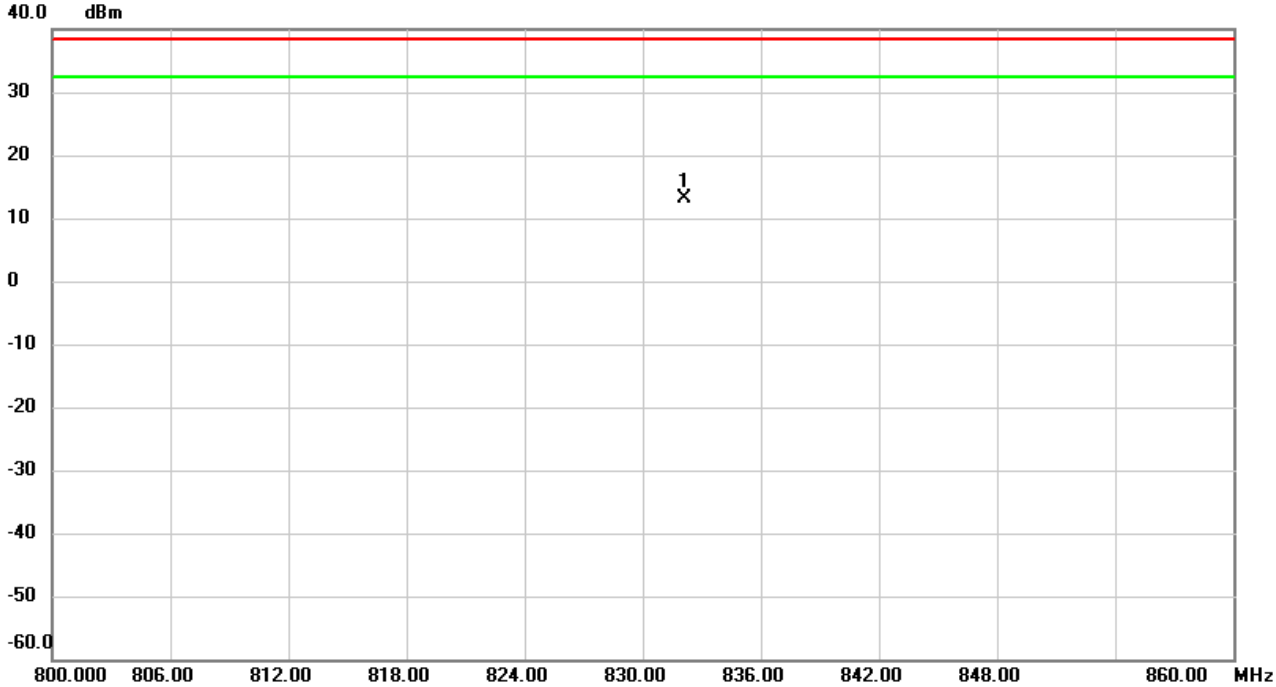
Test Mode	LTE Band 5	Test Date	2021/5/8
Test Channel	CH 20450	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	824.5940	-13.94	33.55	19.61	38.45	-18.84	peak	

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

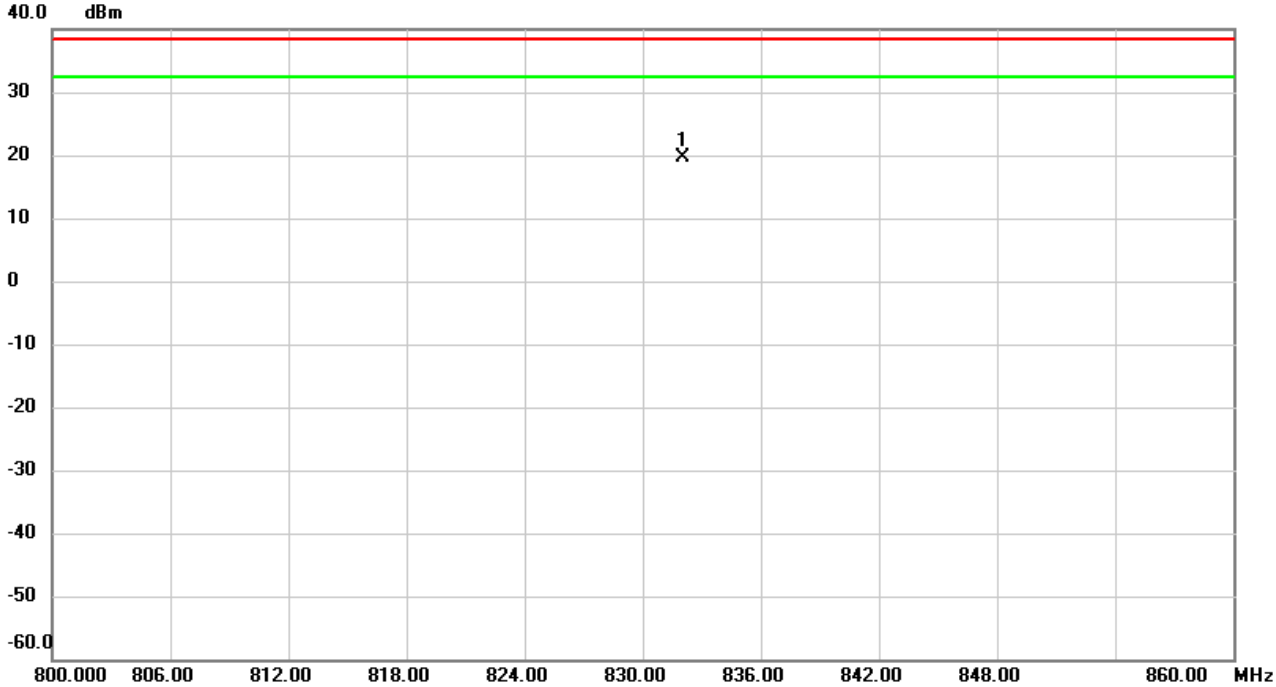
Test Mode	LTE Band 5	Test Date	2021/5/8
Test Channel	CH 20525	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	832.1360	-21.05	34.24	13.19	38.45	-25.26	peak	

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

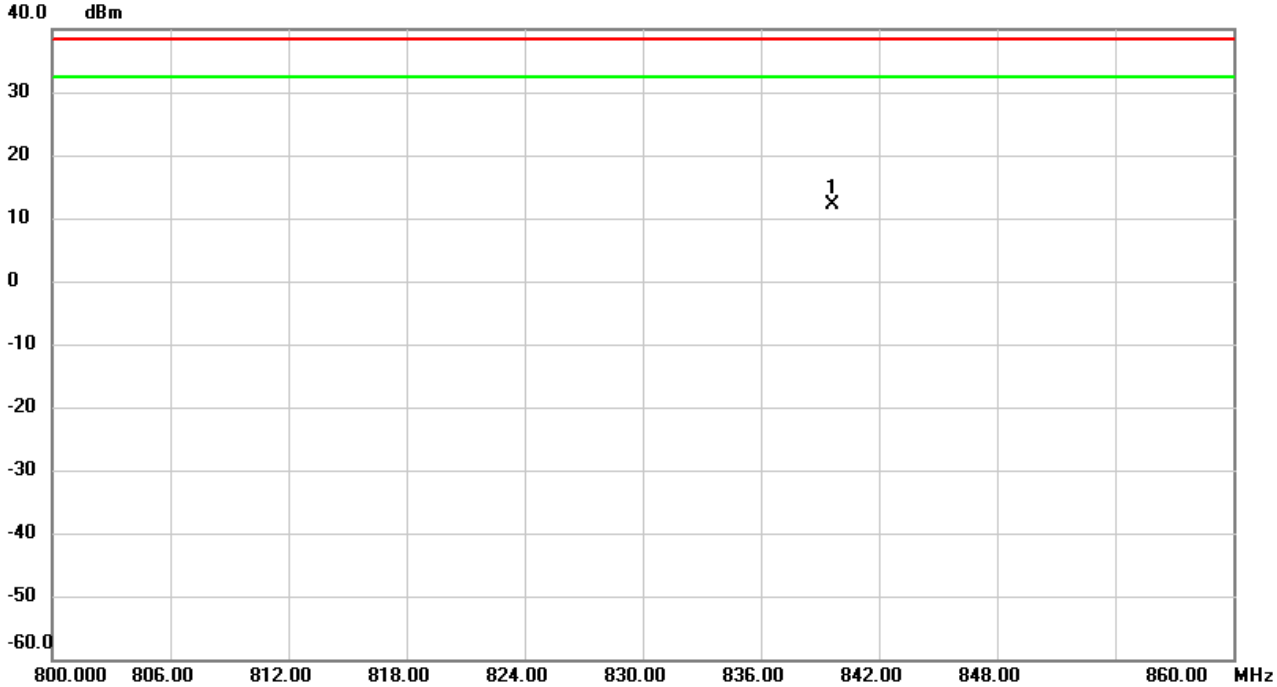
Test Mode	LTE Band 5	Test Date	2021/5/8
Test Channel	CH 20525	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	832.0480	-13.91	33.53	19.62	38.45	-18.83	peak	

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

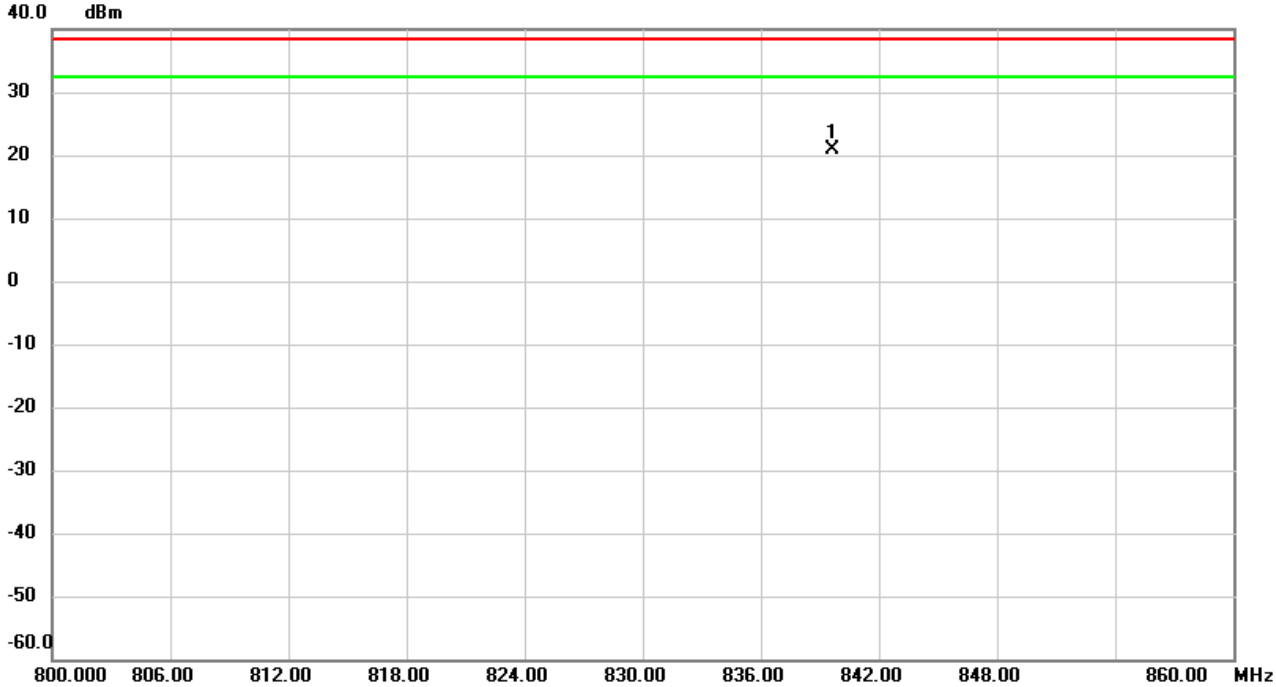
Test Mode	LTE Band 5	Test Date	2021/5/8
Test Channel	CH 20600	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	839.6140	-22.01	34.22	12.21	38.45	-26.24	peak	

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

Test Mode	LTE Band 5	Test Date	2021/5/8
Test Channel	CH 20600	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	*	839.6180	-12.54	33.51	20.97	38.45	-17.48	peak	

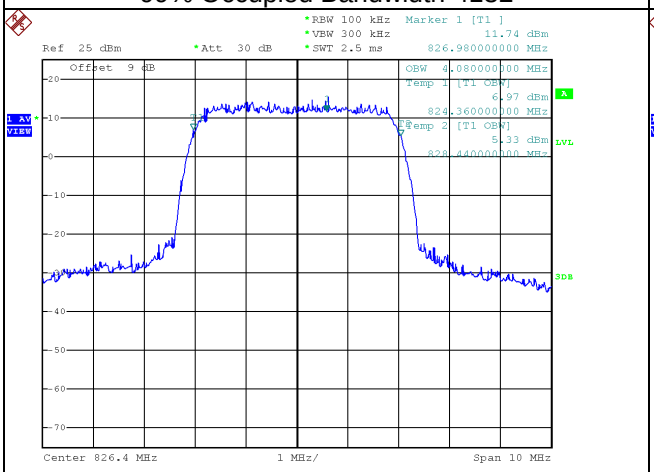
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

APPENDIX B OCCUPIED BANDWIDTH

WCDMA Band V_WCDMA					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
4132	826.4	4.08	4132	826.4	4.62
4183	836.6	4.08	4183	836.3	4.60
4233	846.6	4.06	4233	846.6	4.68

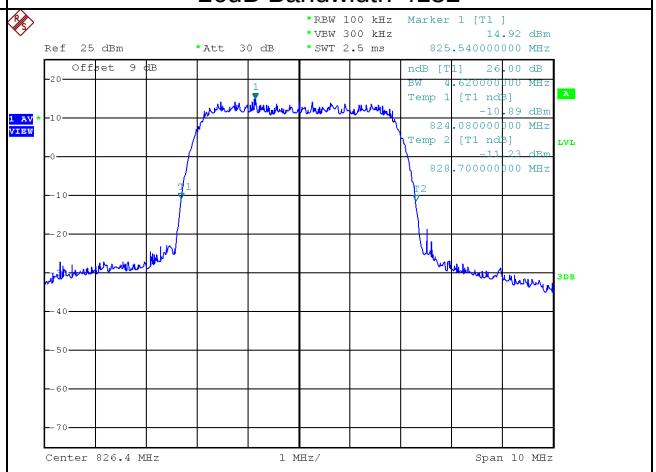
Spectrum Plot

99% Occupied Bandwidth-4132



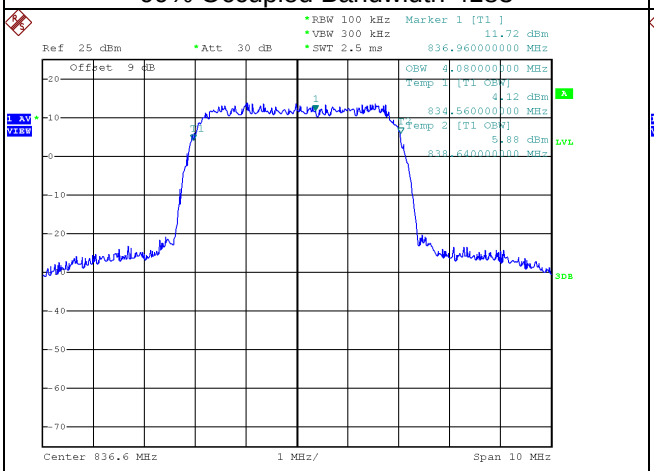
Date: 21.APR.2021 21:07:08

26dB Bandwidth-4132



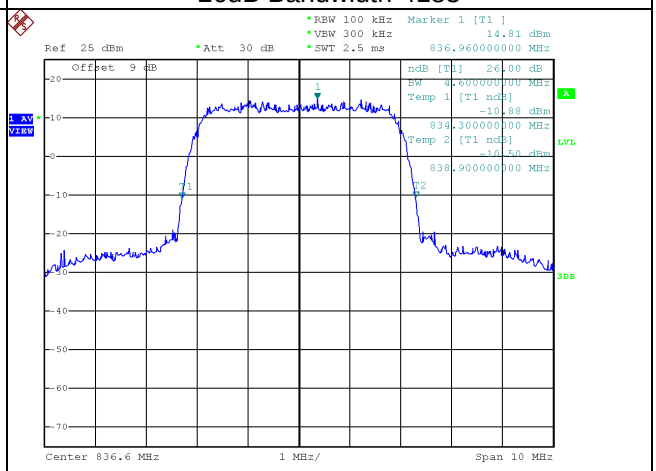
Date: 21.APR.2021 21:08:21

99% Occupied Bandwidth-4183

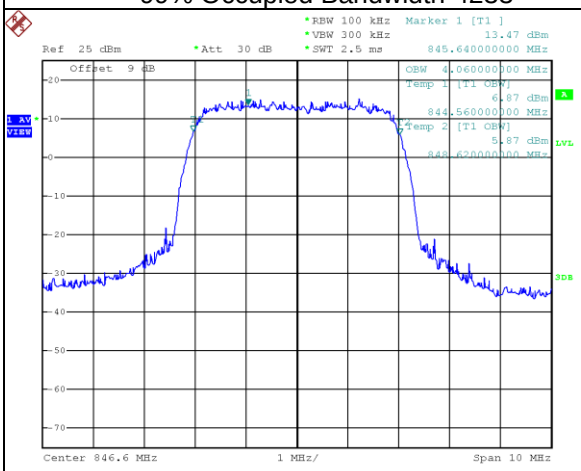
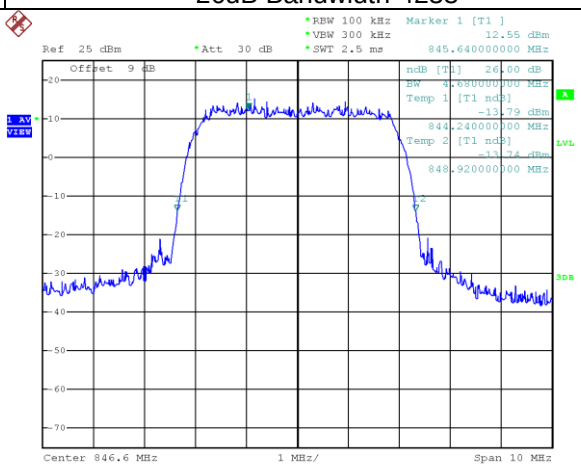


Date: 21.APR.2021 21:04:31

26dB Bandwidth-4183



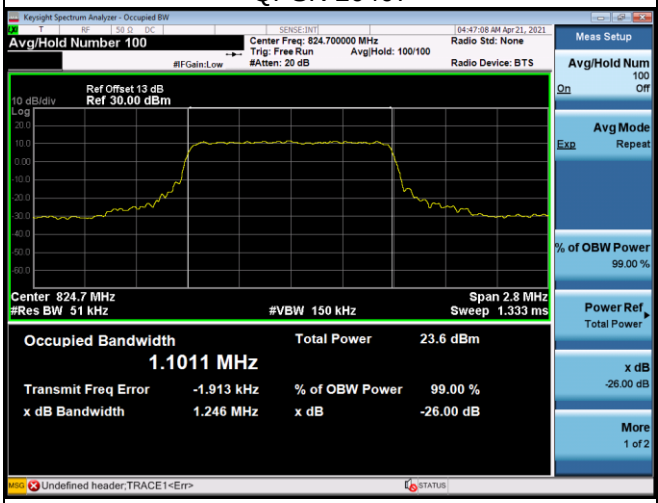
Date: 21.APR.2021 21:03:24

99% Occupied Bandwidth-4233	26dB Bandwidth-4233
	
Date: 21.APR.2021 20:59:21	Date: 21.APR.2021 21:01:13

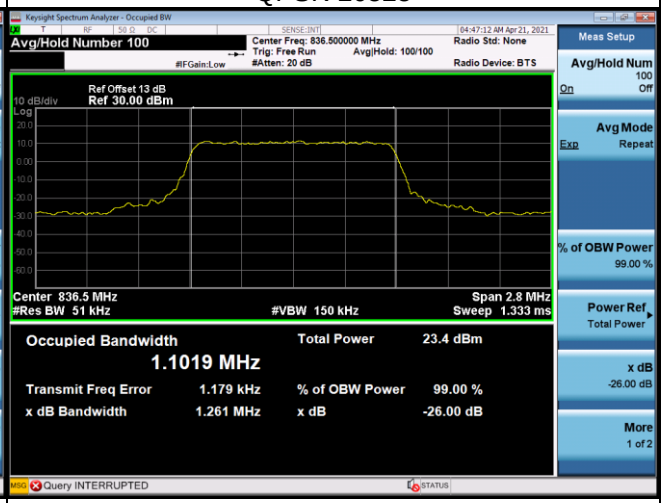
LTE Band 5_1.4M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20407	824.7	1.1011	20407	824.7	1.246
20525	836.5	1.1019	20525	836.5	1.261
20643	848.3	1.1056	20643	848.3	1.285
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20407	824.7	1.1045	20407	824.7	1.310
20525	836.5	1.1021	20525	836.5	1.266
20643	848.3	1.1095	20643	848.3	1.301

Spectrum Plot

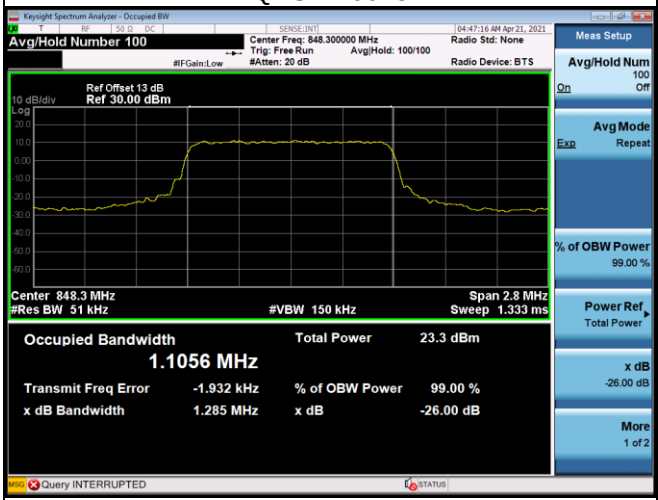
QPSK-20407



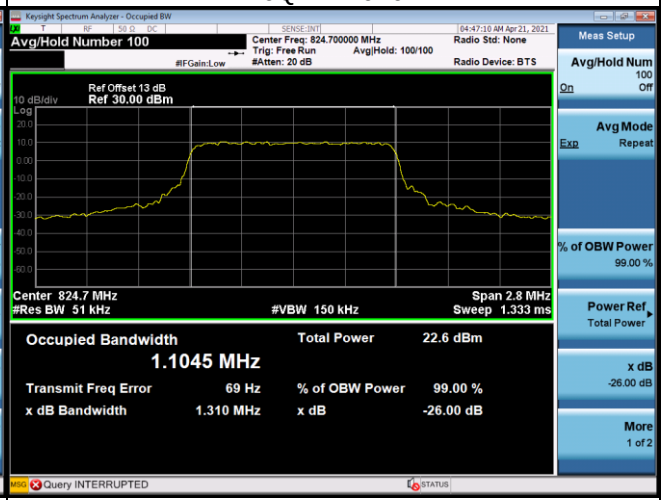
QPSK-20525



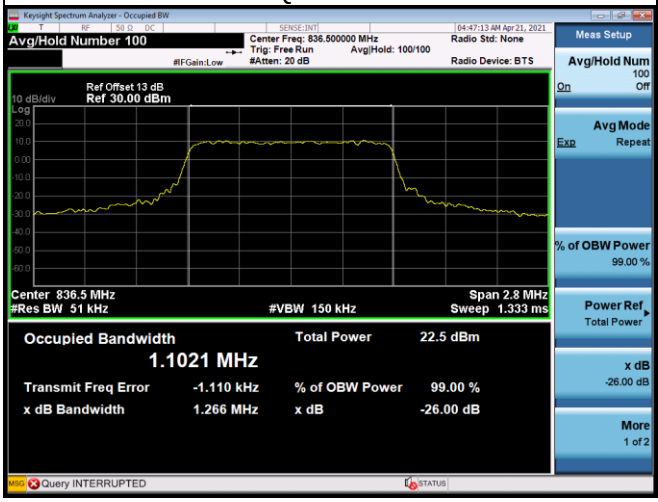
QPSK-20643



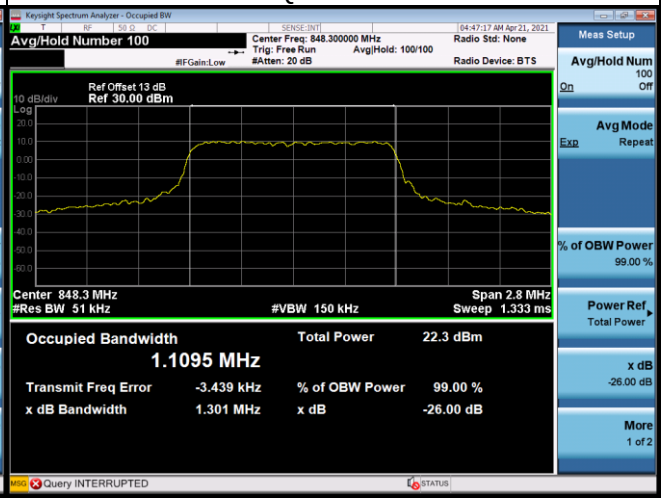
16QAM-20407



16QAM-20525



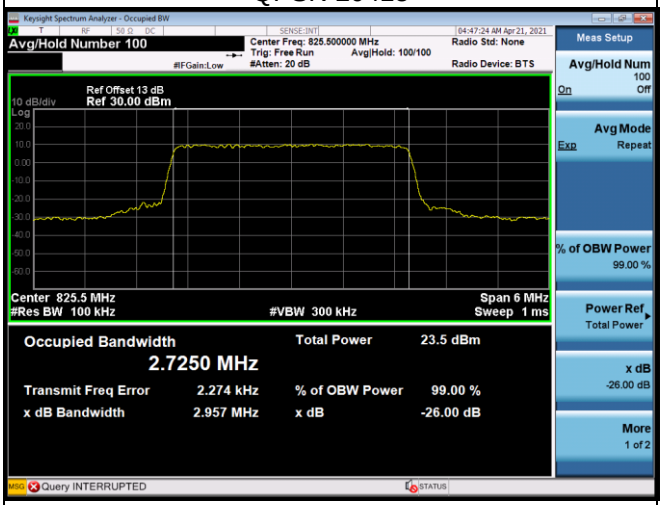
16QAM-20643



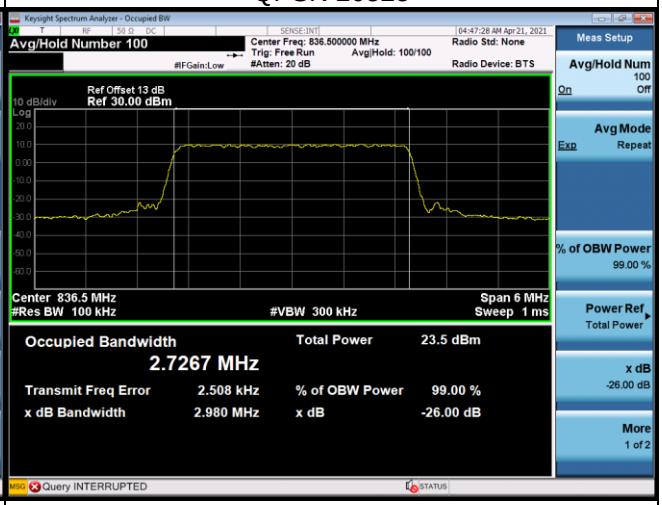
LTE Band 5_3M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20415	825.5	2.7250	20415	825.5	2.957
20525	836.5	2.7267	20525	836.5	2.980
20635	847.5	2.7241	20635	847.5	2.996
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20415	825.5	2.7233	20415	825.5	2.967
20525	836.5	2.7193	20525	836.5	2.973
20635	847.5	2.7170	20635	847.5	2.973

Spectrum Plot

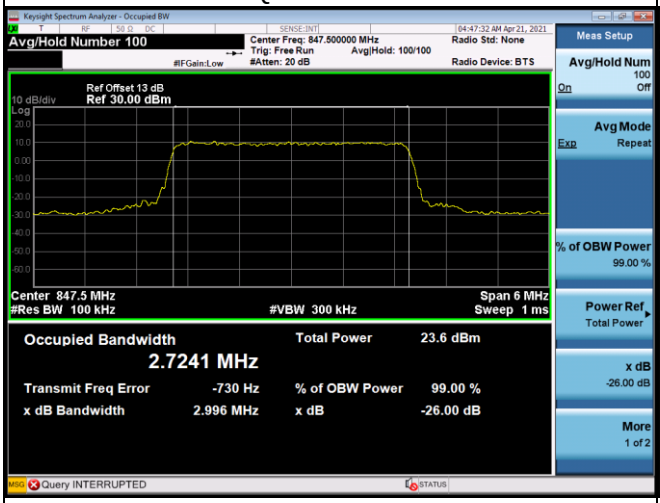
QPSK-20415



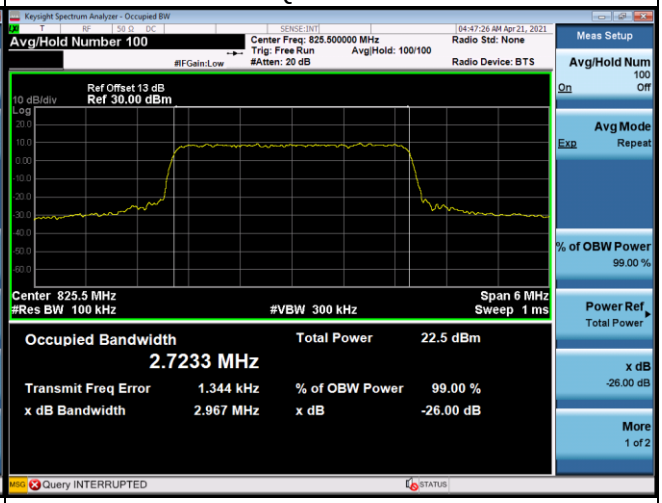
QPSK-20525



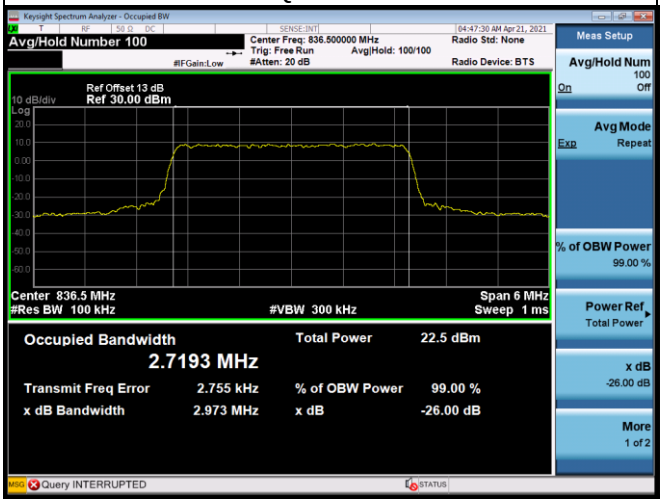
QPSK-20635



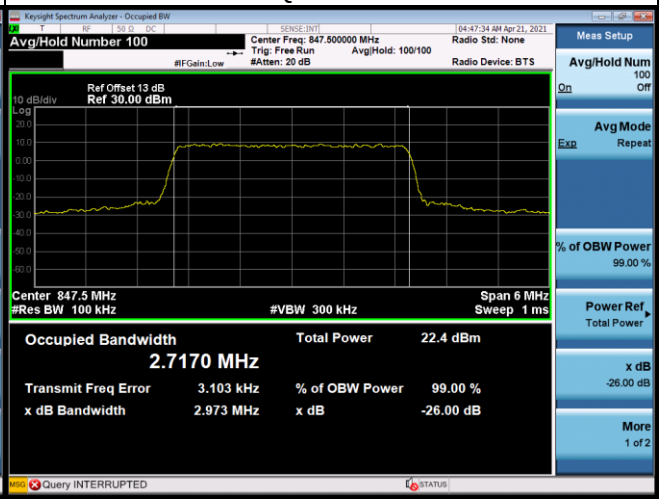
16QAM-20415



16QAM-20525



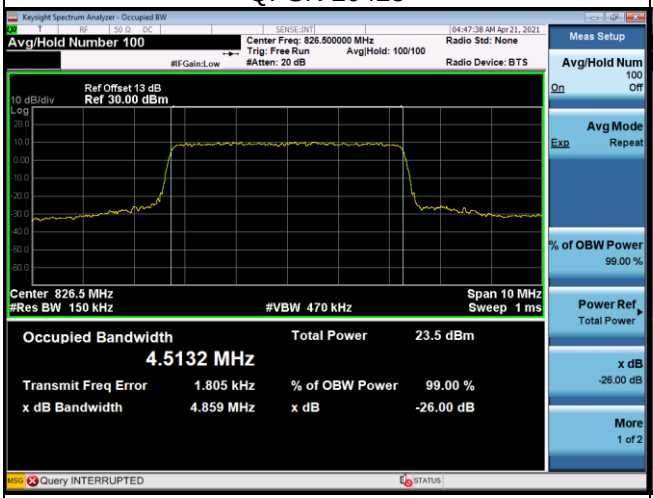
16QAM-20635



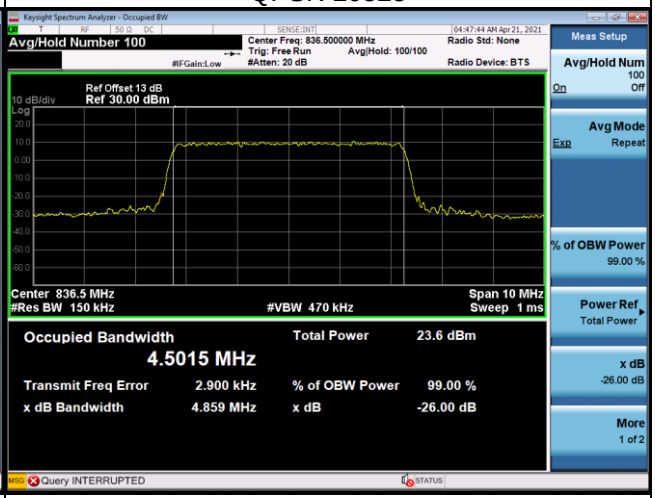
LTE Band 5_5M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20425	826.5	4.5132	20425	826.5	4.859
20525	836.5	4.5015	20525	836.5	4.859
20625	846.5	4.5127	20625	846.5	4.867
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20425	826.5	4.4998	20425	826.5	4.863
20525	836.5	4.4994	20525	836.5	4.876
20625	846.5	4.5025	20625	846.5	4.853

Spectrum Plot

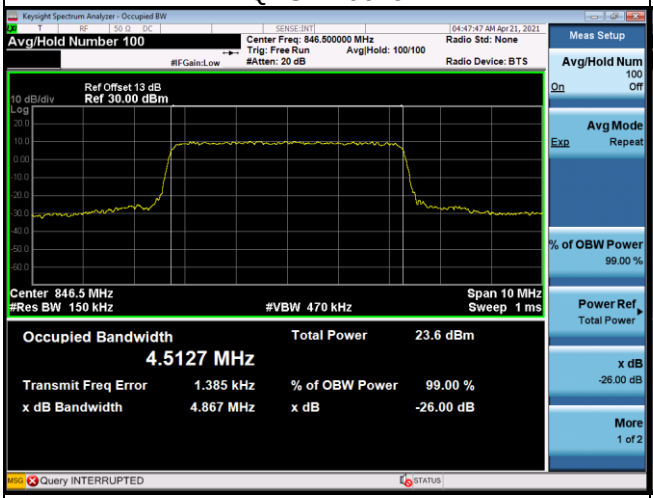
QPSK-20425



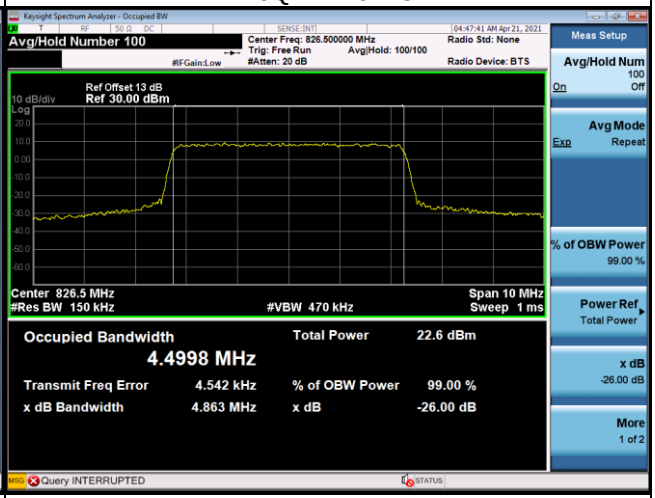
QPSK-20525



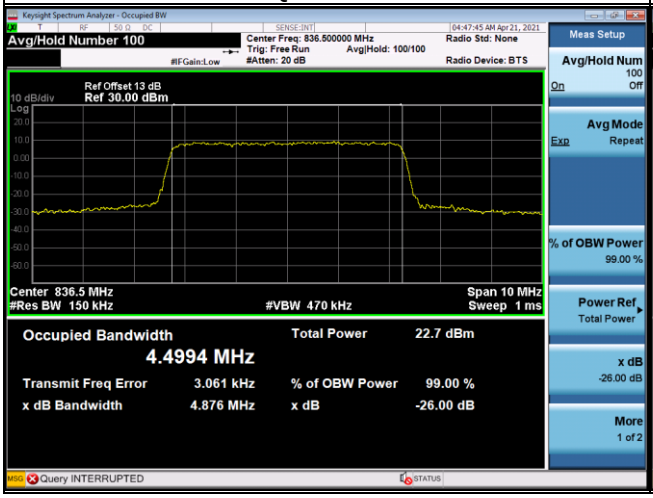
QPSK-20625



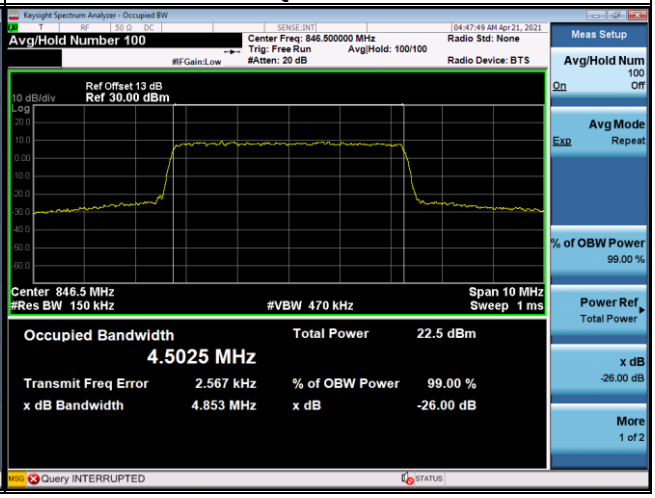
16QAM-20425



16QAM-20525



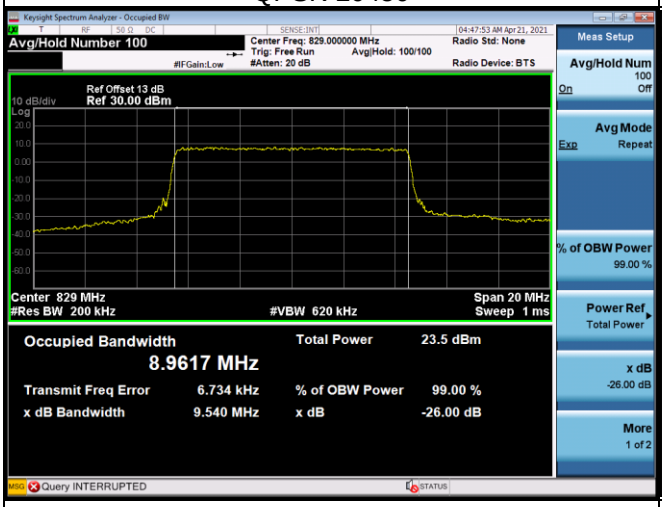
16QAM-20625



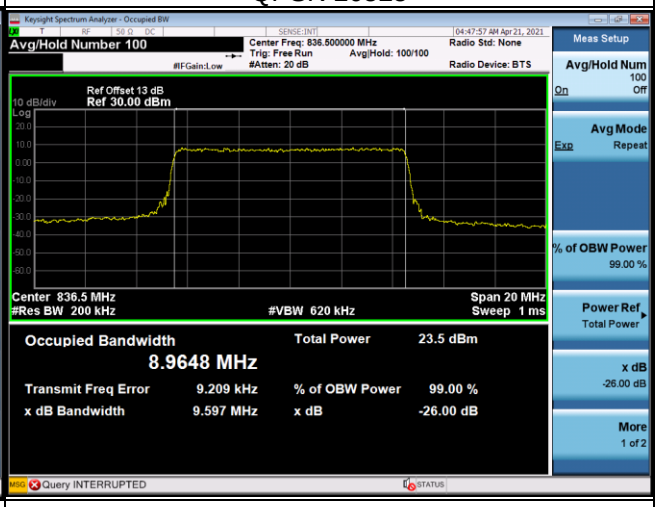
LTE Band 5_10M					
QPSK					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20450	829.0	8.9617	20450	829.0	9.540
20525	836.5	8.9648	20525	836.5	9.597
20600	844.0	8.9552	20600	844.0	9.539
16QAM					
Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)	Channel	Frequency (MHz)	26dB Bandwidth (MHz)
20450	829.0	8.9561	20450	829.0	9.509
20525	836.5	8.9605	20525	836.5	9.522
20600	844.0	8.9518	20600	844.0	9.483

Spectrum Plot

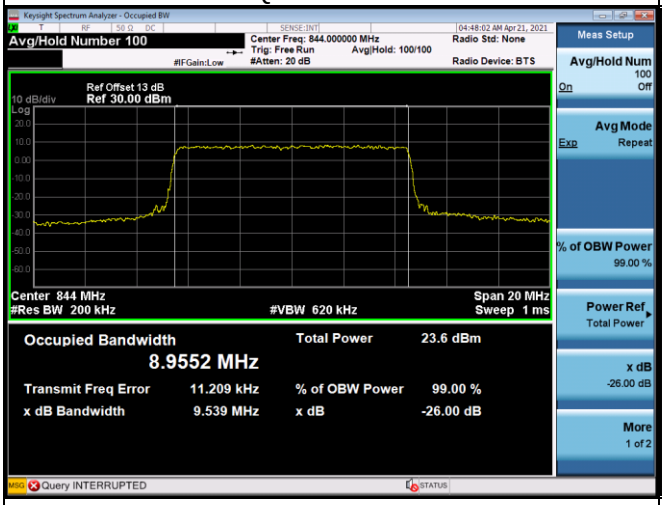
QPSK-20450



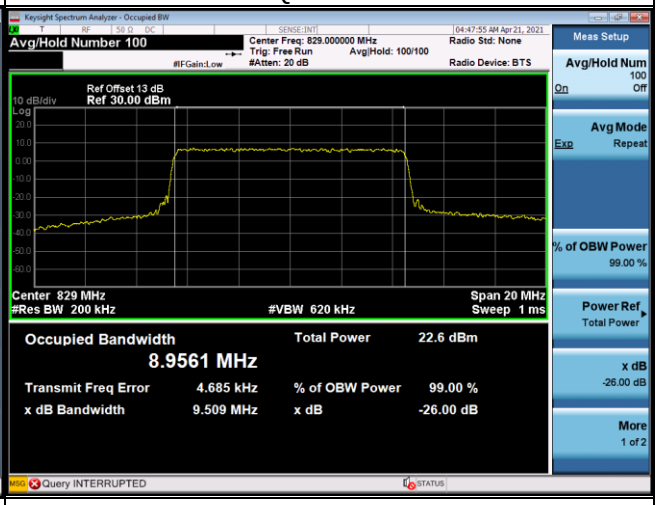
QPSK-20525



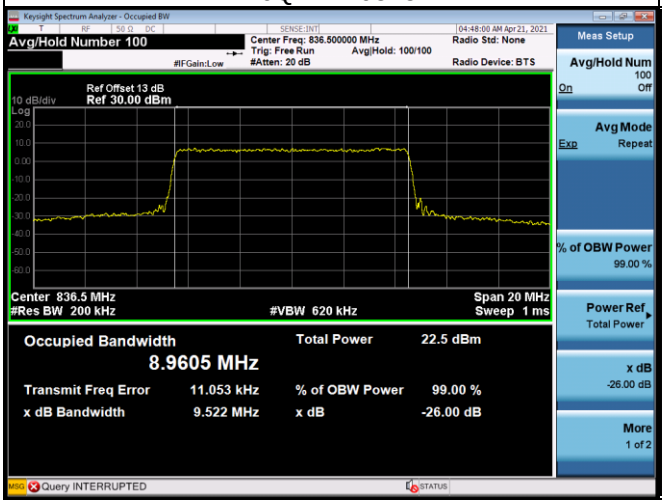
QPSK-20600



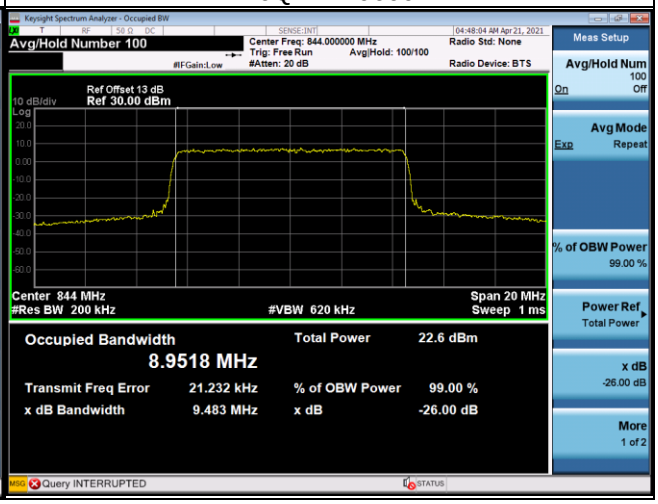
16QAM-20450



16QAM-20525

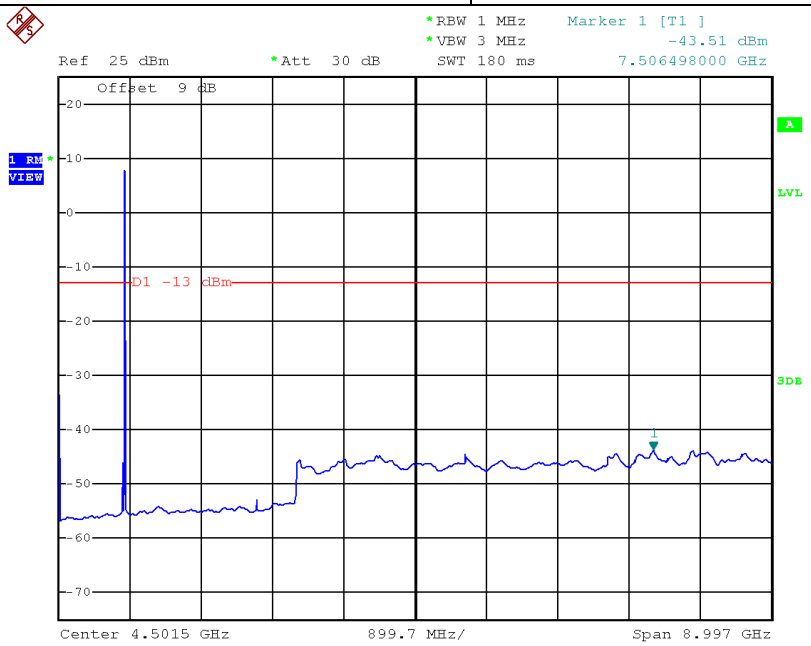


16QAM-20600



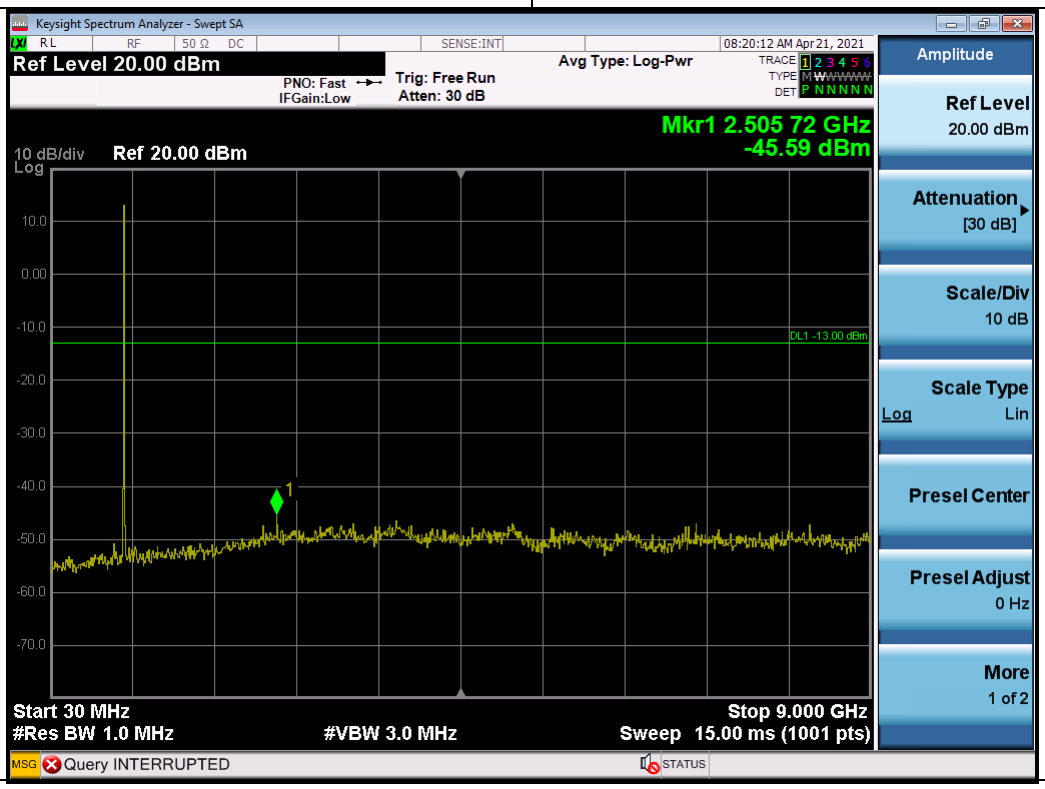
APPENDIX C CONDUCTED SPURIOUS EMISSION

WCDMA Band V_WCDMA Spectrum Plot	
Channel	Frequency(MHz)
4183	836.6

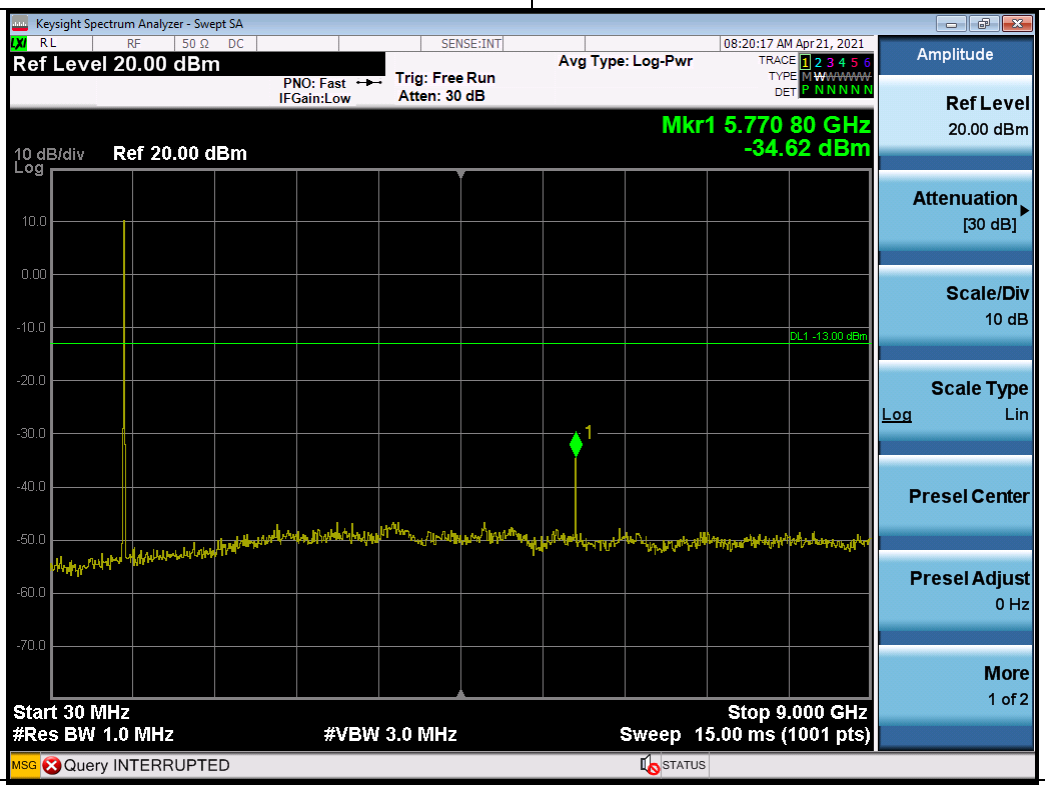


Date: 21.APR.2021 21:53:41

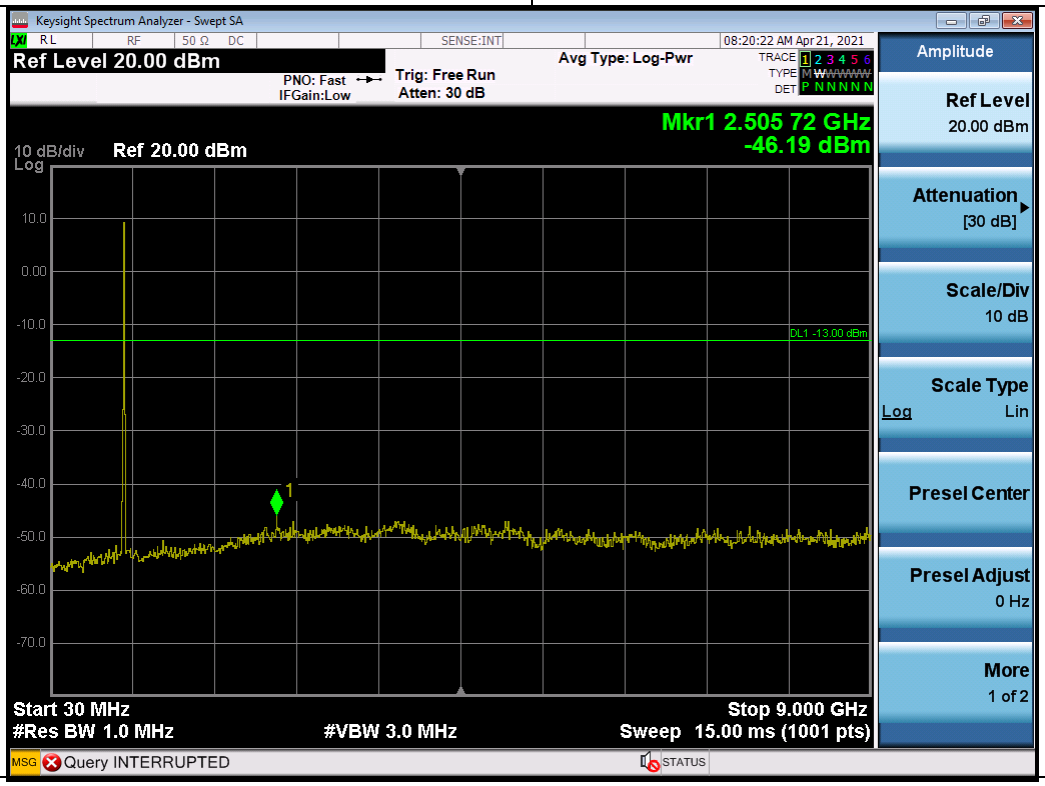
LTE Band 5_1.4M Spectrum Plot	
Channel	Frequency(MHz)
20525	836.5



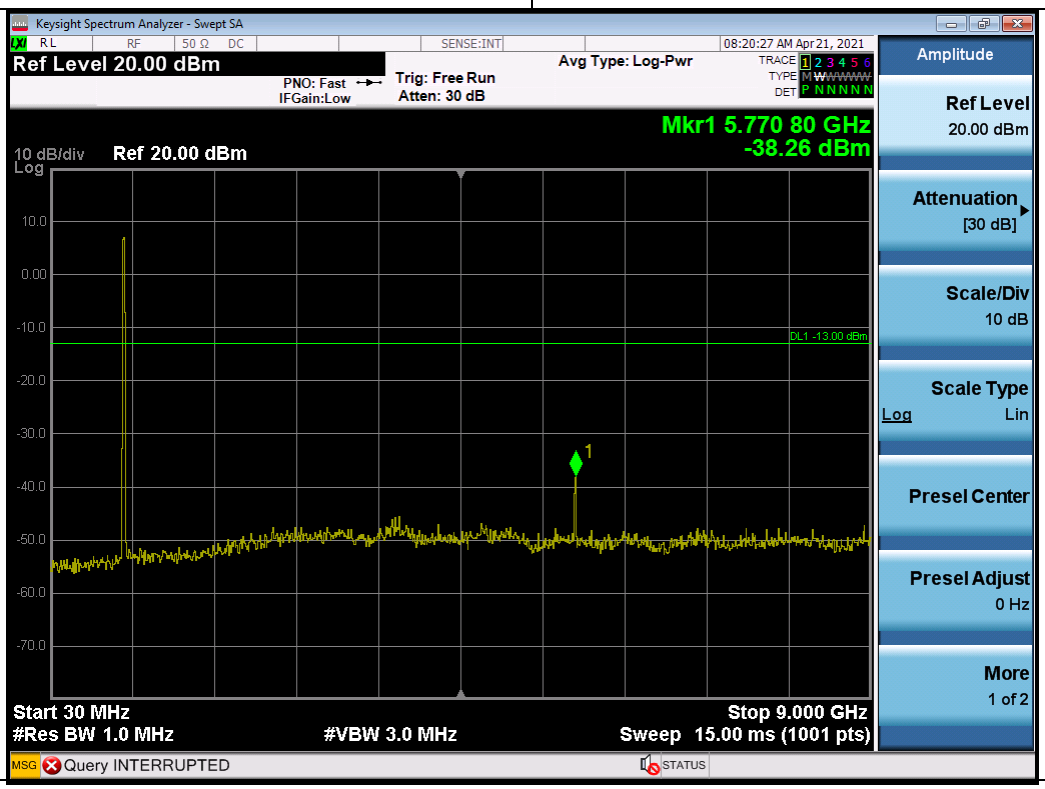
LTE Band 5_3M Spectrum Plot	
Channel	Frequency(MHz)
20525	836.5



LTE Band 5_5M Spectrum Plot	
Channel	Frequency(MHz)
20525	836.5



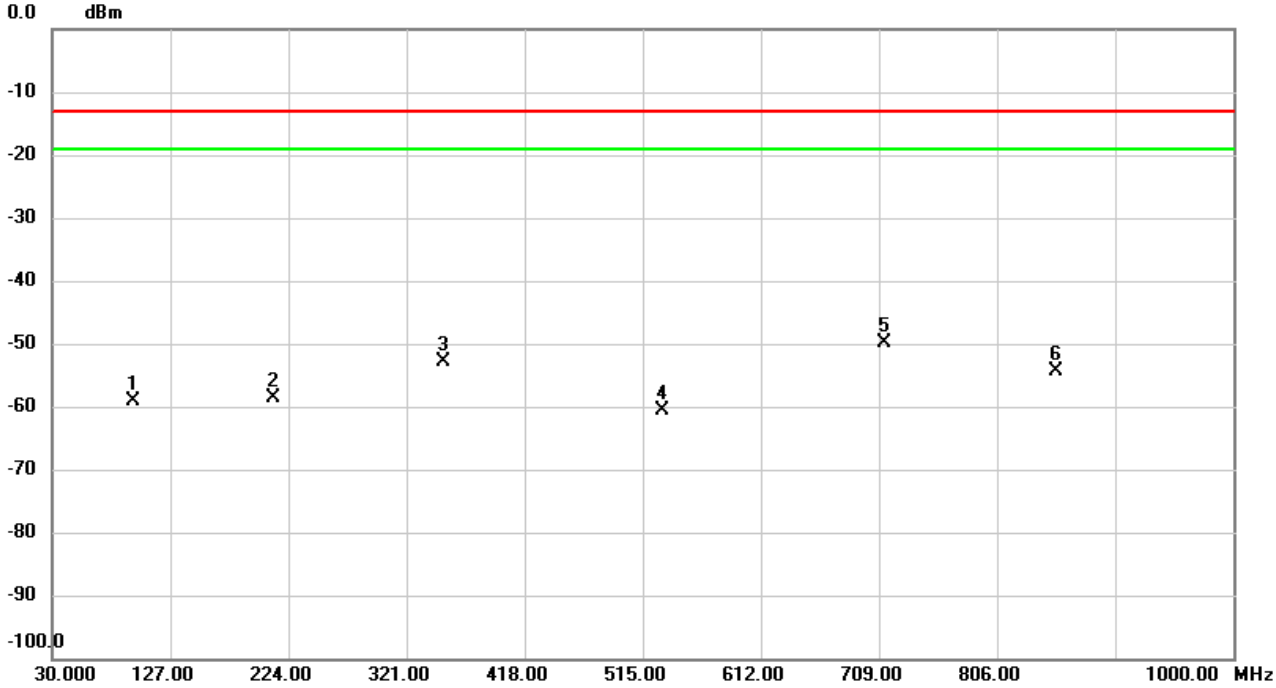
LTE Band 5_10M Spectrum Plot	
Channel	Frequency(MHz)
20525	836.5



APPENDIX D RADIATED SPURIOUS EMISSIONS

For External antenna:

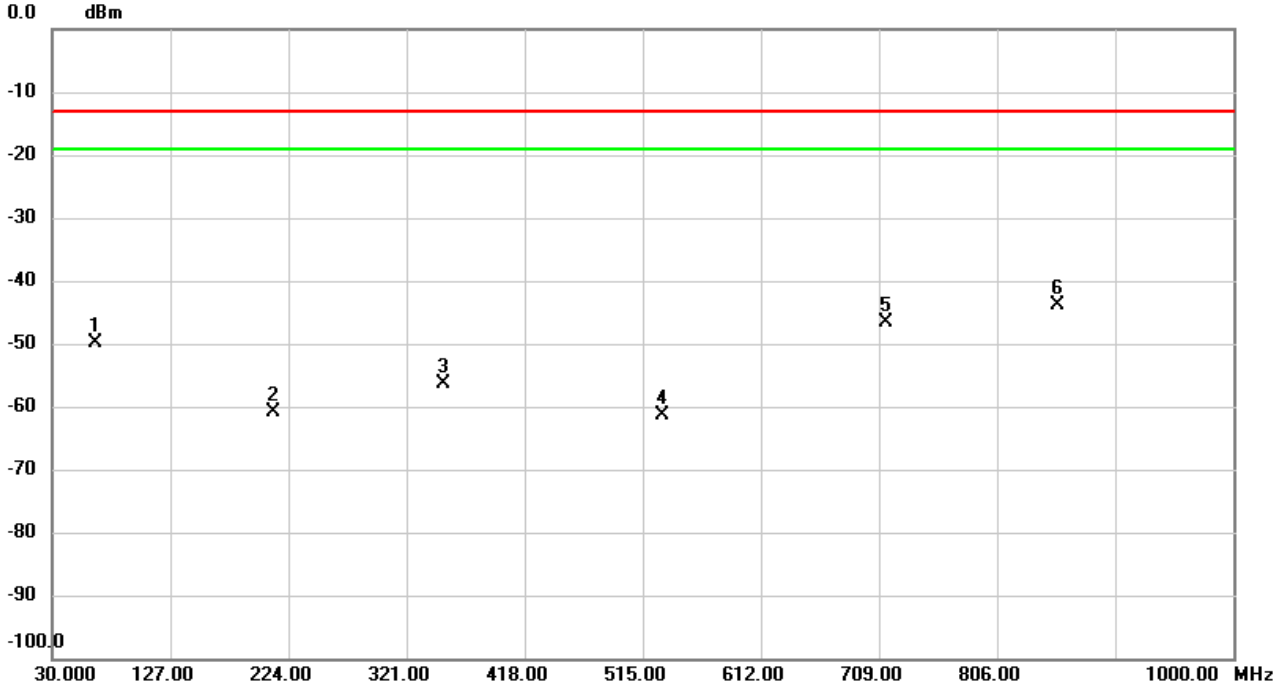
Test Mode	Band V	Test Date	2021/8/30
Test Channel	CH4407	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		95.9923	-58.89	-0.20	-59.09	-13.00	-46.09	peak	
2		211.8426	-60.93	2.31	-58.62	-13.00	-45.62	peak	
3		351.2963	-59.88	6.94	-52.94	-13.00	-39.94	peak	
4		531.4253	-67.77	7.20	-60.57	-13.00	-47.57	peak	
5	*	713.2355	-62.38	12.55	-49.83	-13.00	-36.83	peak	
6		855.0496	-63.90	9.44	-54.46	-13.00	-41.46	peak	

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

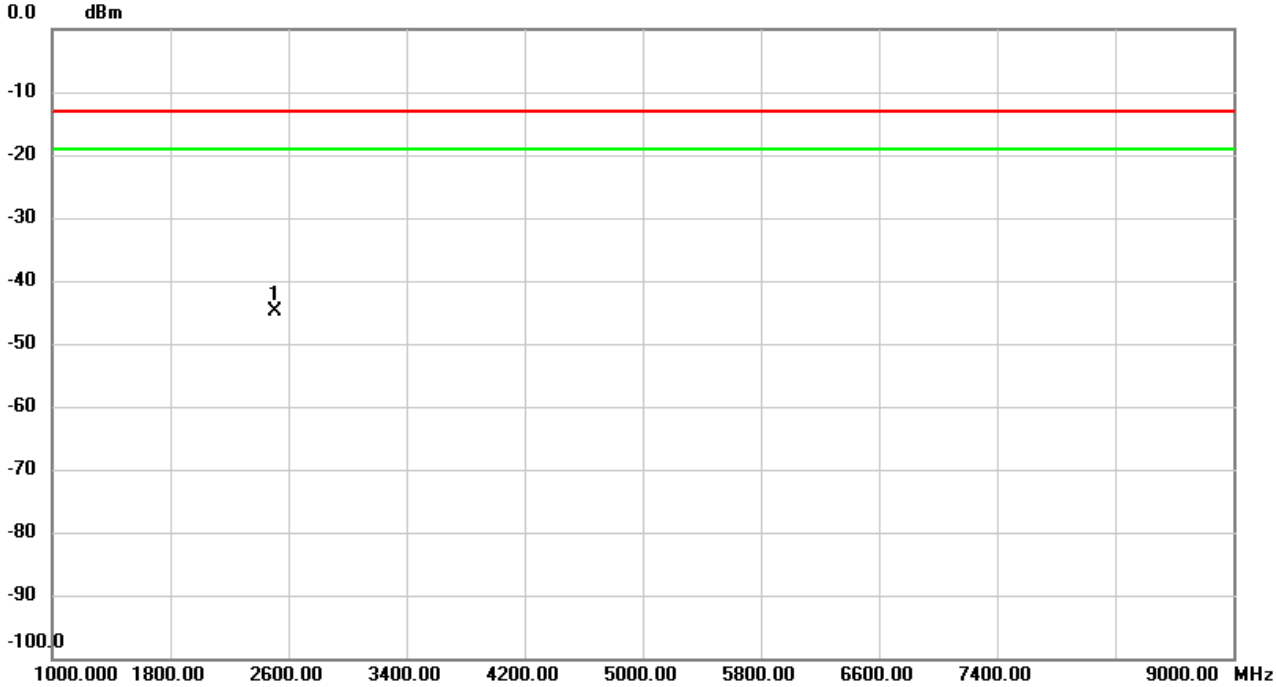
Test Mode	Band V	Test Date	2021/8/30
Test Channel	CH4407	Polarization	Horizontal
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		65.3080	-55.38	5.50	-49.88	-13.00	-36.88	peak	
2		211.8426	-58.85	-1.90	-60.75	-13.00	-47.75	peak	
3		351.2640	-60.44	4.13	-56.31	-13.00	-43.31	peak	
4		531.6840	-70.95	9.51	-61.44	-13.00	-48.44	peak	
5		714.7230	-56.98	10.38	-46.60	-13.00	-33.60	peak	
6	*	855.4376	-60.32	16.34	-43.98	-13.00	-30.98	peak	

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

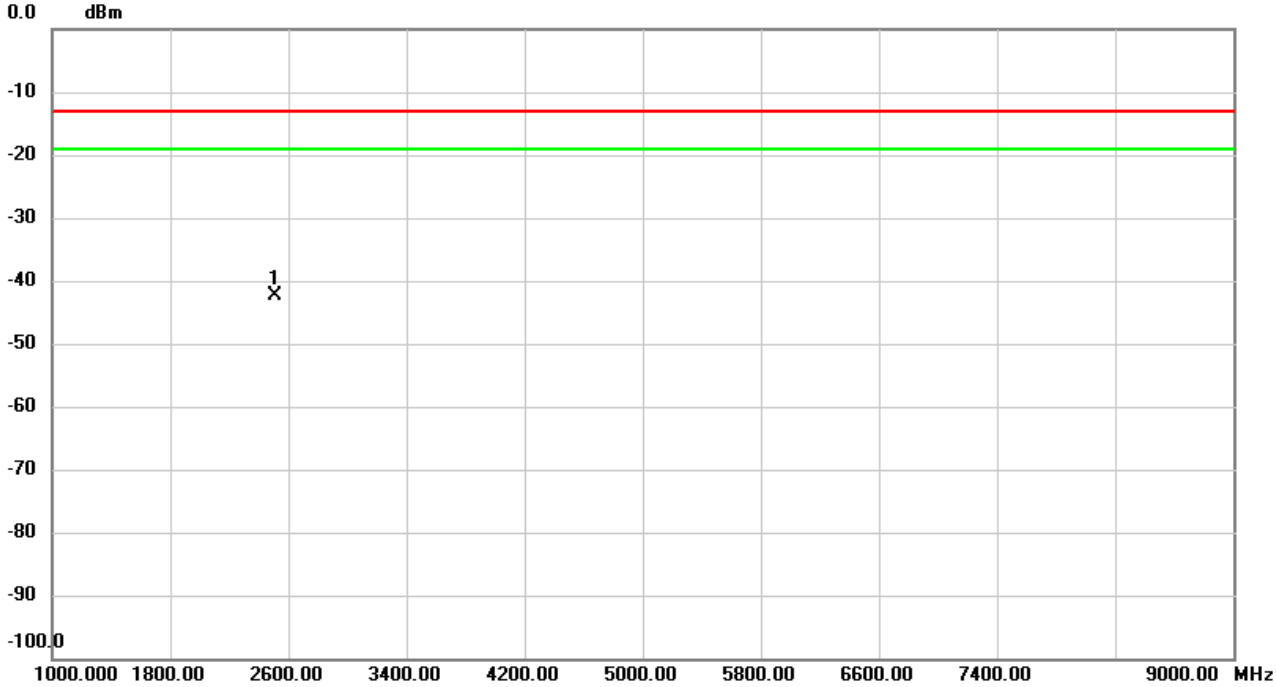
Test Mode	Band V	Test Date	2021/8/30
Test Channel	CH4407	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	2512.533	-40.48	-4.39	-44.87	-13.00	-31.87	peak	

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

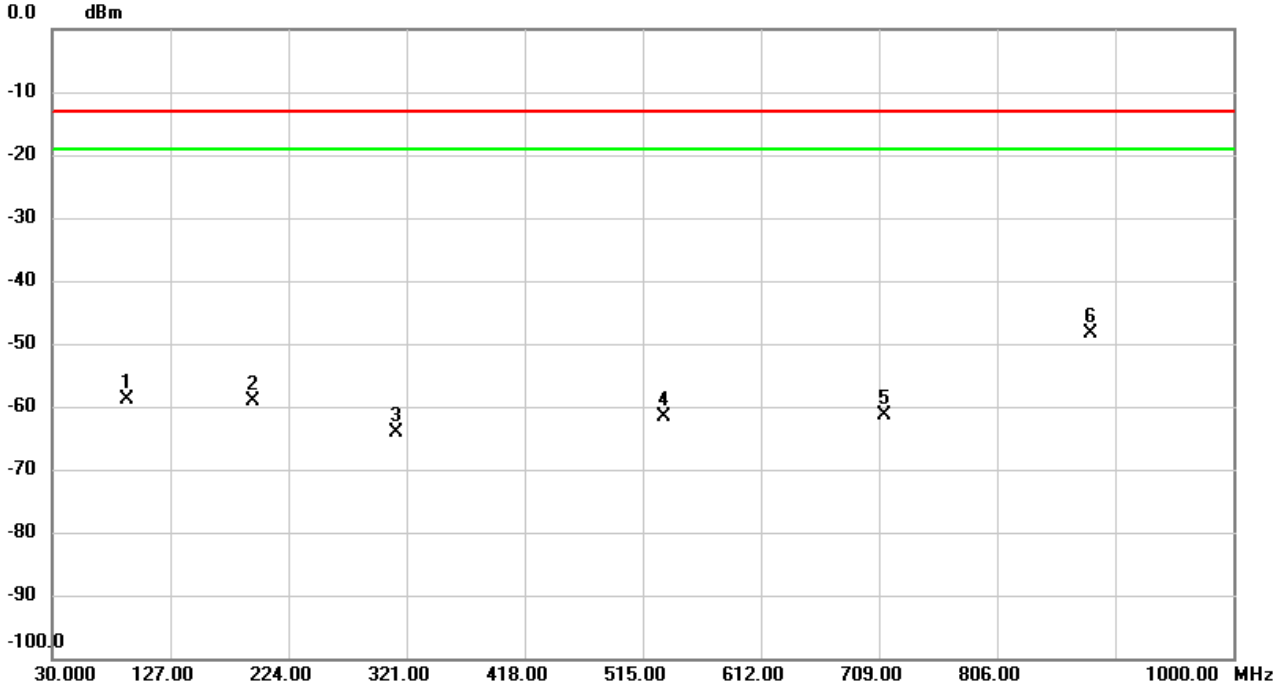
Test Mode	Band V	Test Date	2021/8/30
Test Channel	CH4407	Polarization	Horizontal
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	2509.200	-38.17	-4.21	-42.38	-13.00	-29.38	peak	

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

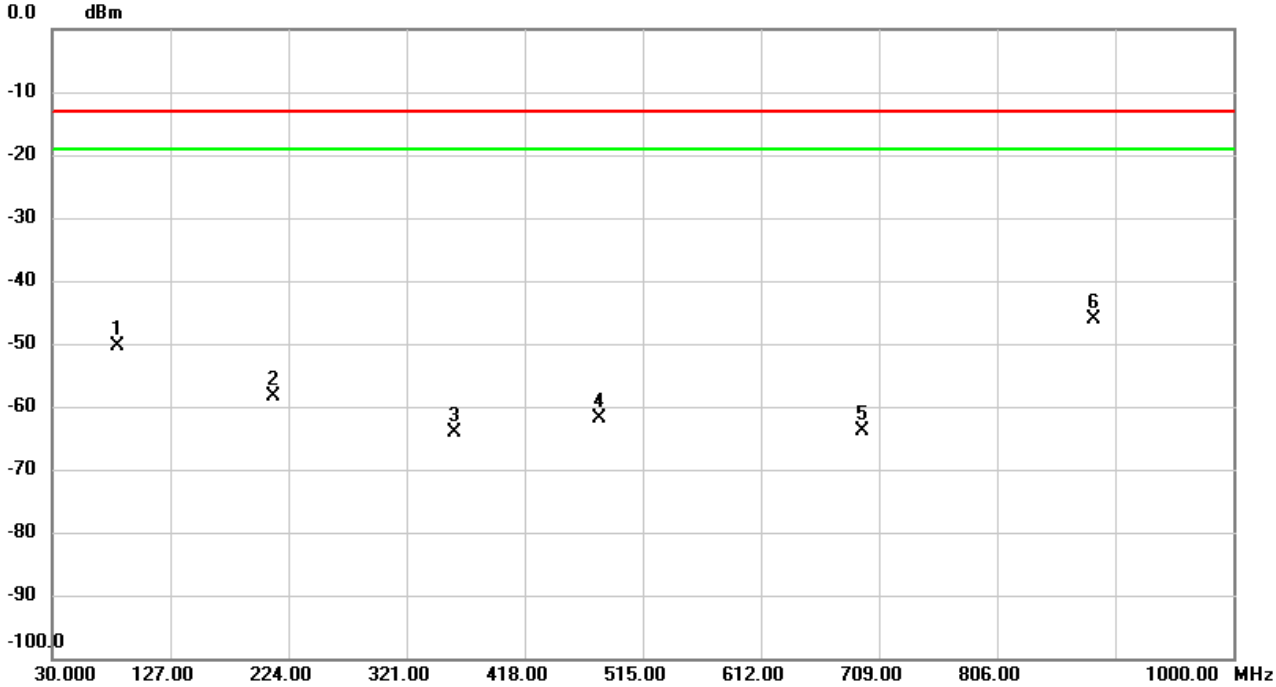
Test Mode	LTE Band 5	Test Date	2021/8/30
Test Channel	CH20525	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		91.7566	-57.61	-1.35	-58.96	-13.00	-45.96	peak	
2		195.5466	-62.76	3.55	-59.21	-13.00	-46.21	peak	
3		312.0113	-71.69	7.51	-64.18	-13.00	-51.18	peak	
4		533.0096	-69.03	7.37	-61.66	-13.00	-48.66	peak	
5		714.0763	-73.89	12.52	-61.37	-13.00	-48.37	peak	
6	*	882.4360	-58.72	10.43	-48.29	-13.00	-35.29	peak	

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

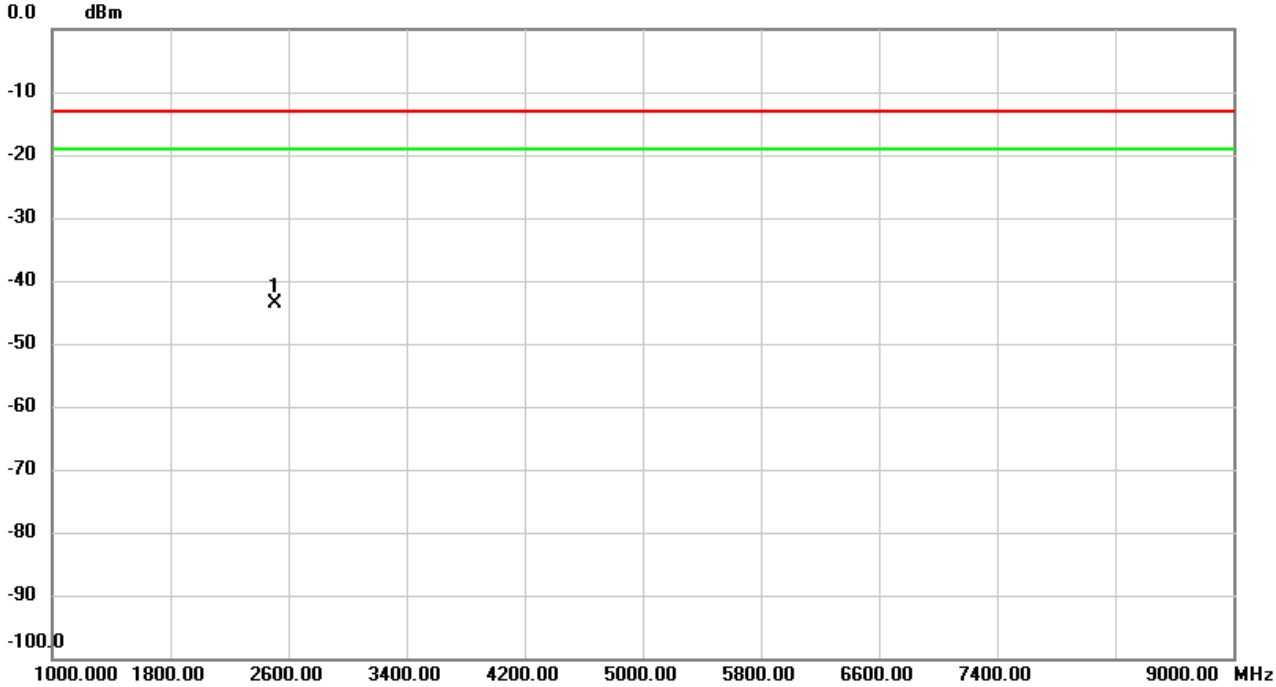
Test Mode	LTE Band 5	Test Date	2021/8/30
Test Channel	CH20525	Polarization	Horizontal
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1		83.9643	-55.17	4.92	-50.25	-13.00	-37.25	peak	
2		211.9073	-56.45	-1.89	-58.34	-13.00	-45.34	peak	
3		360.0263	-68.56	4.50	-64.06	-13.00	-51.06	peak	
4		480.0476	-73.67	11.70	-61.97	-13.00	-48.97	peak	
5		695.9696	-73.11	9.20	-63.91	-13.00	-50.91	peak	
6	*	885.3136	-61.96	15.93	-46.03	-13.00	-33.03	peak	

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

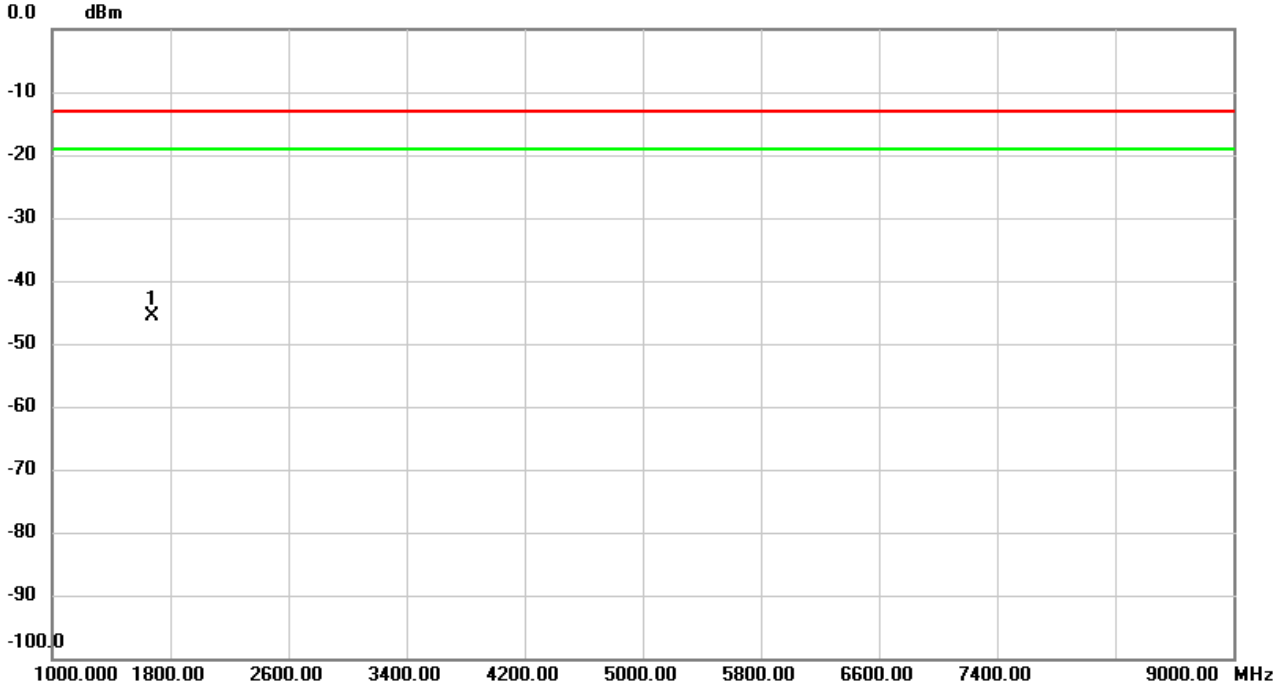
Test Mode	LTE Band 5	Test Date	2021/8/30
Test Channel	CH20525	Polarization	Vertical
Temp	23°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	2509.500	-39.12	-4.42	-43.54	-13.00	-30.54	peak	

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

Test Mode	LTE Band 5	Test Date	2021/8/30
Test Channel	CH20525	Polarization	Horizontal
Temp	23°C	Hum.	58%

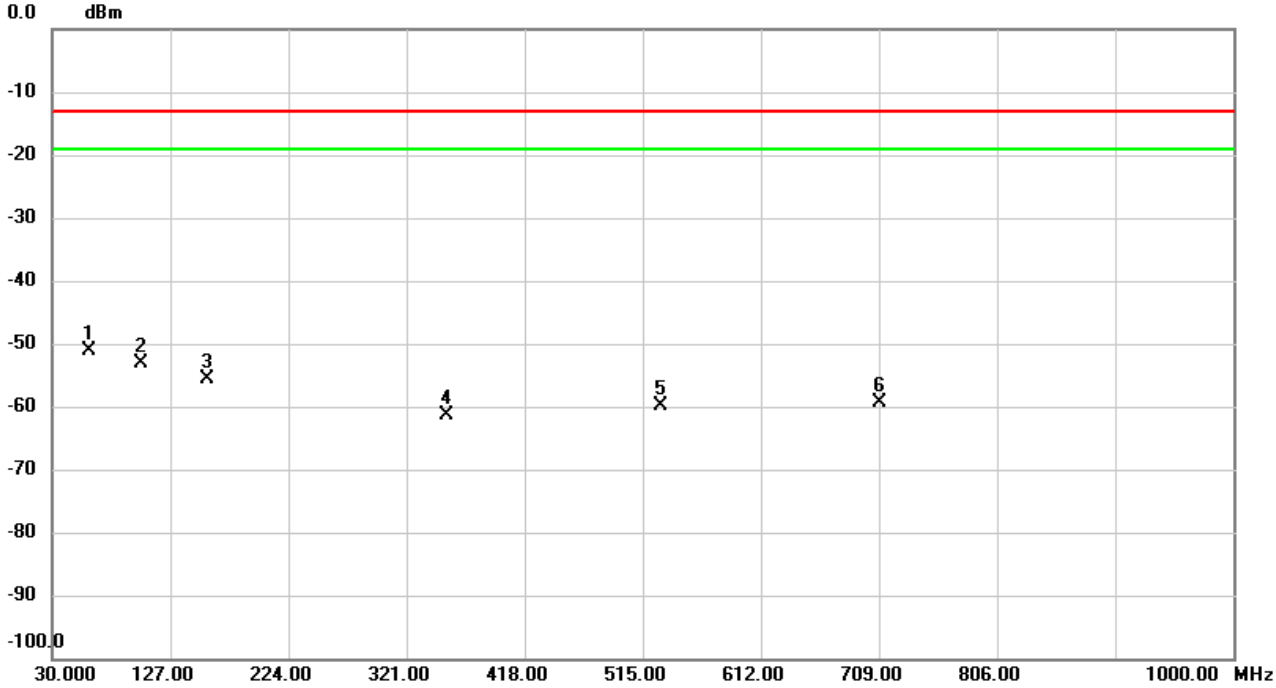


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	1673.000	-37.61	-8.12	-45.73	-13.00	-32.73	peak	

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

For Built-in antenna:

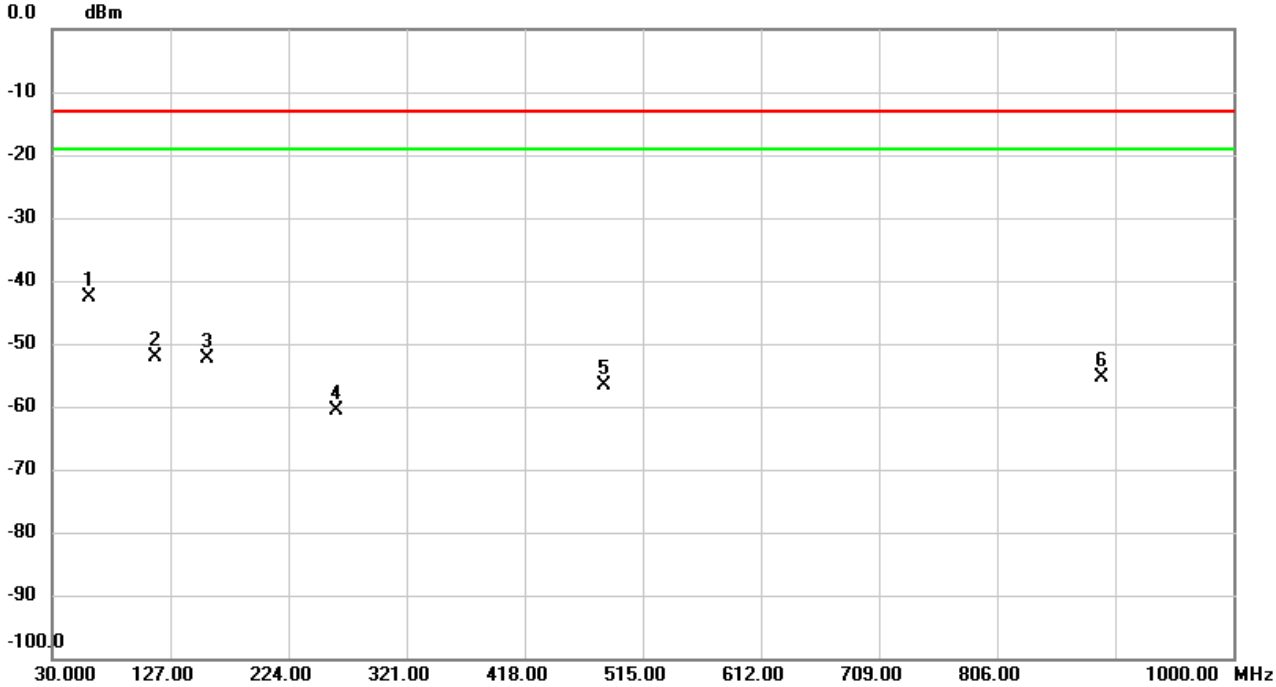
Test Mode	WCDMA Band V	Test Date	2021/5/8
Test Channel	CH 4407	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	60.0053	-49.79	-1.33	-51.12	-13.00	-38.12	peak	
2		102.4913	-53.87	0.66	-53.21	-13.00	-40.21	peak	
3		157.7490	-59.18	3.47	-55.71	-13.00	-42.71	peak	
4		353.7537	-67.71	6.32	-61.39	-13.00	-48.39	peak	
5		529.3560	-66.65	6.89	-59.76	-13.00	-46.76	peak	
6		709.2263	-71.77	12.46	-59.31	-13.00	-46.31	peak	

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

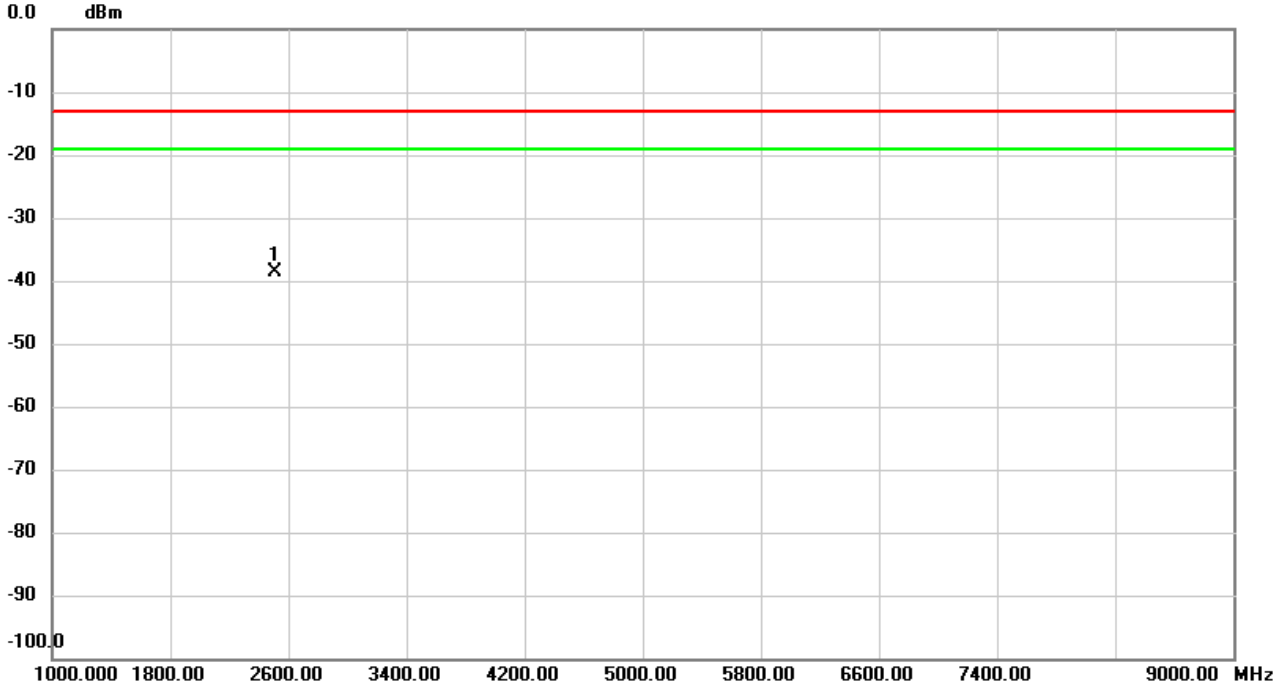
Test Mode	WCDMA Band V	Test Date	2021/5/8
Test Channel	CH 4407	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	60.0053	-49.67	6.97	-42.70	-13.00	-29.70	peak	
2		114.1636	-55.12	3.00	-52.12	-13.00	-39.12	peak	
3		157.6843	-55.02	2.70	-52.32	-13.00	-39.32	peak	
4		264.0285	-60.37	-0.26	-60.63	-13.00	-47.63	peak	
5		483.4750	-68.17	11.56	-56.61	-13.00	-43.61	peak	
6		892.1036	-71.10	15.83	-55.27	-13.00	-42.27	peak	

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

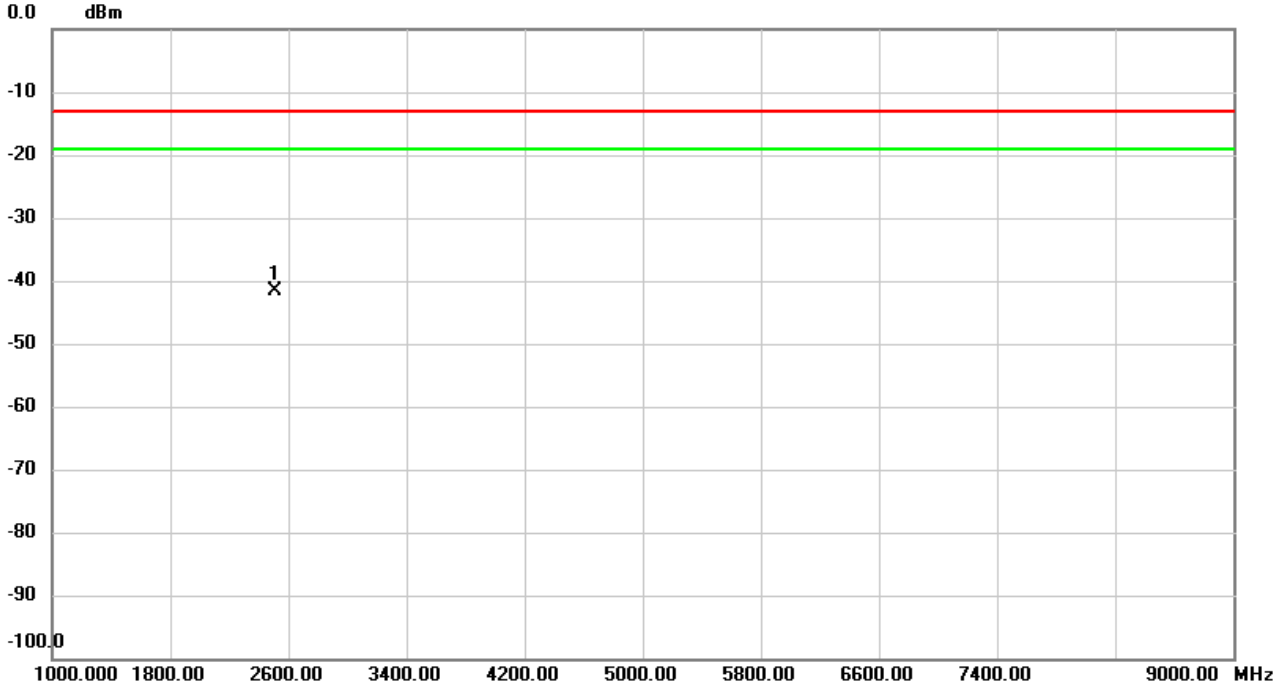
Test Mode	WCDMA Band V	Test Date	2021/5/8
Test Channel	CH 4407	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	2513.333	-34.44	-4.21	-38.65	-13.00	-25.65	peak	

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

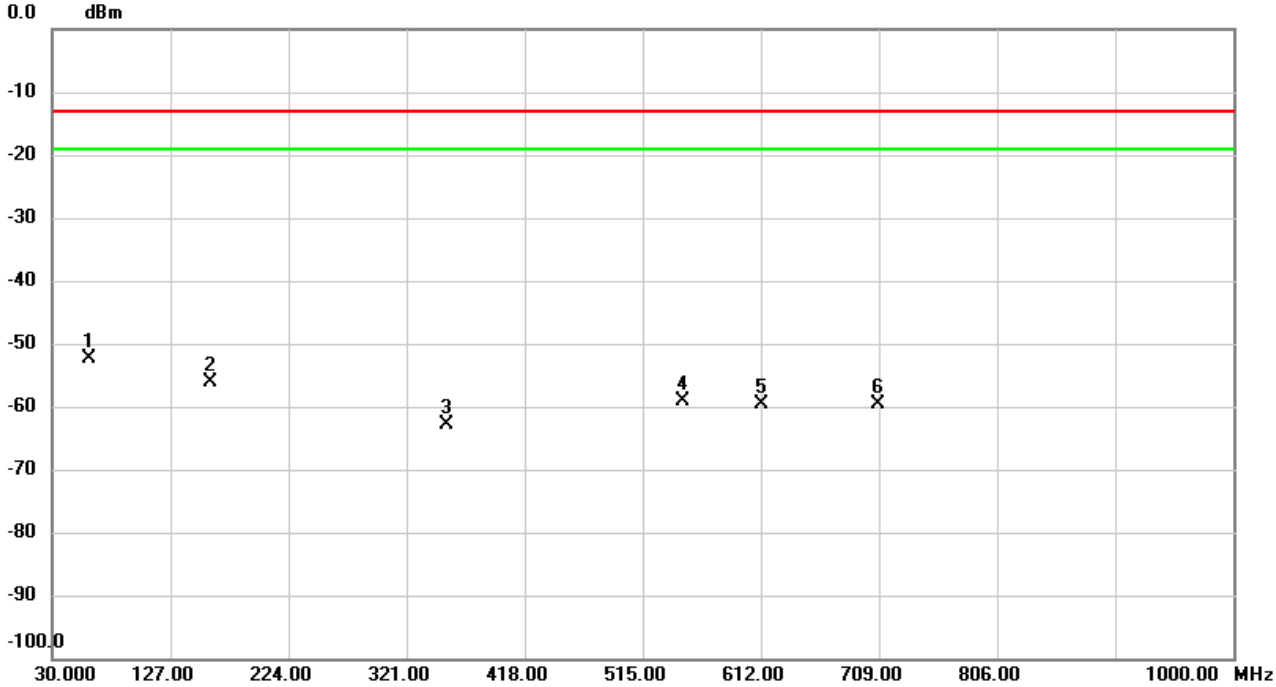
Test Mode	WCDMA Band V	Test Date	2021/5/8
Test Channel	CH 4407	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	2513.333	-37.09	-4.44	-41.53	-13.00	-28.53	peak	

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

Test Mode	LTE Band 5	Test Date	2021/5/8
Test Channel	CH 20525	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	*	60.0053	-51.06	-1.33	-52.39	-13.00	-39.39	peak	
2		160.0770	-59.81	3.57	-56.24	-13.00	-43.24	peak	
3		354.3680	-69.04	6.27	-62.77	-13.00	-49.77	peak	
4		548.1740	-67.94	8.83	-59.11	-13.00	-46.11	peak	
5		613.0993	-71.85	12.29	-59.56	-13.00	-46.56	peak	
6		708.3210	-72.22	12.48	-59.74	-13.00	-46.74	peak	

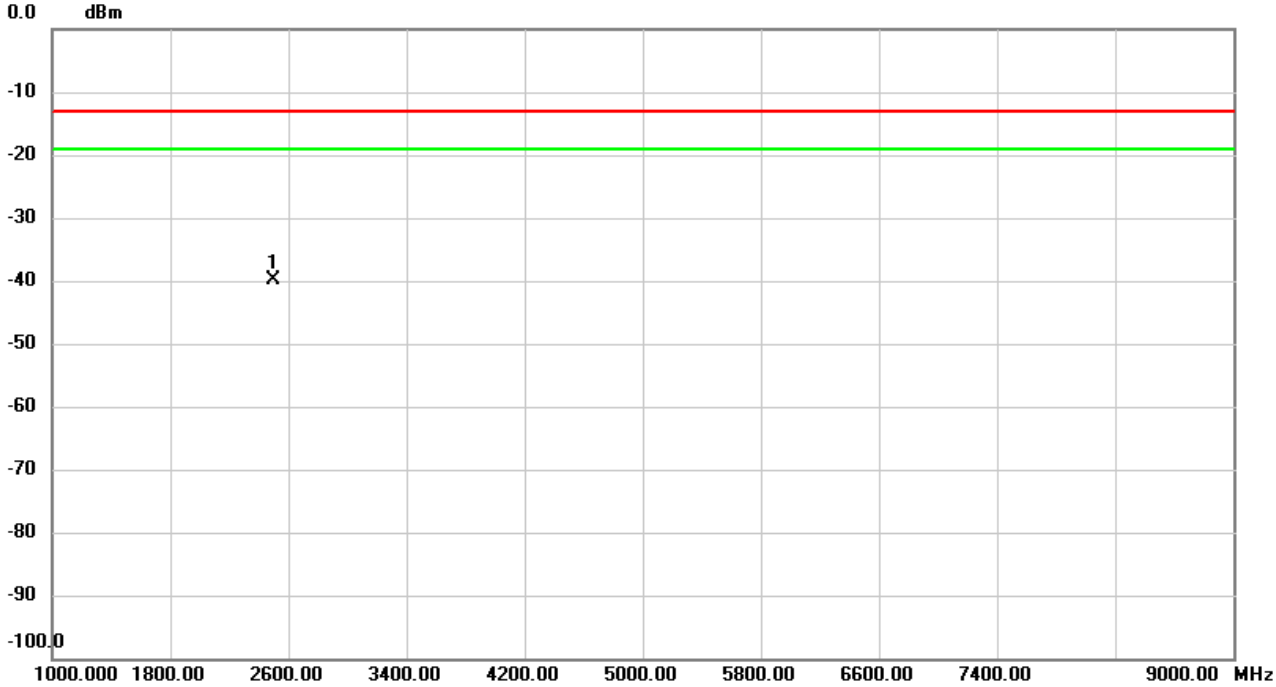
REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	LTE Band 5	Test Date	2021/5/8
Test Channel	CH 20525	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	*	60.0376	-50.11	6.96	-43.15	-13.00	-30.15	peak	
2		159.9476	-55.78	2.64	-53.14	-13.00	-40.14	peak	
3		263.9640	-60.50	-0.26	-60.76	-13.00	-47.76	peak	
4		478.5603	-70.58	11.77	-58.81	-13.00	-45.81	peak	
5		768.0730	-72.49	13.64	-58.85	-13.00	-45.85	peak	
6		929.9336	-74.71	14.00	-60.71	-13.00	-47.71	peak	

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

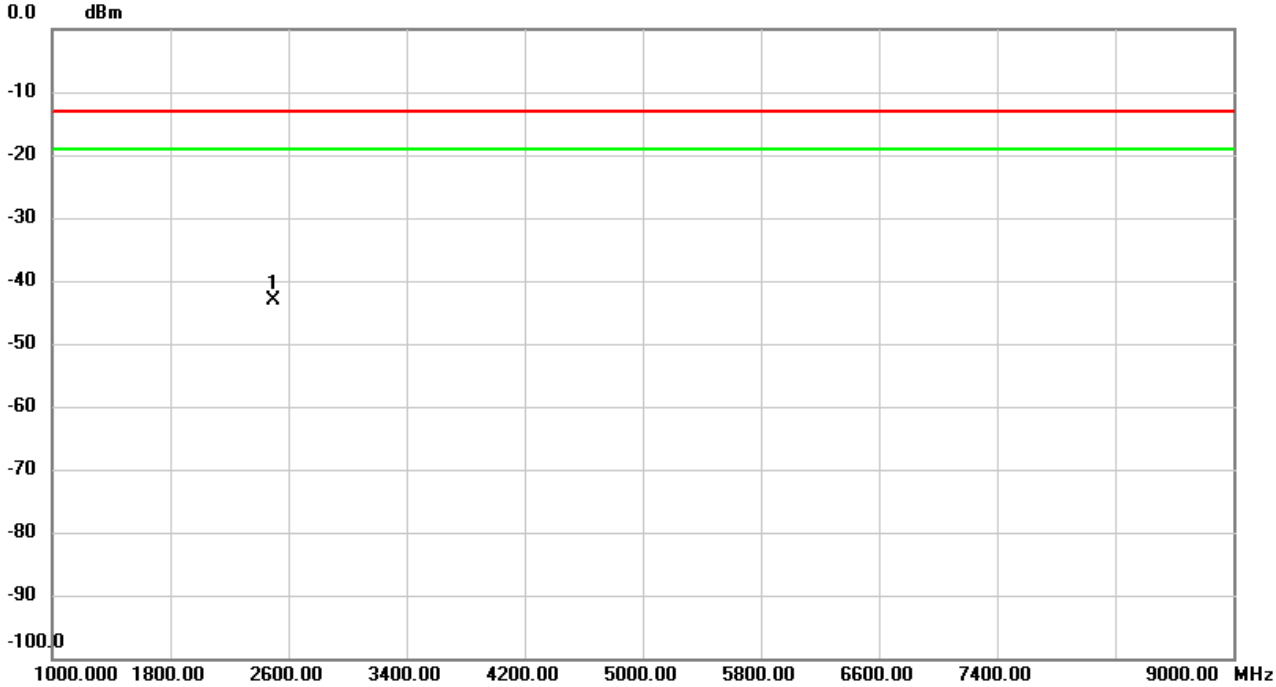
Test Mode	LTE Band 5	Test Date	2021/5/8
Test Channel	CH 20525	Polarization	Vertical
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	2496.267	-35.58	-4.35	-39.93	-13.00	-26.93	peak	

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

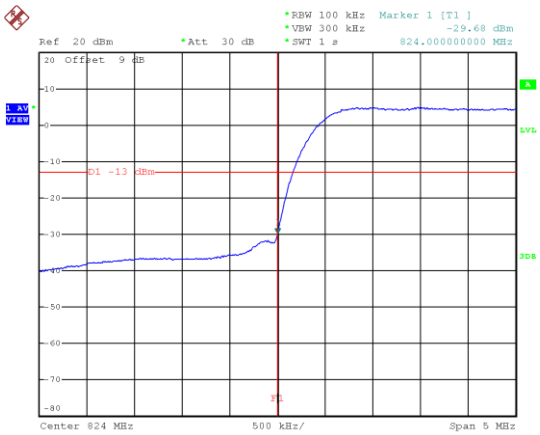
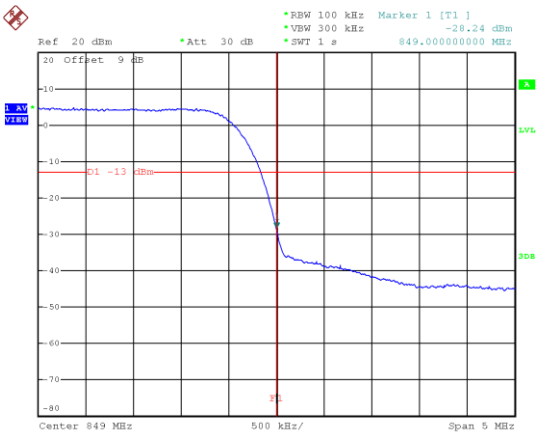
Test Mode	LTE Band 5	Test Date	2021/5/8
Test Channel	CH 20525	Polarization	Horizontal
Temp	24°C	Hum.	58%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBm	dB	dBm	dBm	dB	Detector	Comment
1	*	2496.267	-38.48	-4.70	-43.18	-13.00	-30.18	peak	

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

APPENDIX E BAND EDGE

WCDMA Band V_WCDMA Spectrum Plot			
Channel	4132	Channel	4233
 Date: 21.APR.2021 20:53:02		 Date: 21.APR.2021 20:54:58	

LTE Band 5_1.4M Spectrum Plot			
1RB#0		1RB#5	
Channel	20407	Channel	20643
6RB#0			
Channel	20407	Channel	20643

LTE Band 5_3M Spectrum Plot			
1RB#0		1RB#14	
Channel	20415	Channel	20635
15RB#0			
Channel	20415	Channel	20635