TEST REPORT

FCC Test for PSR-78-9537-XB

Certification

APPLICANT ADRF KOREA, Inc.

REPORT NO. HCT-RF-2004-FC048-R1

DATE OF ISSUE April 29, 2020

74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA Tel. +82 31 634 6300 F ax. +82 31 645 6401

HCT Co., Ltd.



TEST REPORT FCC Test for PSR-78-9537-XB	REPORT NO. HCT-RF-2004-FC048-R1 DATE OF ISSUE 29 April 2020 Additional Model -	
Applicant	ADRF KOREA, Inc. 5-5, Mojeon-Ri, Backsa-Myun, Icheon-Citi, Kyunggi-Do, Korea	
EUT Type Model Name		
FCC ID	N52-PSR-78-9537XB	
Output Power	Downlink: 37 dBm Uplink: 30 dBm	
Date of Test	April 06, 2020 ~ April 17, 2020	
FCC Rule Parts:	Part 2, Part 90	

This test results were applied only to the test methods required by the standard.

Tested by Kwang Il Yoon

Technical Manager Jong Seok Lee

HCT CO., LTD. Soo Chan Lee



REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description	
0	April 21, 2020	Initial Release	
1	April 29, 2020	We have changed the antenna gain.	

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.



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1. GENERAL INFORMATION

1.1. APPLICANT INFORMATION

Company Name	ADRF KOREA, Inc.
Company Address	5-5, Mojeon-Ri, Backsa-Myun, Icheon-Citi, Kyunggi-Do, Korea

1.2. PRODUCT INFORMATION

EUT Type	REPEATER		
EUT Serial Number	P789537XB200001		
Power Supply	100 -240 VAC, 60 Hz		
Frequency Range	Band Name FirstNet	Uplink (MHz) 788 ~ 798	Downlink (MHz) 758 ~ 768
Tx Output Power	Downlink: 37 dBm Uplink: 30 dBm		
Antenna Peak Gain	Downlink: 2.6 dBi Uplink: 15 dBi		

1.3. TEST INFORMATION

FCC Rule Parts	Part 2, Part 90
Measurement Standards	KDB 935210 D05 v01r04, ANSI C63.26-2015
Test Location	HCT CO., LTD.
	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do,
	17383, Rep. of KOREA



2. FACILITIES AND ACCREDITATIONS

2.1. FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4 (Version: 2014) and CISPR Publication 22.

Detailed description of test facility was submitted to the Commission and accepted dated April 02, 2018 (Registration Number: KR0032).

2.2. EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."



3. TEST SPECIFICATIONS

3.1. STANDARDS

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 2, 90.

Description	Reference
AGC threshold	KDB 935210 D05 v01r04 3.2 KDB 935210 D05 v01r04 4.2
Out-of-band rejection	KDB 935210 D05 v01r04 3.3 KDB 935210 D05 v01r04 4.3
Input-versus-output signal comparison	§ 90.210, § 90.219(e)(4)(iii)
Input/output power and amplifier/booster gain	§ 2.1046, § 90.219, § 90.541, § 90.635
Noise figure	§ 90.219(e)(2)
Emission masks Out-of-band/out-of-block emissions and spurious emissions	§ 2.1051, § 90.219(e)(3)
Spurious emissions radiated	§ 2.1053



3.2. ADDITIONAL DESCRIPTIONS ABOUT TEST

Except for the following cases, EUT was tested under normal operating conditions. : Out-of-band rejection test requires maximum gain condition without AGC.

This EUT is supported power supply both of AC and DC. Test results are only attached worst cases.

The test was generally based on the method of KDB 935210 D05 v01r04 and only followed ANSI C63.26-2015 if there was no test method in KDB standard.

EUT was tested with following modulated signals provide by applicant.

Band Name	Tested signals
	LTE 5 MHz
FirstNet	LTE 10 MHz

The frequency stability measurement has been omitted in accordance with section 3.7 of KDB 935210 D05 v01r04. : It can be confirmed through input-versus-output signal comparison test that EUT does not alter the input signal.



The tests results included actual loss value for attenuator and cable combination as shown in the table below. : Input Path

	Correction factor table		
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
600	0.723	2 100	1.245
650	0.760	2 150	1.198
700	0.763	2 200	0.985
750	0.756	2 250	1.565
800	0.795	2 300	1.442
850	0.756	2 350	1.470
900	0.728	2 400	1.530
1 700	1.033	2 450	1.289
1 750	0.970	2 500	1.300
1 800	0.929	2 550	1.551
1 850	1.252	2 600	1.630
1 900	1.093	2 650	1.390
1 950	1.207	2 700	1.350
2 000	1.083		



: Output Path

	Correctio	on factor table	
Frequency (MHz)	Factor (dB)	Frequency (MHz)	Factor (dB)
2	30.497	3 000	32.272
10	29.846	4 000	32.685
30	29.772	5 000	32.662
50	29.780	6 000	33.361
100	29.858	7 000	33.551
200	30.053	8 000	33.681
300	30.409	9 000	34.452
400	30.536	10 000	36.689
500	30.682	-	-
600	30.773	-	-
700	30.855	-	-
800	30.878	-	-
900	30.890	-	-
1 000	30.920	-	-
1 100	30.991	-	-
1 200	31.244	-	-
1 300	31.227	-	-
1 400	31.309	-	-
1 500	31.413	-	-
1 600	31.515	-	-
1 700	31.368	-	-
1 800	31.368	-	-
1 900	31.419	-	-
2 000	31.603	-	-
2 100	31.650	-	-
2 200	31.707	-	-
2 300	31.738	-	-
2 400	31.866	-	-
2 500	31.931	-	-
2 600	32.047	-	-
2 700	31.816	-	-



3.3. MEASUREMENTUNCERTAINTY

Reference	Results
-	±0.87 dB
-	\pm 0.58 MHz
OBW 25 kHz	±0.16 MHz
OBW > 5 MHz	\pm 0.58 MHz
-	±0.87 dB
-	±0.87 dB
-	±1.08 dB
$f \le 1 GHz$	±4.80 dB
f > 1 GHz	±6.07 dB
	- OBW 25 kHz OBW > 5 MHz - - f ≤ 1 GHz

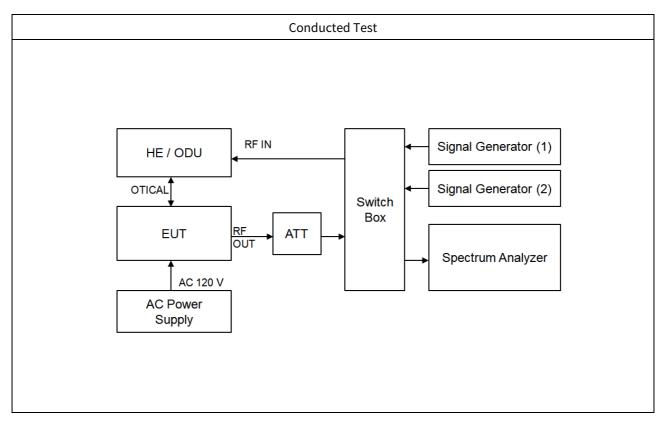
* Coverage factor k = 2, Confidence levels of 95 %

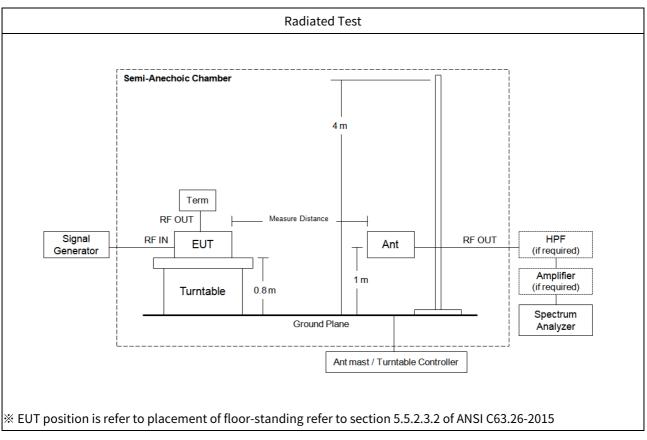
3.4. STANDARDS ENVIRONMENTAL TEST CONDITIONS

Temperature	+15 °C to +35 °C
Relative humidity	30 % to 60 %
Air pressure	860 mbar to 1 060 mbar



3.5. TEST DIAGRAMS







4. TEST EQUIPMENTS

Manufacturer	Model / Equipment	Calibration	Calibration	Serial No.
		Date	Interval	
Agilent	N9020A / MXA Signal Analyzer	08/21/2019	Annual	MY46471250
Keysight	N9030B / PXA Signal Analyzer	03/27/2020	Annual	MY55480167
Agilent	N5182A / MXG Vector Signal Generator	08/08/2019	Annual	MY50141649
Agilent	N5182A / MXG Vector Signal Generator	01/17/2020	Annual	MY47070406
Weinschel	WA93-30-33 / Attenuator	04/01/2020	Annual	0190
KEITHLEY	S46 / Switch	N/A	N/A	1088024
Deayoung ENT	DFSS60 / AC Power Supply	04/07/2020	Annual	1003030-1
Innco system	CO3000 / Controller(Antenna mast)	N/A	N/A	CO3000-4p
Innco system	MA4640/800-XP-EP / Antenna Position Tower	N/A	N/A	N/A
Audix	EM1000 / Controller	N/A	N/A	060520
Audix	Turn Table	N/A	N/A	N/A
TNM system	FBSM-01B / Amp & Filter Bank Switch Controller	N/A	N/A	N/A
Schwarzbeck	VULB 9168 / Hybrid Antenna	08/02/2019	Biennial	01039
Schwarzbeck	BBHA 9120D / Horn Antenna	06/28/2019	Biennial	1300
Schwarzbeck	BBHA9170 / Horn Antenna(15 GHz ~ 40 GHz)	04/29/2019	Biennial	BBHA9170342
Rohde & Schwarz	FSP(9 kHz ~ 40 GHz) / Spectrum Analyzer	07/16/2019	Annual	100843
Wainwright		07/15/0010		_
Instruments	WHKX10-900-1000-15000-40SS	07/15/2019	Annual	5
CERNEX	CBL18265035 / Power Amplifier	12/26/2019	Annual	22966
CERNEX	CBL26405040 / Power Amplifier	06/18/2019	Annual	25956
TNM system	FBSM-05B / HPF(3~18GHz) + LNA1(1~18GHz)	01/21/2020	Annual	F6
TNM system	FBSM-05B / LNA1(1~18GHz)	01/21/2020	Annual	25540



5. TEST RESULT

5.1. AGC THRESHOLD

Test Requirement:

KDB 935210 D05 v01r04 Testing at and above the AGC threshold is required.

Test Procedures:

Measurements were in accordance with the test methods section 3.2 of KDB 935210 D05 v01r04.

In the case of fiber-optic distribution systems, the RF input port of the equipment under test (EUT) refers to the RF input of the supporting equipment RF to optical convertor; see also descriptions and diagrams for typical DAS booster systems in KDB Publication 935210 D02

Devices intended to be directly connected to an RF source (donor port) only need to be evaluated for any over-theair transmit paths.

- a) Connect a signal generator to the input of the EUT.
- b) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.
- c) The signal generator should initially be configured to produce either of the required test signals.
- d) Set the signal generator frequency to the center frequency of the EUT operating band.
- e) While monitoring the output power of the EUT, measured using the methods of ANSI C63.26-2015 subclause
 5.2.4.4.1, increase the input level until a 1 dB increase in the input signal power no longer causes a 1 dB increase
 in the output signal power.
- f) Record this level as the AGC threshold level.
- g) Repeat the procedure with the remaining test signal.

Measurements were in accordance with the test methods section 4.2 of KDB 935210 D05 v01r04.

Testing at and above the AGC threshold will be required. The AGC threshold shall be determined by applying the procedure of 3.2, but with the signal generator configured to produce a test signal defined in Table 1, a CW input signal, or a digitally modulated signal, consistent with the discussion about signal types in 4.1.

Output power measurement in subclause 5.2.4.4.1 of ANSI C63.26

- a) Set span to $2 \times to 3 \times the OBW$.
- b) Set RBW = 1% to 5% of the OBW.
- c) Set VBW \geq 3 × RBW.
- d) Set number of measurement points in sweep $\geq 2 \times \text{span} / \text{RBW}$.



- e) Sweep time: auto-couple
- f) Detector = power averaging (rms).
- g) If the EUT can be configured to transmit continuously, then set the trigger to free run.
- h) Omit
- Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately
 determine the average power over multiple symbols, it can be necessary to increase the number of traces to be
 averaged above 100 or, if using a manually configured sweep time, increase the sweep time.
- j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.



Test Results:

Test Band	Link	Signal	Center Frequency (MHz)	AGC Threshold Level (dBm)	Output Level (dBm)
Uplink FirstNet Downlin	Unlink	LTE 5 MHz	793.00	-65	30.25
	Oplink	LTE 10 MHz	793.00	-65	30.23
	Downlink	LTE 5 MHz	763.00	-58	37.39
		LTE 10 MHz	763.00	-58	37.35



5.2. OUT-OF-BAND REJECTION

Test Requirement:

KDB 935210 D05 v01r04

Out-of-band rejection required.

Test Procedures:

Measurements were in accordance with the test methods section 3.3 of KDB 935210 D05 v01r04.

Adjust the internal gain control of the EUT to the maximum gain for which equipment certification is sought.

- a) Connect a signal generator to the input of the EUT.
- b) Configure a swept CW signal with the following parameters:
 - 1) Frequency range = ± 250 % of the passband, for each applicable CMRS band.
 - 2) Level = a sufficient level to affirm that the out-of-band rejection is > 20 dB above the noise floor and will not engage the AGC during the entire sweep.
 - 3) Dwell time = approximately 10 ms.
 - 4) Number of points = SPAN/(RBW/2).
- c) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
- d) Set the span of the spectrum analyzer to the same as the frequency range of the signal generator.
- e) Set the resolution bandwidth (RBW) of the spectrum analyzer to be 1 % to 5 % of the EUT passband, and the video bandwidth (VBW) shall be set to \geq 3 × RBW.
- f) Set the detector to Peak Max-Hold and wait for the spectrum analyzer's spectral display to fill.
- g) Place a marker to the peak of the frequency response and record this frequency as f₀.
- h) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the -20 dB down amplitude, to determine the 20 dB bandwidth.
- i) Capture the frequency response of the EUT.
- j) Repeat for all frequency bands applicable for use by the EUT.

Measurements were in accordance with the test methods section 4.3 of KDB 935210 D05 v01r04.

Adjust the internal gain control of the EUT to the maximum gain for which equipment certification is sought.

- a) Connect a signal generator to the input of the EUT.
- b) Configure a swept CW signal with the following parameters:
 - 1) Frequency range = \pm 250 % of the manufacturer's specified pass band.
 - 2) The CW amplitude shall be 3 dB below the AGC threshold (see 4.2), and shall not activate the AGC threshold throughout the test.
 - 3) Dwell time = approximately 10 ms.

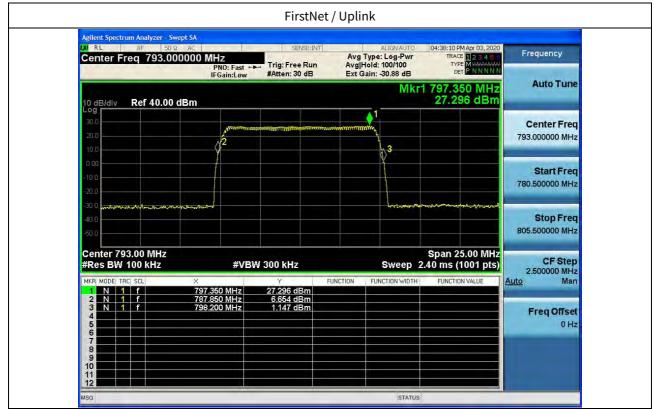


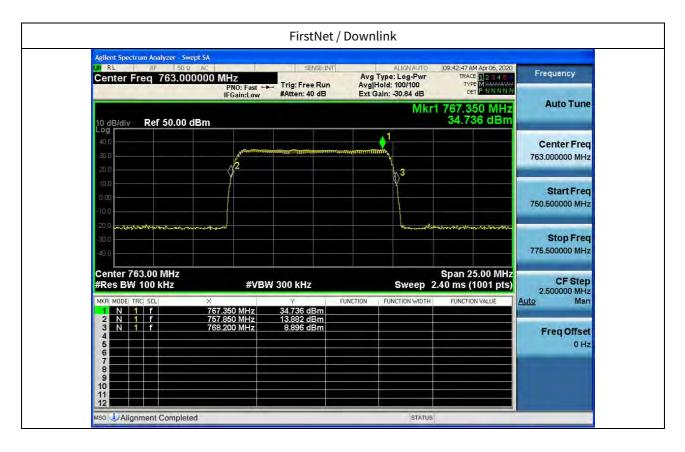
- 4) Frequency step = 50 kHz.
- c) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
- d) Set the RBW of the spectrum analyzer to between 1 % and 5 % of the manufacturer's rated passband, and VBW
 = 3 × RBW.
- e) Set the detector to Peak and the trace to Max-Hold.
- f) After the trace is completely filled, place a marker at the peak amplitude, which is designated as f0, and with two additional markers (use the marker-delta method) at the 20 dB bandwidth (i.e., at the points where the level has fallen by 20 dB).
- g) Capture the frequency response plot for inclusion in the test report.





Test Results:







5.3. INPUT-VERSUS-OUTPUT SIGNAL COMPARISON

Test Requirement:

§ 2.1049 Measurements required: Occupied bandwidth.

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the specified conditions of § 2.1049 (a) through (i) as applicable.

Test Procedures:

Measurements were in accordance with the test methods section 3.4 of KDB 935210 D05 v01r04.

- a) Connect a signal generator to the input of the EUT.
- b) Configure the signal generator to transmit the AWGN signal.
- c) Configure the signal amplitude to be just below the AGC threshold level (see 3.2), but not more than 0.5 dB below.
- d) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
- e) Set the spectrum analyzer center frequency to the center frequency of the operational band under test. The span range of the spectrum analyzer shall be between 2 times to 5 times the emission bandwidth (EBW) or alternatively, the OBW.
- f) The nominal RBW shall be in the range of 1 % to 5 % of the anticipated OBW, and the VBW shall be \geq 3 × RBW.
- g) Set the reference level of the instrument as required to preclude the signal from exceeding the maximum spectrum analyzer input mixer level for linear operation. In general, the peak of the spectral envelope must be more than [10 log (OBW / RBW)] below the reference level.
- h) Steps f) and g) may require iteration to enable adjustments within the specified tolerances.
- i) The noise floor of the spectrum analyzer at the selected RBW shall be at least 36 dB below the reference level.
- j) Set spectrum analyzer detection function to positive peak.
- k) Set the trace mode to max hold.
- l) Determine the reference value: Allow the trace to stabilize. Set the spectrum analyzer marker to the highest amplitude level of the displayed trace (this is the reference value) and record the associated frequency.
- m) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the -26 dB down amplitude. The 26 dB EBW (alternatively OBW) is the positive frequency difference between the two markers. If the spectral envelope crosses the -26 dB down amplitude at multiple points, the lowest or highest frequency shall be selected as the frequencies that are the furthest removed from the center frequency at which the spectral envelope crosses the -26 dB down amplitude point.
- n) Repeat steps e) to l) with the input signal connected directly to the spectrum analyzer (i.e., input signal measurement).
- o) Compare the spectral plot of the input signal (determined from step m) to the output signal (determined from step l) to affirm that they are similar (in passband and rolloff characteristic features and relative spectral



locations), and include plot(s) and descriptions in test report.

- A. Repeat the procedure [steps e) to n)] with the input signal amplitude set to 3 dB above the AGC threshold.
- p) Repeat steps e) to o) with the signal generator set to the narrowband signal.
- q) Repeat steps e) to p) for all frequency bands authorized for use by the EUT.



Test Results:

Tabular data of Output Occupied Bandwidth

Test Band	Link	Link		Center Frequency	99 % OBW	26 dB OBW
	Link	Signal	(MHz)	(MHz)	(MHz)	
Uplin FirstNet Downl	Unlink	LTE 5 MHz	793.00	4.5276	5.046	
	υριπκ	LTE 10 MHz	793.00	9.0094	9.792	
	Downlink	LTE 5 MHz	763.00	4.5200	5.044	
	Downlink LTE 10 MHz	763.00	8.9962	9.754		

Tabular data of Input Occupied Bandwidth

Test Band Link	Cignal	Center Frequency	99 % OBW	26 dB OBW	
	LINK	Signal	(MHz)	(MHz)	(MHz)
Uplink FirstNet Downlink	Unlink	LTE 5 MHz	793.00	4.5121	5.039
	υριιικ	LTE 10 MHz	793.00	9.0097	10.019
	Downlink LTE 5 MHz	LTE 5 MHz	763.00	4.5251	5.032
		763.00	9.0386	10.046	

Tabular data of 3 dB above the AGC threshold Output Occupied Bandwidth

Test Band Link	Link Cignal	Center Frequency	99 % OBW	26 dB OBW	
	LINK	Link Signal	(MHz)	(MHz)	(MHz)
Uplii FirstNet Down	Unlink	LTE 5 MHz	793.00	4.5256	5.005
	Optilik	LTE 10 MHz	793.00	9.0032	9.742
	Downlink	LTE 5 MHz	763.00	4.5242	5.048
	Downlink LTE 10 MHz	763.00	8.9978	9.775	



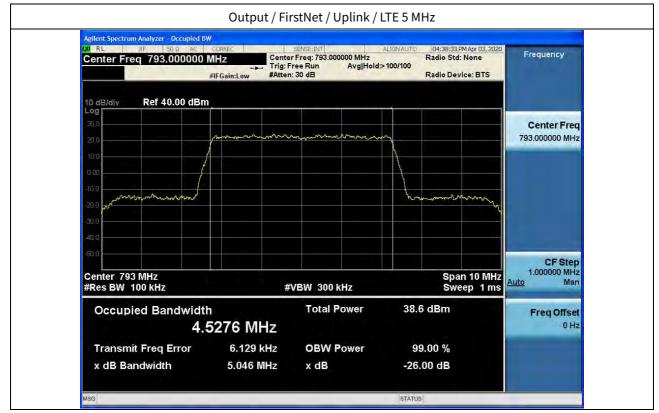
Measured Occupied Bandwidth Comparison

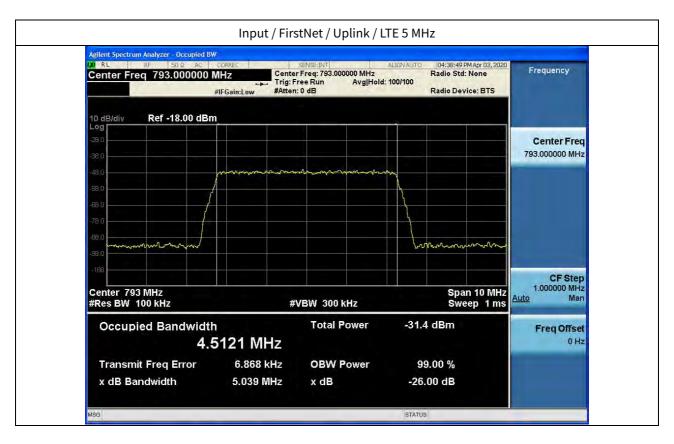
Test Band	Link	Signal	Variant of Input and output Occupied Bandwidth (%)	Variant of Input and 3 dB above the AGC threshold output Occupied Bandwidth (%)
Uplink FirstNet Downlink	LTE 5 MHz	0.139	-0.675	
	оршк	LTE 10 MHz	-2.266	-2.765
	Davualiate	LTE 5 MHz	0.238	0.318
		LTE 10 MHz	-2.907	-2.698

* Change in input-output OBW is less than ± 5 %.

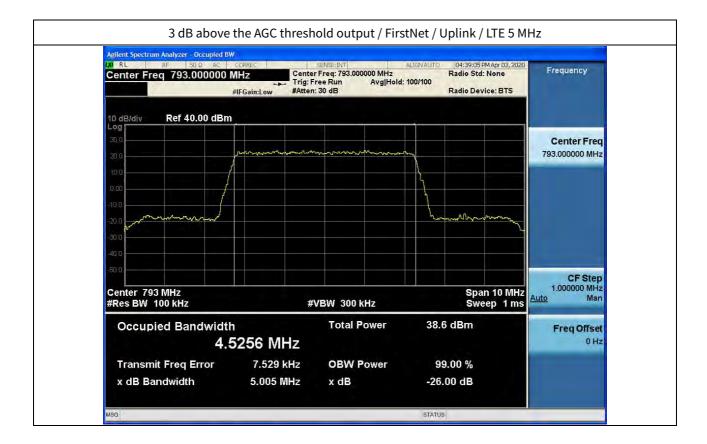


Plot data of Occupied Bandwidth

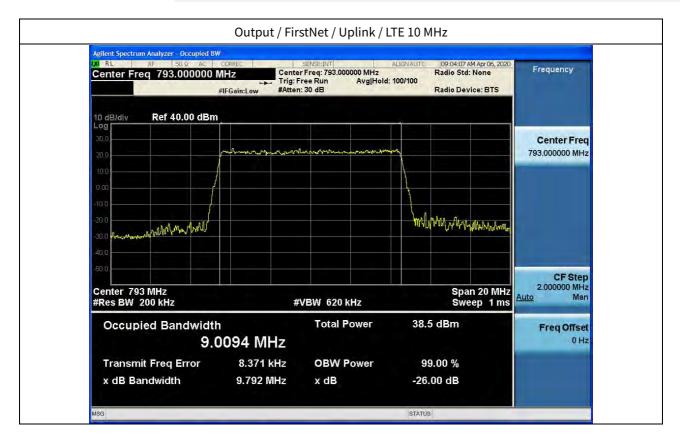


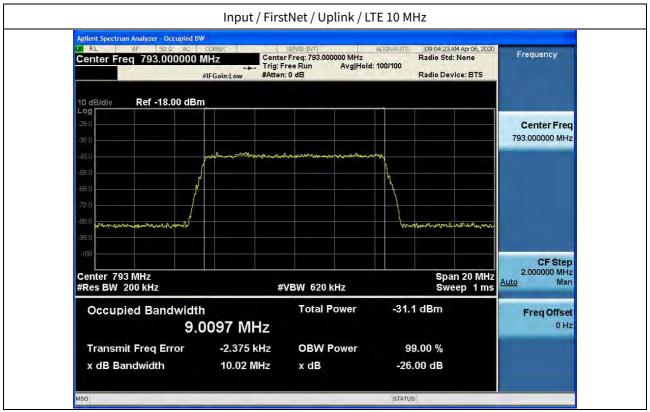




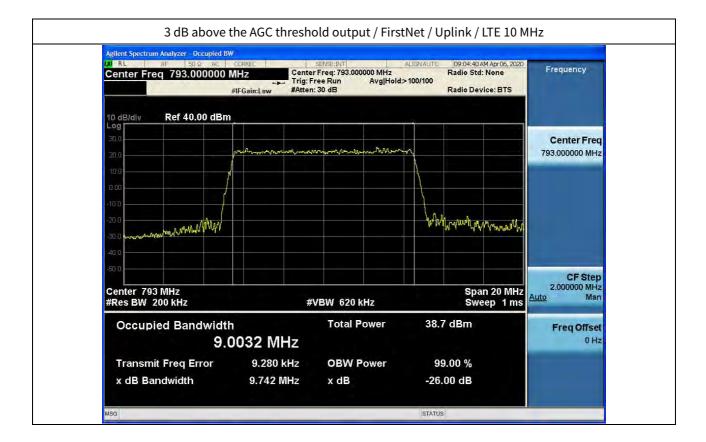




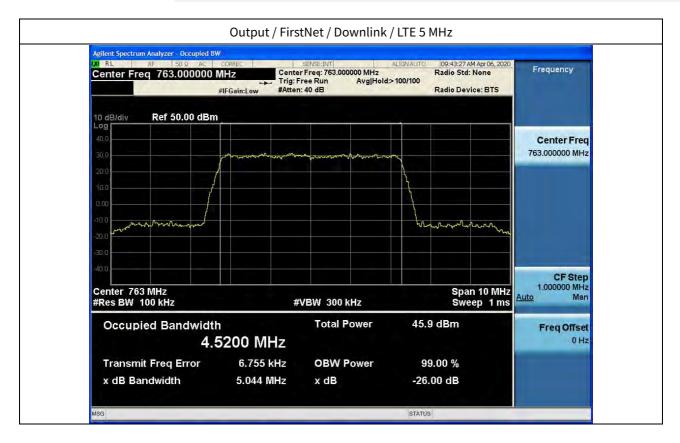


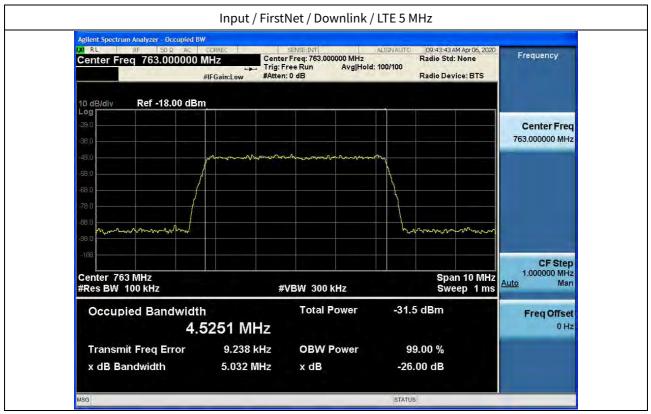




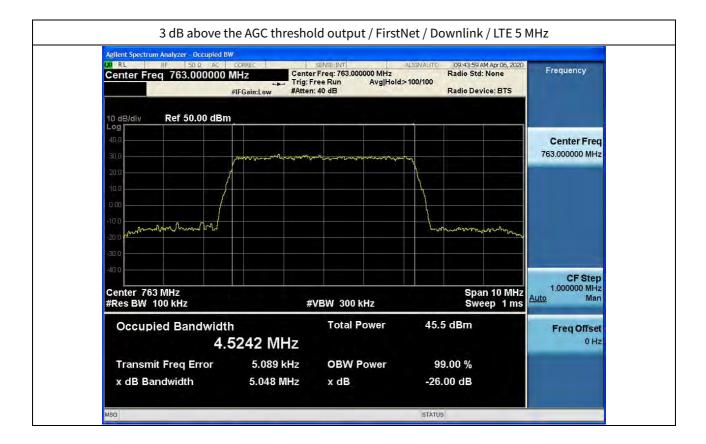




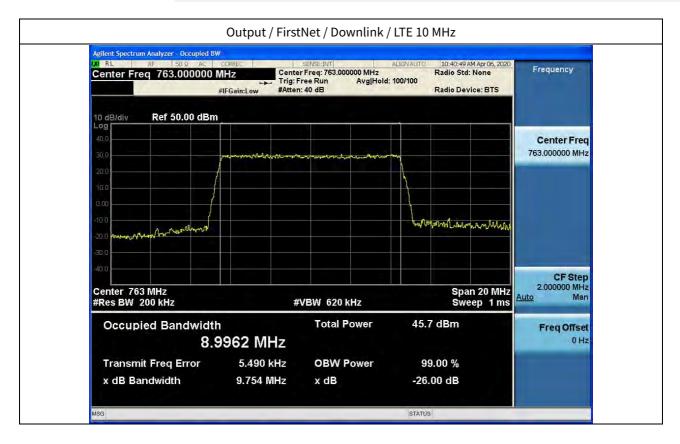


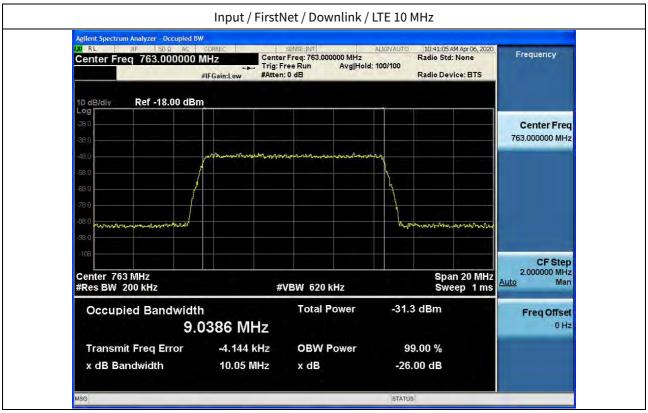




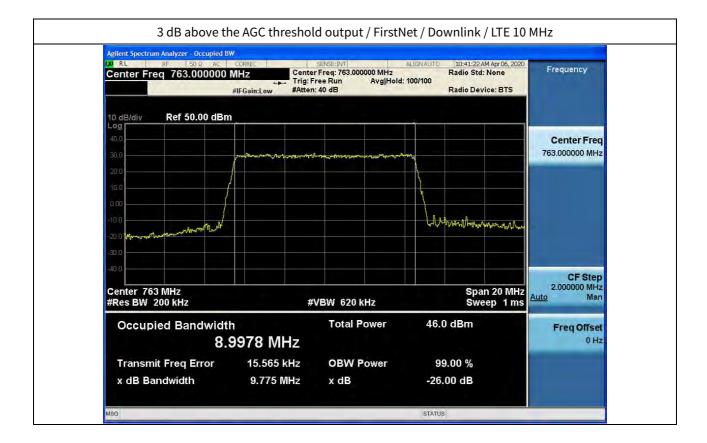














5.4. INPUT/OUTPUT POWER AND AMPLIFIER/BOOSTER GAIN

Test Requirement:

§ 2.1046 Measurements required: RF power output.

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

(b) For single sideband, independent sideband, and single channel, controlled carrier radiotelephone transmitters the procedure specified in paragraph (a) of this section shall be employed and, in addition, the transmitter shall be modulated during the test as specified and applicable in § 2.1046 (b) (1-5). In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.

(c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

§ 90.542 Broadband transmitting power limits.

(a) The following power limits apply to the 758-768/788-798 MHz band:

(1) Fixed and base stations transmitting a signal in the 758-768 MHz band with an emission bandwidth of 1 MHz or less must not exceed an ERP of 1000 watts and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts ERP in accordance with Table 1 of this section.

(2) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 758-768 MHz band with an emission bandwidth of 1 MHz or less must not exceed an ERP of 2000 watts and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts ERP in accordance with Table 2 of this section.

(3) Fixed and base stations transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP accordance with Table 3 of this section.

(4) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000



watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section. (5) Licensees of fixed or base stations transmitting a signal in the 758-768 MHz band at an ERP greater than 1000 watts must comply with the provisions set forth in paragraph (b) of this section.

(6) Control stations and mobile stations transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 30 watts ERP.

(7) Portable stations (hand-held devices) transmitting in the 758-768 MHz band and the 788-798 MHz band are limited to 3 watts ERP.

(8) For transmissions in the 758-768 MHz and 788-798 MHz bands, licensees may employ equipment operating in compliance with either of the following measurement techniques:

(i) The maximum composite transmit power shall be measured over any interval of continuous transmission using instrumentation calibrated in terms of RMS-equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, etc., so as to obtain a true maximum composite measurement for the emission in question over the full bandwidth of the channel.

(ii) A Commission-approved average power technique.

Table 1 to § 90.542(a)—Permissible Power and Antenna Heights for Base and Fixed Stations in the 758-768 MHz Band Transmitting a Signal With an Emission Bandwidth of 1 MHz or Less

Antenna height (AAT) in meters	Effective radiated power (ERP)
(feet)	(watts)
Above 1372 (4500)	65
Above 1220 (4000) To 1372 (4500)	70
Above 1067 (3500) To 1220 (4000)	75
Above 915 (3000) To 1067 (3500)	100
Above 763 (2500) To 915 (3000)	140
Above 610 (2000) To 763 (2500)	200
Above 458 (1500) To 610 (2000)	350
Above 305 (1000) To 458 (1500)	600
Up to 305 (1000)	1000

Table 2 to § 90.542(a)—Permissible Power and Antenna Heights for Base and Fixed Stations in the 758-768 MHz

Band Transmitting a Signal With an Emission Bandwidth of 1 MHz or Less

Antenna height (AAT) in meters (feet)	Effective radiated power (ERP) (watts)
Above 1372 (4500)	130
Above 1220 (4000) To 1372 (4500)	140



Above 1067 (3500) To 1220 (4000)	150
Above 915 (3000) To 1067 (3500)	200
Above 763 (2500) To 915 (3000)	280
Above 610 (2000) To 763 (2500)	400
Above 458 (1500) To 610 (2000)	700
Above 305 (1000) To 458 (1500)	1200
Up to 305 (1000)	2000

Table 3 to § 90.542(a)—Permissible Power and Antenna Heights for Base and Fixed Stations in the 758-768 MHz Band Transmitting a Signal With an Emission Bandwidth Greater Than 1 MHz

Antenna height (AAT) in meters (feet)	Effective radiated power (ERP) per MHz (watts/MHz)
Above 1372 (4500)	65
Above 1220 (4000) To 1372 (4500)	70
Above 1067 (3500) To 1220 (4000)	75
Above 915 (3000) To 1067 (3500)	100
Above 763 (2500) To 915 (3000)	140
Above 610 (2000) To 763 (2500)	200
Above 458 (1500) To 610 (2000)	350
Above 305 (1000) To 458 (1500)	600
Up to 305 (1000)	1000

Table 4 to § 90.542(a)—Permissible Power and Antenna Heights for Base and Fixed Stations in the 758-768 MHzBand Transmitting a Signal With an Emission Bandwidth Greater Than 1 MHz

Antenna height (AAT) in meters	Effective radiated power (ERP) per MHz
(feet)	(watts/MHz)
Above 1372 (4500)	130
Above 1220 (4000) To 1372 (4500)	140
Above 1067 (3500) To 1220 (4000)	150
Above 915 (3000) To 1067 (3500)	200
Above 763 (2500) To 915 (3000)	280
Above 610 (2000) To 763 (2500)	400
Above 458 (1500) To 610 (2000)	700
Above 305 (1000) To 458 (1500)	1200
Up to 305 (1000)	2000

(b) For base and fixed stations operating in the 758-768 MHz band in accordance with the provisions of paragraph (a)(5) of this section, the power flux density that would be produced by such stations through a combination of antenna height and vertical gain pattern must not exceed 3000 microwatts per square meter on the ground over the area extending to 1 km from the base of the antenna mounting structure.



Test Procedures:

Measurements were in accordance with the test methods section 3.5 of KDB 935210 D05 v01r04.

Adjust the internal gain control of the EUT to the maximum gain for which the equipment certification is being sought. Any EUT attenuation settings shall be set to their minimum value.

Input power levels (uplink and downlink) should be set to maximum input ratings while confirming that the device is not capable of operating in saturation (non-linear mode) at the rated input levels, including during the performance of the input/output power measurements.

3.5.2 Measuring the EUT mean input and output power

a) Connect a signal generator to the input of the EUT.

- b) Configure to generate the test signal.
- c) The frequency of the signal generator shall be set to the frequency f₀ as determined from out-of-band rejection test.

d) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.

e) Set the signal generator output power to a level that produces an EUT output level that is just below the AGC threshold, but not more than 0.5 dB below.

f) Measure and record the output power of the EUT; use ANSI C63.26-2015 subclause 5.2.4.4.1, for power measurement.

g) Remove the EUT from the measurement setup. Using the same signal generator settings, repeat the power measurement at the signal generator port, which was used as the input signal to the EUT, and record as the input power. EUT gain may be calculated as described in 3.5.5.

h) Repeat steps f) and g) with input signal amplitude set to 3 dB above the AGC threshold level.

- i) Repeat steps e) to h) with the narrowband test signal.
- j) Repeat steps e) to i) for all frequency bands authorized for use by the EUT.
- 3.5.5 Calculating amplifier, repeater, or industrial booster gain

After the input and output power levels have been measured as described in the preceding subclauses, the gain of the EUT can be determined from:

Gain (dB) = output power (dBm) - input power (dBm).

Report the gain for each authorized operating frequency band, and each test signal stimulus. **Note1.** If f₀ that determined from out-of-band test is smaller or greater than difference of test signal's center frequency and operation band block, test is performed at the lowest or the highest frequency that test signals can be passed.



Test Results:

Tabular data of Input / Output Power and Gain

Test Band	Link	Signal	f₀ Frequency (MHz)	Input Power (dBm)	Output Power (dBm)	Gain (dB)
Uplink FirstNet Downlink	LTE 5 MHz	795.50	-64.72	30.39	95.11	
	υριιηκ	LTE 10 MHz	793.00	-64.64	30.23	94.87
	LTE 5 MHz	765.50	-58.02	37.44	95.46	
		LTE 10 MHz	763.00	-57.94	37.23	95.17

Tabular data of Input / 3 dB above AGC threshold Output Power and Gain

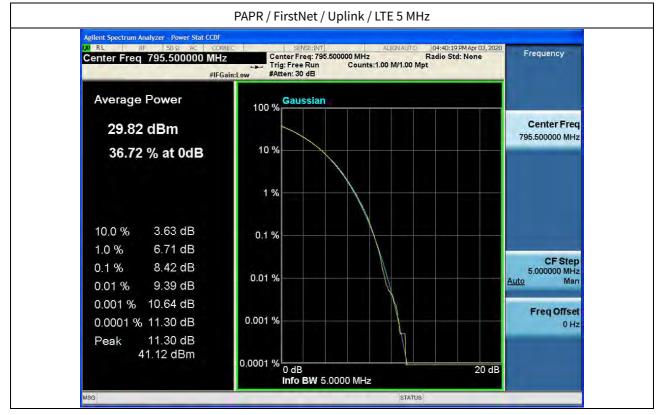
Test Band	Link	Signal	f₀ Frequency (MHz)	Input Power (dBm)	+3 dB Output Power (dBm)	Gain (dB)
FirstNet	Uplink	LTE 5 MHz	795.50	-64.72	30.30	95.02
		LTE 10 MHz	793.00	-64.64	30.16	94.80
	Downlink	LTE 5 MHz	765.50	-58.02	37.20	95.22
		LTE 10 MHz	763.00	-57.94	37.39	95.33

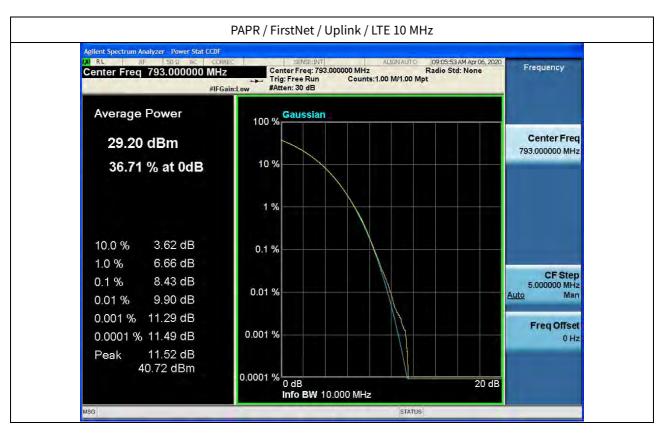
Tabular data of PAPR

Test Band	Link	Signal	f₀ Frequency (MHz)	0.1 % PAPR (dB)
FirstNet	Uplink	LTE 5 MHz	795.50	8.42
		LTE 10 MHz	793.00	8.43
	Downlink	LTE 5 MHz	765.50	8.42
		LTE 10 MHz	763.00	8.41



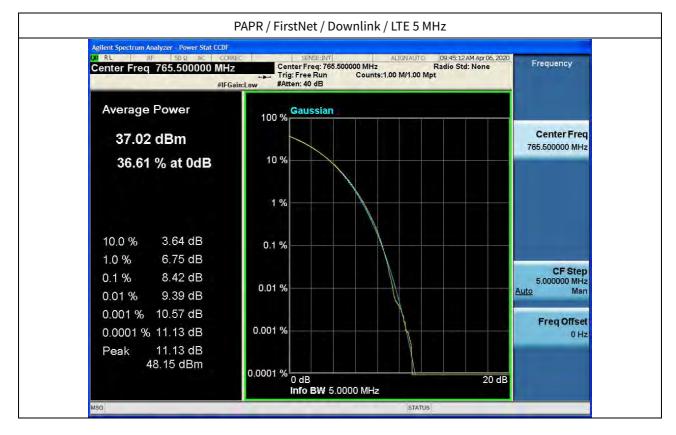
Plot data of PAPR

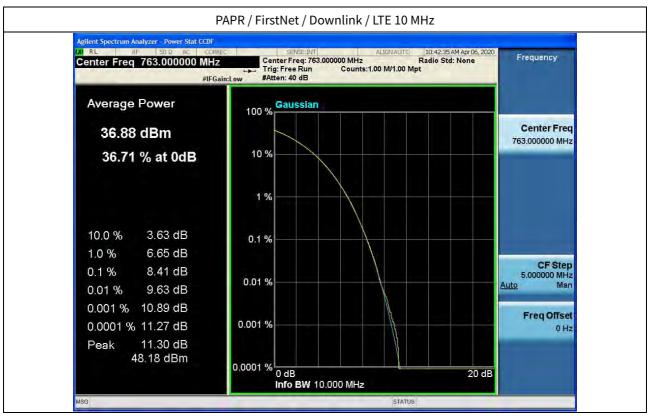














5.5. OUT-OF-BAND/OUT-OF-BLOCK EMISSIONS AND SPURIOUS EMISSIONS

Test Requirements:

§ 2.1051 Measurements required: Spurious emissions at antenna terminals.

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 90.219 Use of signal booters.

(e) Device Specifications. In addition to the general rules for equipment certification in § 90.203(a)(2) and part 2, subpart J of this chapter, a signal booster must also meet the rules in this paragraph.

(3) Spurious emissions from a signal booster must not exceed -13 dBm within any 100 kHz measurement bandwidth.

§ 90.543 Emission limitations.

- (e) For operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the 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, in accordance with the following:
- (1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.
- (2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.
- (3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.
- (4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.
- (5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.
- (f) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.



Test Procedures:

Measurements were in accordance with the test methods section 3.6 of KDB 935210 D05 v01r04.

Spurious emissions shall be measured using a single test signal sequentially tuned to the low, middle, and high channels or frequencies within each authorized frequency band of operation.

Out-of-band/out-of-block emissions (including intermodulation products) shall be measured under each of the following two stimulus conditions:

a) two adjacent test signals sequentially tuned to the lower and upper frequency band/block edges;

b) a single test signal, sequentially tuned to the lowest and highest frequencies or channels within the frequency band/block under examination.

NOTE—Single-channel boosters that cannot accommodate two simultaneous signals within the passband may be excluded from the test stipulated in step a).

3.6.2 Out-of-band/out-of-block emissions conducted measurements

a) Connect a signal generator to the input of the EUT.

If the signal generator is not capable of generating two modulated carriers simultaneously, then two discrete signal generators can be connected with an appropriate combining network to support this two-signal test. b) Set the signal generator to produce two AWGN signals as previously described.

c) Set the center frequencies such that the AWGN signals occupy adjacent channels, as defined by industry standards such as 3GPP or 3GPP2, at the upper edge of the frequency band or block under test.

d) Set the composite power levels such that the input signal is just below the AGC threshold, but not more than

0.5 dB below. The composite power can be measured using the procedures provided in KDB Publication 971168, but it will be necessary to expand the power integration bandwidth so as to include both of the transmit channels.

e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.

f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band.

g) Set the VBW = $3 \times RBW$.

h) Set the detector to power averaging (rms) detector.

i) Set the Sweep time = auto-couple.

j) Set the spectrum analyzer start frequency to the upper block edge frequency, and the stop frequency to the upper block edge frequency plus 300 kHz or 3 MHz, for frequencies below and above 1 GHz, respectively.

k) Trace average at least 100 traces in power averaging (rms) mode.

l) Use the marker function to find the maximum power level.

m) Capture the spectrum analyzer trace of the power level for inclusion in the test report.



- n) Repeat steps k) to m) with the composite input power level set to 3 dB above the AGC threshold.
- o) Reset the frequencies of the input signals to the lower edge of the frequency block or band under test.
- p) Reset the spectrum analyzer start frequency to the lower block edge frequency minus 300 kHz or 3 MHz, for

frequencies below and above 1 GHz, respectively, and the stop frequency to the lower band or block edge frequency.

q) Repeat steps k) to n).

r) Repeat steps a) to q) with the signal generator configured for a single test signal tuned as close as possible to the block edges.

s) Repeat steps a) to r) with the narrowband test signal.

t) Repeat steps a) to s) for all authorized frequency bands or blocks used by the EUT.

3.6.3 Spurious emissions conducted measurements

a) Connect a signal generator to the input of the EUT.

b) Set the signal generator to produce the broadband test signal as previously described.

c) Set the center frequency of the test signal to the lowest available channel within the frequency band or block.

d) Set the EUT input power to a level that is just below the AGC threshold, but not more than 0.5 dB below.

e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.

f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band of operation.

g) Set the VBW \geq 3 × RBW.

h) Set the Sweep time = auto-couple.

i) Set the spectrum analyzer start frequency to the lowest RF signal generated in the equipment, without going below 9 kHz, and the stop frequency to the lower band/block edge frequency minus 100 kHz or 1 MHz, as specified in the applicable rule part.

The number of measurement points in each sweep must be $\geq (2 \times \text{span/RBW})$, which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.

j) Select the power averaging (rms) detector function.

k) Trace average at least 10 traces in power averaging (rms) mode.

l) Use the peak marker function to identify the highest amplitude level over each measured frequency range. Record the frequency and amplitude and capture a plot for inclusion in the test report.

m) Reset the spectrum analyzer start frequency to the upper band/block edge frequency plus 100 kHz or 1 MHz, as specified in the applicable rule part, and the spectrum analyzer stop frequency to 10 times the highest frequency of the fundamental emission. The number of measurement points in each sweep must be \geq (2 × span/RBW), which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer. n) Trace average at least 10 traces in power averaging (rms) mode.

o) Use the peak marker function to identify the highest amplitude level over each of the measured frequency



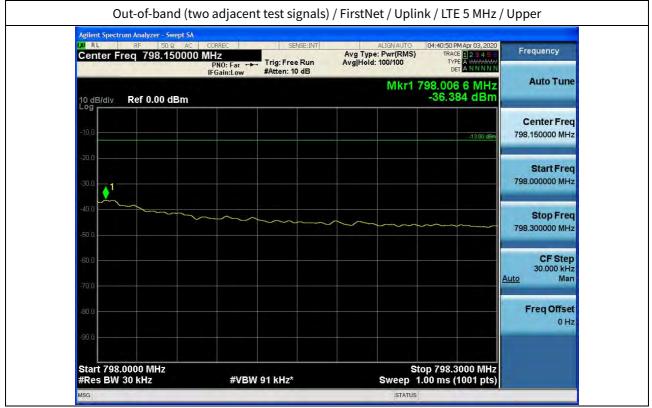
ranges. Record the frequency and amplitude and capture a plot for inclusion in the test report; also provide tabular data, if required.

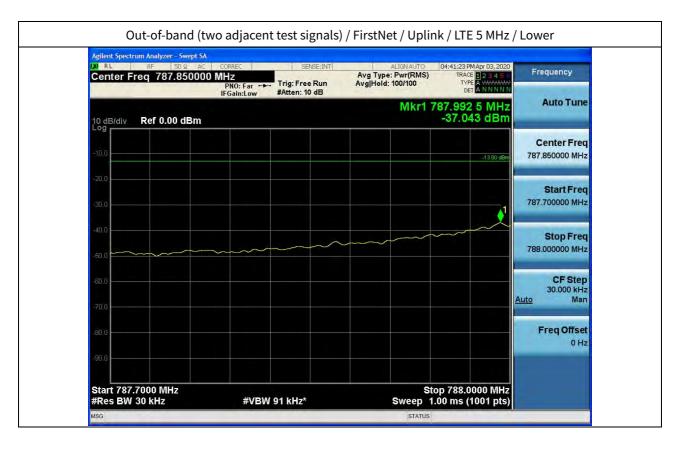
- p) Repeat steps i) to o) with the input test signals firstly tuned to a middle band/block frequency/channel, and then tuned to a high band/block frequency/channel.
- q) Repeat steps b) to p) with the narrowband test signal.
- r) Repeat steps b) to q) for all authorized frequency bands/blocks used by the EUT.

Note: In 9 kHz-150 kHz and 150 kHz-30 MHz bands, RBW was reduced to 0.1 % and 1 % of the reference bandwidth for measuring unwanted emission level (typically, 1 MHz if the authorized frequency band is above 1 GHz) and power was integrated.(1% = +30 dB, 10% = +20 dB)



Test Results: Plot data of Out-of-band/out-of-block emissions





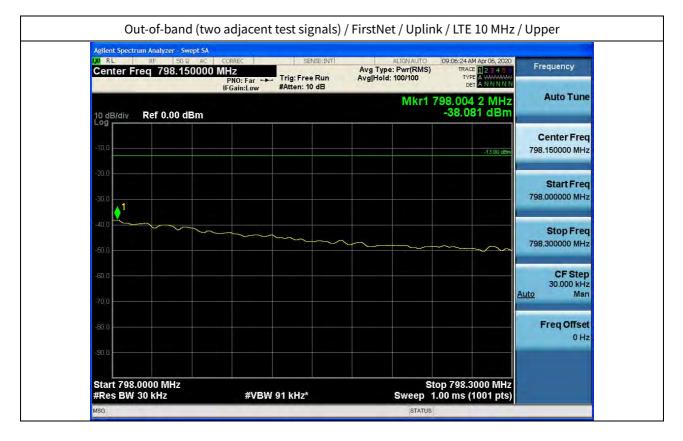


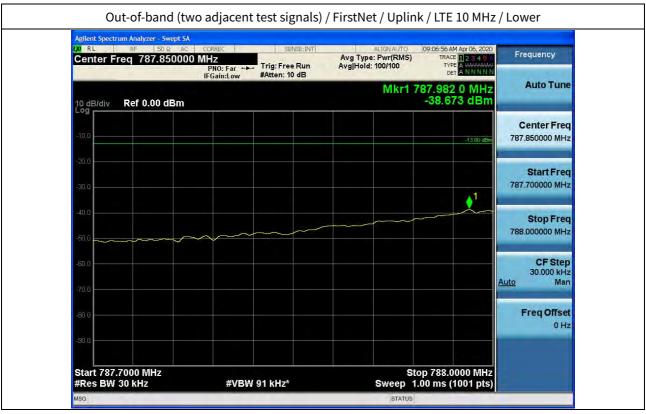
04/ RL RF 50 Ω A0 Center Freq 798.15000	O MHz PNO: Far +++ Trig: F	ree Run Avg H	ALIGNAUTO ype: Pwr(RMS) old: 100/100	04:41:06 PM Apr 03, 2020 TRACE 1 2 3 4 5 1 TYPE A WANNAN DET A N N N N N	Frequency
10 dB/div Ref 0.00 dBm	IFGain:Low #Atter	n: 10 dB		8.000 0 MHz -36.594 dBm	Auto Tune
-10.0				-13.00 dBm	Center Free 798.150000 MH
-20.0					Start Free 798.000000 MHz
-40.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~~~			Stop Fred 798.300000 MHz
-60.0					CF Step 30.000 kHz
-70.0					Auto Mar Freq Offset 0 Hz
-90.0					
Start 798.0000 MHz #Res BW 30 kHz	#VBW 91 kH	7*	Sween 1.0	o 798.3000 MHz 0 ms (1001 pts)	

Agilent Spectrum Analyzer - Swept SA OV RL RF 50 Q AC Center Freq 787.850000		ALIGNAUTO 04:41:39 PM Apr 03 Avg Type: Pwr(RMS) TRACE 12 Avg[Hold: 100/100 Type Avv DET A N N	455 Frequency
10 dB/div Ref 0.00 dBm		Mkr1 788.000 0 N -37.451 d	
-10.0		-13.0	Center Freq 787.850000 MHz
-20.0			Start Freq 787.700000 MHz
-40.0	~~~~~		Stop Freq 788.000000 MHz
-60.0			CF Step 30.000 kHz <u>Auto</u> Man
-70,0			Freq Offset 0 Hz
-90.0 Start 787.7000 MHz		Stop 788.0000 F Sweep 1.00 ms (1001	ЛНZ











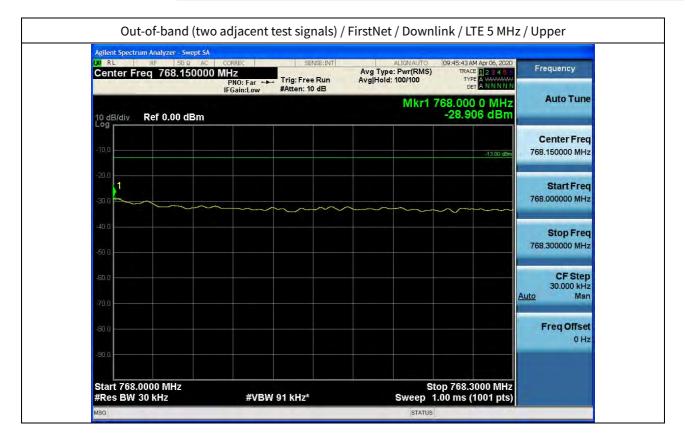


Agilent Spectrum Analyzer - Swept SA α RL RF 50 Ω AC	CORREC	SENSE:INT			06:40 AM Apr 06, 2020	Frequency
Center Freq 798.15000	O MHZ PNO: Far ↔→ IFGain:Low	Trig: Free Run #Atten: 10 dB	Avg Type: Avg Hold: 1		TRACE 1 2 3 4 5 5 TYPE A WARAWAY DET A N N N N N	
	II OUMEDIA			Mkr1 798	.005 1 MHz 38.058 dBm	Auto Tune
IO dB/div Ref 0.00 dBm					56.056 UBIII	
10.0						Center Free
					-13.00 dBm	798.150000 MHz
20.0						Start Fred
30.0						798.000000 MHz
40.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					Stop Freq
50.0						798.300000 MHz
60.0						CF Step
						30.000 kHz Auto Man
70.0						
80.0						Freq Offset
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Start 798.0000 MHz				Otom	798.3000 MHz	

Agilent Spectrum Analyzer - Swept		SENSE:INT	ALIGN AUTO	09:07:13 AM Apr 06, 2020	
Center Freq 787.8500	00 MHz PNO: Far ↔ Trig	: Free Run en: 10 dB	Avg Type: Pwr(RMS) Avg Hold: 100/100	TRACE 12345 TYPE A WWAWAW DET A NNNNN	Frequency
10 dB/div Ref 0.00 dBm			Mkr1	787.996 7 MHz -39.070 dBm	Auto Tune
-i0,0				-13.00 dBm	Center Fred 787.850000 MH:
-20.0					Start Freq 787.700000 MHz
-40.0					Stop Freq 788.000000 MHz
-60.0					CF Step 30.000 kHz
-70,0					<u>Auto</u> Man
-80,0					Freq Offset 0 Hz
Start 787.7000 MHz #Res BW 30 kHz	#VBW 91 k	H7*	Sween_1	top 788.0000 MHz 1.00 ms (1001 pts)	







Center Freq 757		Far 🛶 Trig: Free Ru	Avg Type: P Avg Hold: 10	wr(RMS) TR 0/100	ACE 123455 TYPE A WWWWW DET A NNNNN	Frequency
10 dB/div Ref 0.0	0 dBm			Mkr1 757.99 -28.	96 1 MHz 925 dBm	Auto Tune
-10,0					-13.00 dBm	Center Fred 757.850000 MHz
-20.0						Start Freq 757.700000 MHz
-40.0						Stop Freq 758.000000 MHz
-60.0						CF Step 30.000 kHz Auto Man
-80,0						Freq Offset 0 Hz
-90,0						

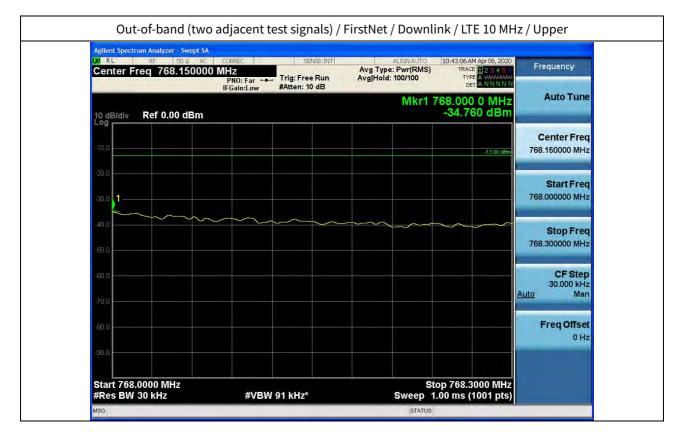


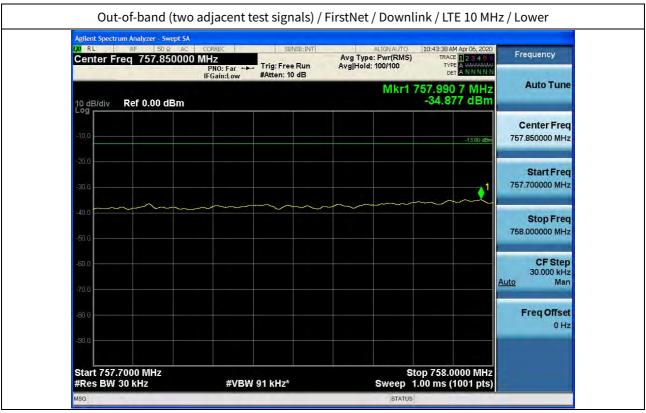
M RL RF 50Ω A Center Freq 768.1500	Avg Type: Pwr(RMS) TRACE	5 Frequency
10 dB/div Ref 0.00 dBm	Mkr1 768.000 0 M -28.704 dE	Hz Auto Tune Sm
-10.0	-1300	Center Fred
-20.0		Start Freq 768.000000 MHz
-40.0		Stop Freq 768.300000 MHz
-60.0		CF Step 30.000 kHz Auto Man
-80.0		Freq Offset
-90,0		

Agilent Spectrum Analyzer - Swept SA (M) RL RF 50 Q AC Center Freq 757.850000		ALIGNAUTO 09:46:32AM Apr 06, 20 Avg Type: Pwr(RMS) TRACE Avg Hold: 100/100 TYPE A Det A MININ	Frequency
10 dB/div Ref 0.00 dBm		Mkr1 758.000 0 MH -29.821 dBr	z Auto Tune n
-10.0		-13.00 dB	Center Freq 757.850000 MHz
-20.0			Start Freq 757.700000 MHz
-40.0			Stop Freq 758.000000 MHz
-60.0			CF Step 30.000 kHz <u>Auto</u> Man
-80.0			Freq Offset 0 Hz
-3000 Start 757.7000 MHz #Res BW 30 kHz	#VBW 91 kHz*	Stop 758.0000 MH Sweep 1.00 ms (1001 pt	z











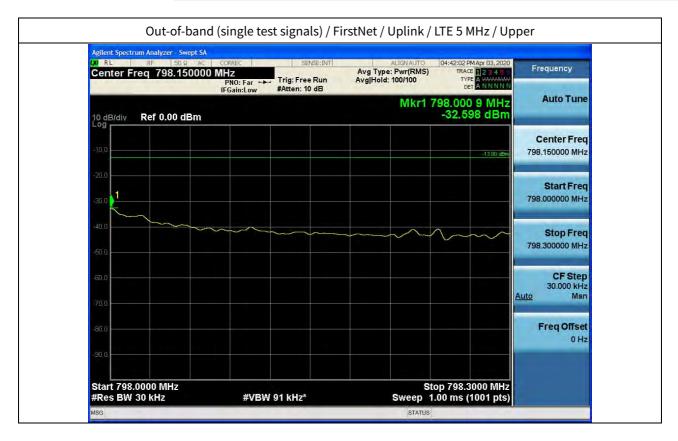


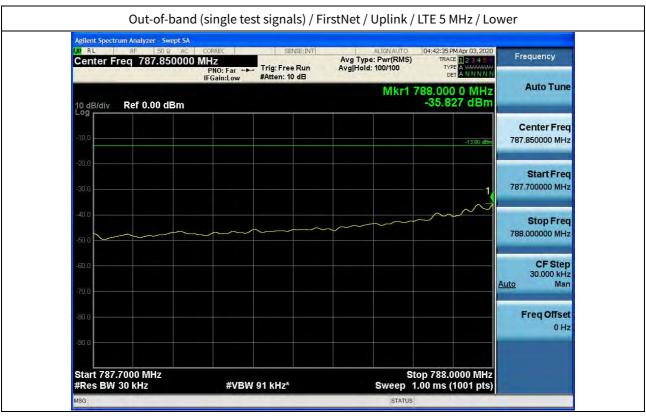
Center Freq 768.150000	MHz PNO: Far ↔ Trig: Free Run	ALIGNAUTO 10:43:22 AM Apr 06, 202 Avg Type: Pwr(RMS) TRACE 2 4 5 Avg[Hold: 100/100 TYPE 4 DET A NNNN	Frequency
10 dB/div Ref 0.00 dBm	IFGain:Low #Atten: 10 dB	Mkr1 768.033 6 MH -30.376 dBn	z Auto Tune
-10.0		-13.00 dB	Center Free 768.150000 MH
-20.0			Start Fred 768.000000 MHz
-40.0			Stop Free 768.300000 MHz
-60.0			CF Step 30,000 kHz Auto Mar
-70.0 -80.0			Freq Offset
-90.0			

Agilent Spectrum Analyzer - Swept SA (M) RL RF 50 Q AC Center Freq 757.850000		Avg Type: Pwr(RMS) Avg Hold: 100/100	0:43:55 AM Apr 06, 2020 TRACE 2 3 4 5 TYPE A WWWWW DET A NNNNN	Frequency
10 dB/div Ref 0.00 dBm		Mkr1 75	7.989 2 MHz -31.114 dBm	Auto Tune
-10.0			13.00 dBm	Center Freq 757.850000 MHz
-20.0			1	Start Freq 757.700000 MHz
-40 0 -50 0				Stop Freq 758.000000 MHz
-60.0				CF Step 30.000 kHz <u>Auto</u> Man
-80,¢				Freq Offset 0 Hz
-300 Start 757.7000 MHz #Res BW 30 kHz	#VBW 91 kHz*	Stop	o 758.0000 MHz 0 ms (1001 pts)	











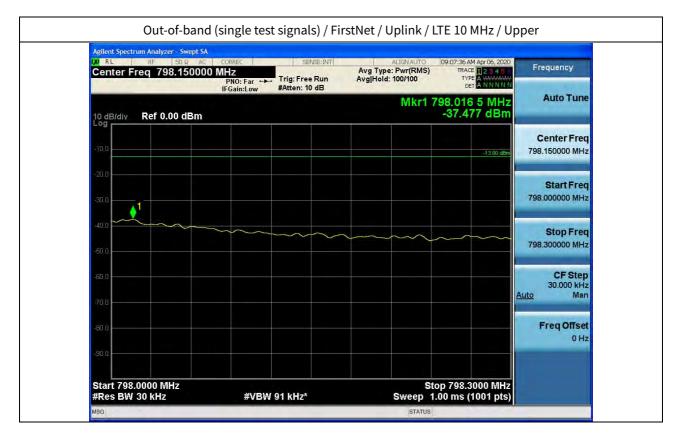


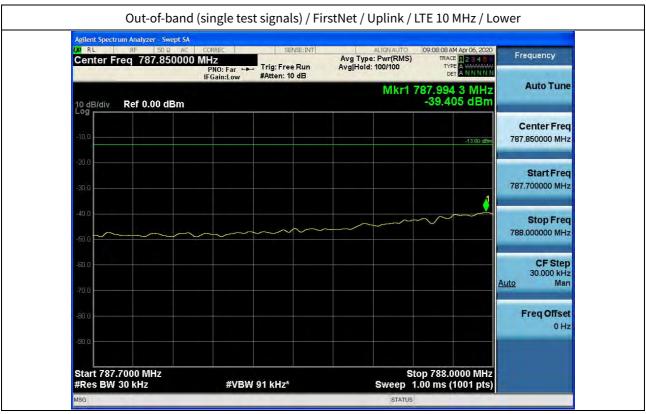
ເຜັ RL RF 50 ຊ AC Center Freq 798.15000	SENSE:INT → Trig: Free Run #Atten: 10 dB	ALIGNAUTO Avg Type: Pwr(RMS) Avg Hold: 100/100	04:42:19 PM Apr 03, 2020 TRACE 1 2 3 4 5 5 TYPE A MARAMAN DET A N N N N N	Frequency
10 dB/div Ref 0.00 dBm		Mkr1	798.000 0 MHz -33.756 dBm	Auto Tune
-10.0			-13.00 dBm	Center Freq 798.150000 MHz
-20.0				Start Freq 798.000000 MHz
-40.0	 			Stop Freq 798.300000 MHz
-60,0				CF Step 30.000 kHz <u>Auto</u> Man
-70,0				Freq Offset
-90.0				

Agilent Spectrum Analyzer - Swept S V RL RF 50 Q A Center Freq 787.85001	CORREC SENSE:INT DO MHZ PNO: Far ↔ Trig: Free Run	ALIGNAUTO 04:42:51 PMApr 03 Avg Type: Pwr(RMS) TRACE 12 Avg[Hold: 100/100 TVPE A DET ANN DET ANN	2020 4 5 5 Avvi
10 dB/div Ref 0.00 dBm	IFGain:Low #Atten: 10 dB	Mkr1 787.993 1 M -35.383 dl	Hz Auto Tune
-10.0		130	Center Fred 787.850000 MHz
-20.0			Start Freq 787.700000 MHz
-40.0			Stop Freq 788.000000 MHz
-60.0			CF Step 30.000 kHz <u>Auto</u> Man
-80.0			Freq Offset 0 Hz
3000 Start 787.7000 MHz #Res BW 30 kHz	#VBW 91 kHz*	Stop 788.0000 M Sweep 1.00 ms (1001	AHz











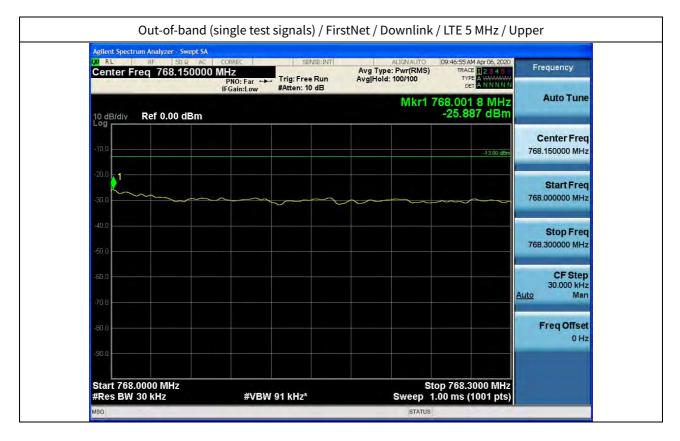


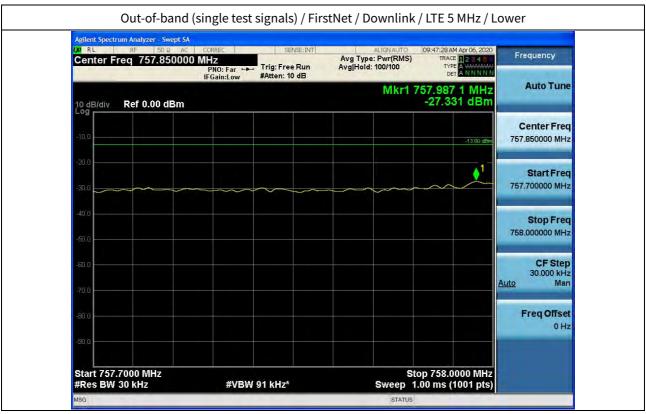
Center Fre	a Analyzer - Swept SA RF 50 Ω AC q 798.150000 Ν	PNO: Far ↔	SENSE:INT Trig: Free Run #Atten: 10 dB	ALIG Avg Type: Pw Avg Hold: 100/	r(RMS)	52 AM Apr 06, 2020 RACE 1 2 3 4 5 TYPE A WWWWWW DET A N N N N N	Frequency
10 dB/div	Ref 0.00 dBm			n	/kr1 798.0 -38	00 0 MHz .020 dBm	Auto Tune
-10.0						-13.00 dBm	Center Freq 798.150000 MHz
-20.0							Start Freq 798.000000 MHz
-40.0		~~~~					Stop Freq 798.300000 MHz
-60.0							CF Step 30.000 kHz Auto Man
-70.0							Freq Offset
-90,0							

Agilent Spectrum Analyzer - Swept S/ 04 RL RF 50.0 AC Center Freq 787.85000	CORREC SENSE:I	Avg Type: Pwr(RMS) TRACE n Avg Hold: 100/100 Type A Det A	2345 Frequency
10 dB/div Ref 0.00 dBm		Mkr1 788.000 0 -39.760	
-10.0			13:00 dBm 787.850000 MHz
-20.0			Start Freq 787.700000 MHz
-40.0		~~~~~	Stop Freq 788.000000 MHz
-60.0			CF Step 30.000 kHz <u>Auto</u> Man
-80,0			Freq Offset 0 Hz
Start 787.7000 MHz #Res BW 30 kHz	#VBW 91 kHz*	Stop 788.000 Sweep 1.00 ms (100	











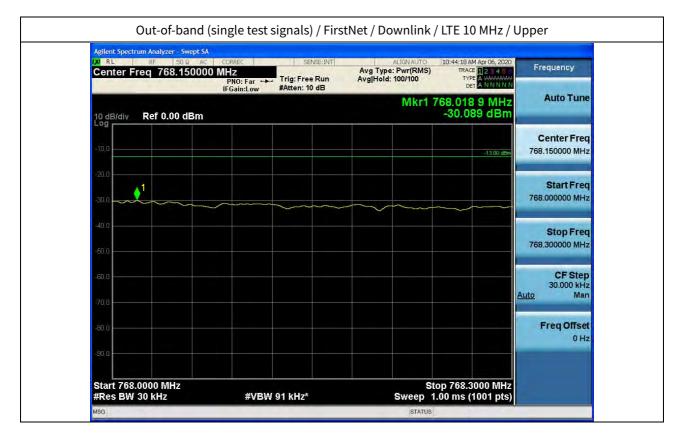


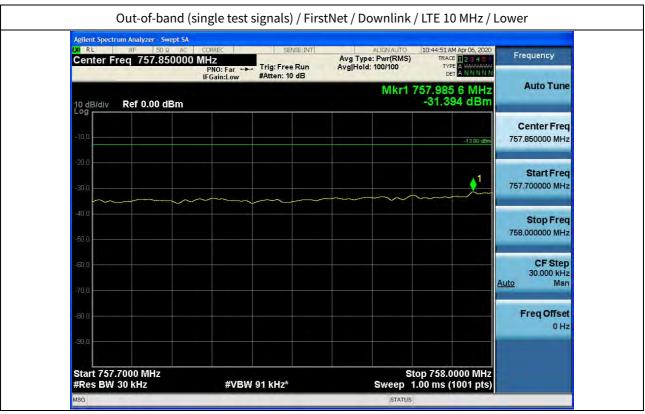
Agilent Spectrum Analyzer - Swept M RL RF 50 Ω Center Freq 768.1500	AC CORREC SENSE:INT DO MHZ PNO: Far +++ Trig: Free Run	ALIGNAUTO Avg Type: Pwr(RMS Avg[Hold: 100/100		Frequency
10 dB/div Ref 0.00 dBn	a sum su	Mkr1	768.009 9 MHz -26.055 dBm	Auto Tune
-10,0			-13.00 dBm	Center Free 768.150000 MH
-20.0			~	Start Free 768.000000 MH
-40.0				Stop Free 768.300000 MH
-60.0				CF Step 30.000 kH: <u>Auto</u> Mar
-80.0				Freq Offset 0 Hz
-90.0 Start 768.0000 MHz			Stop 768.3000 MHz	

Agilent Spectrum Analyzer - Swept S M RL RF 50 Q A Center Freq 757.85000	C CORREC SENSE:INT DO MHZ PNO: Far ++++ Trig: Free Run	ALIGNAUTO 09:47:44AM Apr 06, 2 Avg Type: Pwr(RMS) TRACE 2 4 Avg Hold: 100/100 Type 2 4 DET A 11110 DET A 11110	Frequency
10 dB/div Ref 0.00 dBm	IFGain:Low #Atten: 10 dB	Mkr1 757.992 2 Mi -25.557 dB	z Auto Tune
-jū,0		-13.00	Center Freq 757.850000 MHz
-20.0			Start Freq 757.700000 MHz
-40.0			Stop Freq 758.000000 MHz
-60.0			CF Step 30.000 kHz <u>Auto</u> Man
-80.0			Freq Offset 0 Hz
-2000 Start 757,7000 MHz #Res BW 30 kHz	#VBW 91 kHz*	Stop 758.0000 M Sweep 1.00 ms (1001 p	









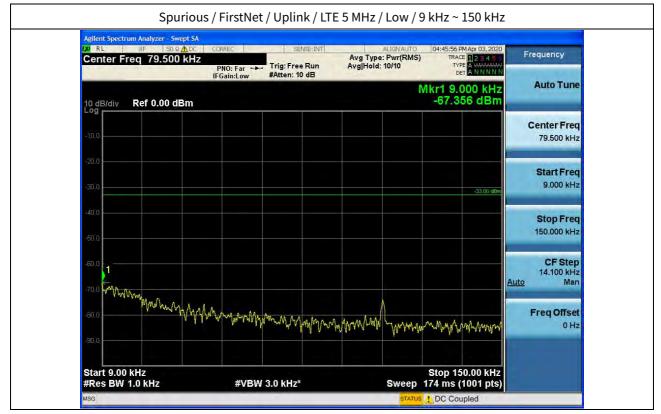


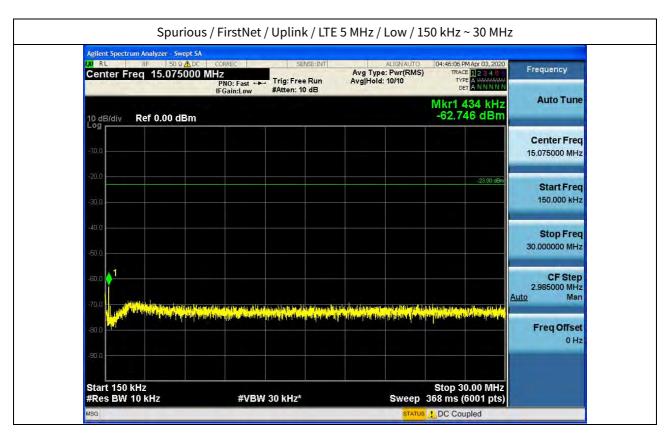
00 RL RF 50 Ω AC Center Freq 768.15000		, Trig: Free Run #Atten: 10 dB	ALIGN AUTO Avg Type: Pwr(RMS Avg Hold: 100/100	10:44:34 AM Apr 06, 2020 TRACE 1 2 3 4 5 TYPE A MANANA DET A N N N N N	Frequency
10 dB/div Ref 0.00 dBm			Mkr1	768.004 8 MHz -29.832 dBm	
-10.0				-13.00 dBm	Center Freq 768.150000 MHz
-20.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Start Freq 768.000000 MHz
-40.0					Stop Freq 768.300000 MHz
-60.0					CF Step 30.000 kHz Auto Man
-80.0					Freq Offset
-90,0					

Agilent Spectrum Analyzer - Swept SA	CORREC SENSE:INT		10:45:07 AM Apr 06, 2020	Francisco
Center Freq 757.85000	O MHZ PNO: Far ↔ Trig: Free Run IFGain:Low #Atten: 10 dB	Avg Type: Pwr(RMS) Avg Hold: 100/100	TRACE 1 2 3 4 5 5 TYPE A WWWWW DET A NNNNN	Frequency
10 dB/div Ref 0.00 dBm		Mkr1	757.997 3 MHz -30.380 dBm	Auto Tune
-iù,0			-13.00 dBm	Center Free 757.850000 MH:
-20.0				Start Free 757.700000 MH:
-40.0				Stop Free 758.000000 MH;
-60.0				CF Step 30.000 kHz <u>Auto</u> Mar
-80.0				Freq Offset 0 Hz
-3000 Start 757.7000 MHz #Res BW 30 kHz	#VBW 91 kHz*	S	top 758.0000 MHz 1.00 ms (1001 pts)	



Plot data of Spurious Emissions





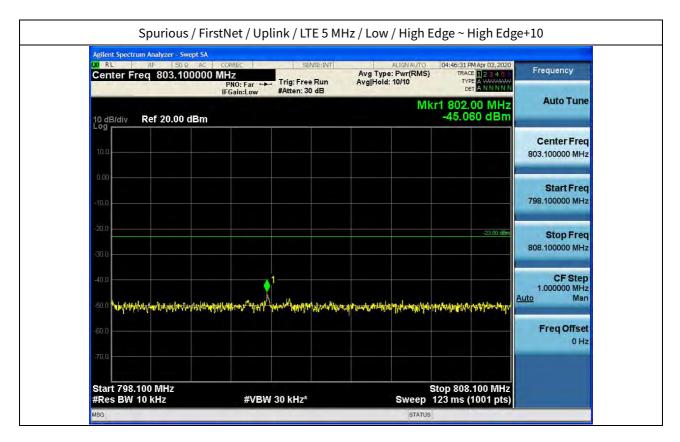


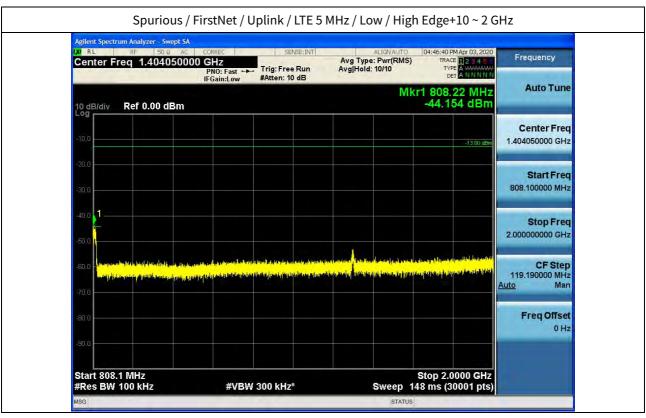


Agilent Spectrum Analyzer - Sv V RL RF 50 S Center Freq 403.95	Ω AC CORREC		Avg Ty In Avg Ho	ALIGNAUTO pe: Pwr(RMS) Id: 10/10	04:46:15 PM Apr TRACE 1 2 TYPE A DET A N	R 1455 Frequency
10 dB/div Ref 0.00 d	IBm			Mk	r1 761.07 -50.802	
-10,0						Center Freq 403.950000 MHz
-20.0						Start Freq 30.000000 MHz
-40.0						Stop Freq 777.900000 MHz
-60.0 <mark>paratet ante provinsi attivent</mark> -60.0 paratet ante in gas di se ara paratet	n y a hanna a shikarakin darida miya Inaniya sha ka panayan ini a tarah	n an de der sin de s Reference de sin de s				
-80.0						Freq Offset
-90,0						

Center Freq 782.900000 M	CORREC SENSE:INT		ACE 1 2 3 4 5 Frequency
and the second sec	PNO: Far ↔ Trig: Free Run IFGain:Low #Atten: 30 dB	AvalHold: 10/10	YPE A MARAMAN DET A NNNNN
10 dB/div Ref 20.00 dBm		Mkr1 787 -45.0	.89 MHz Auto Tune 038 dBm
10.0			Center Free 782.900000 MHz
0.00 10,0			Start Free 777.900000 MHz
-20.0			-23.00 dBm Stop Fred 787.900000 MHz
+40.0			1 CF Step 1.00000 MHz 4
-50.0 -10.0	waterfloorsing his and his	When the share the second shower and the second	Freq Offset
-70,0			

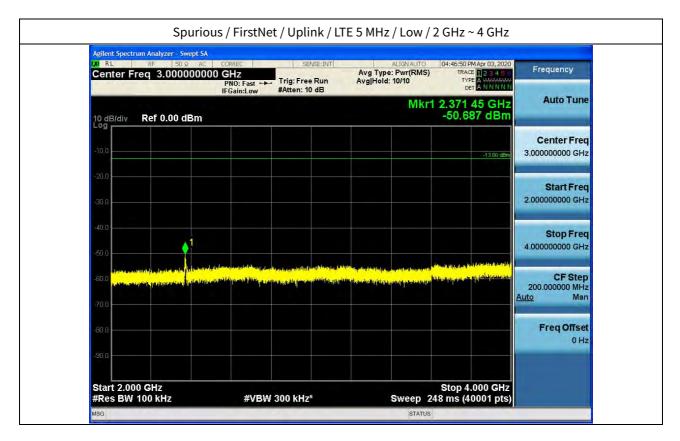


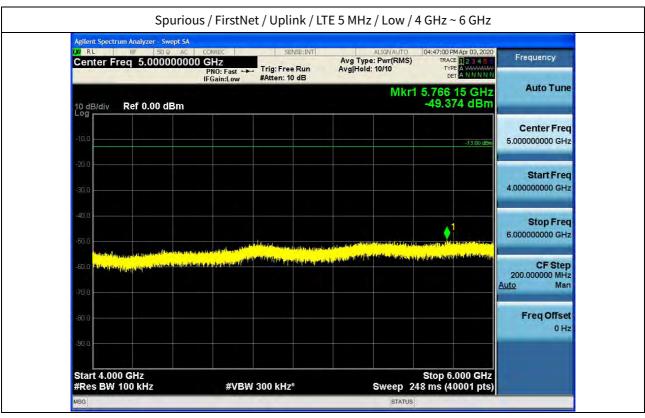






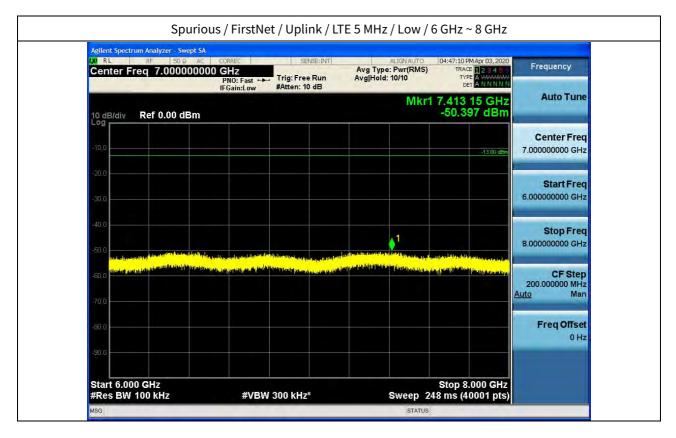


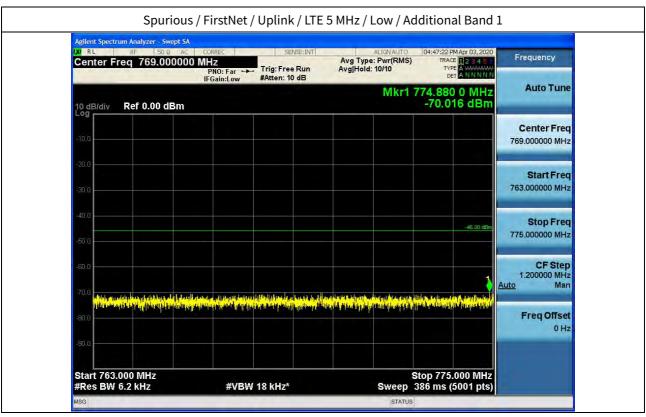




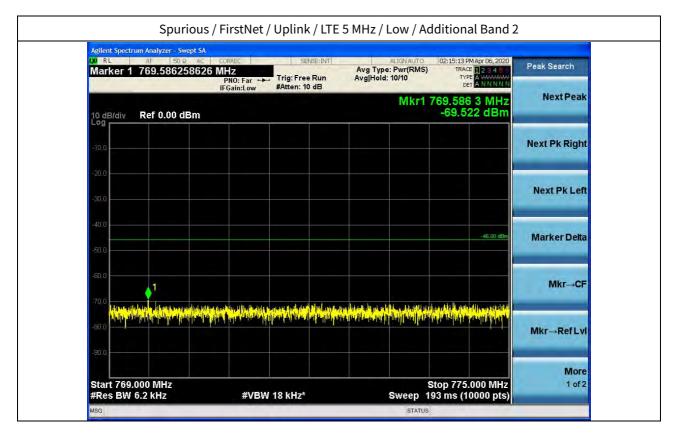








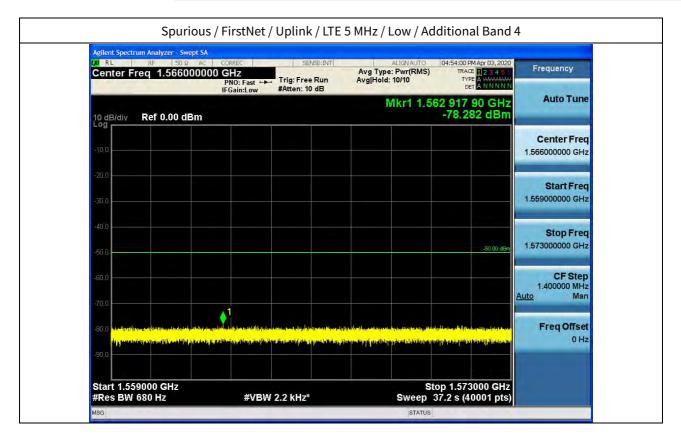


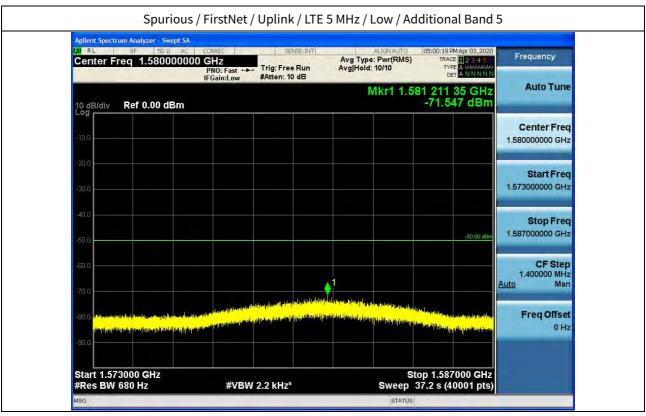






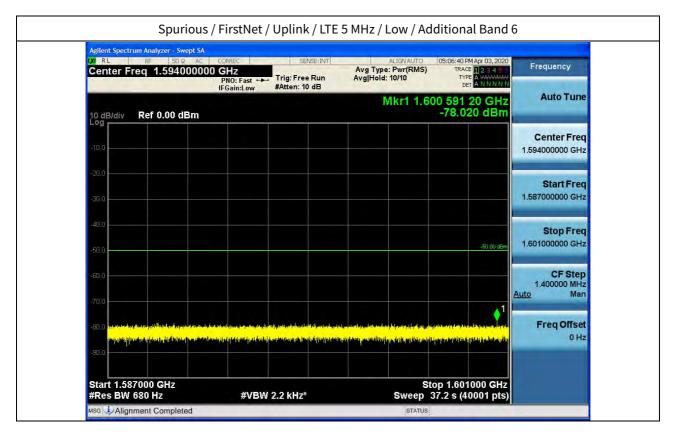


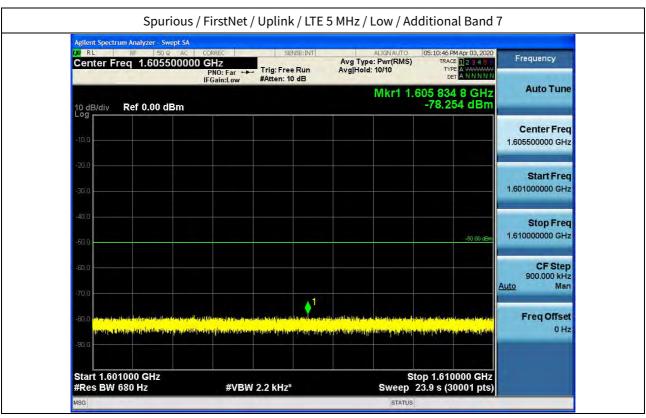






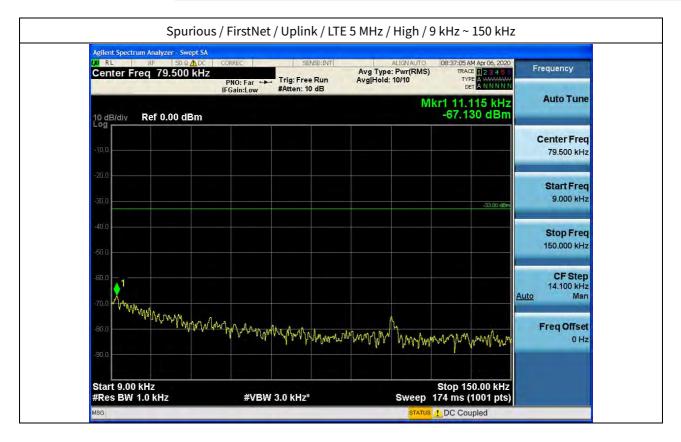


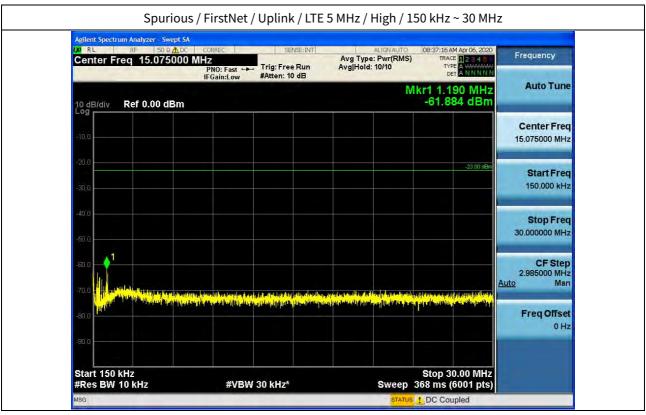














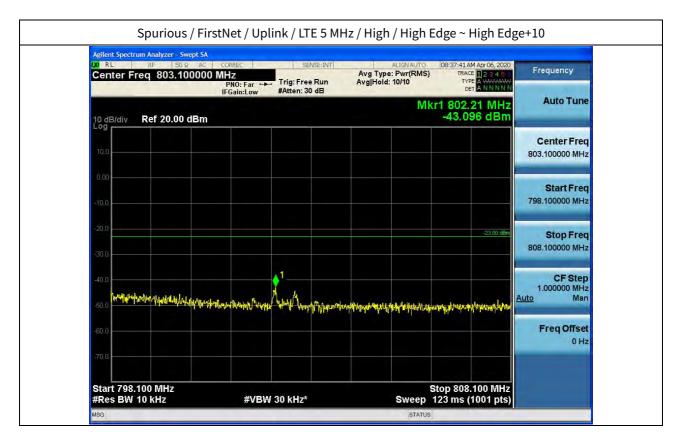


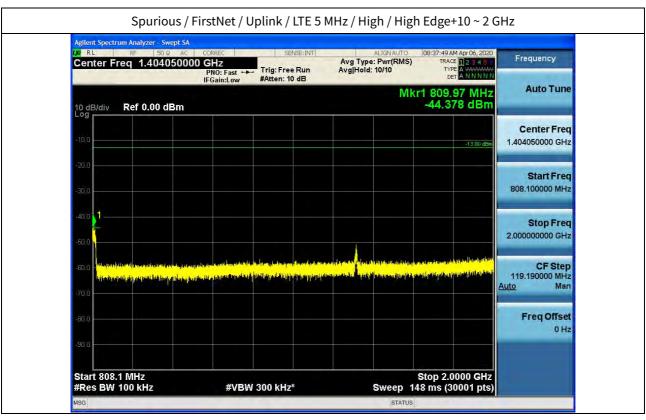
04 RL RF 50 Ω Center Freq 403.950		SENSE:INT → Trig: Free Run #Atten: 16 dB	ALIGNAUTO Avg Type: Pwr(RMS Avg Hold: 10/10		Frequency
10 dB/div Ref 0.00 dB	m		М	kr1 743.98 MHz -50.621 dBm	Auto Tune
-10,0				-13:00 dBm	Center Freq 403.950000 MHz
-20.0					Start Freq 30.000000 MHz
-40.0				↓ ¹	Stop Freq 777.900000 MHz
-60.0 <mark>aliantiyaliyaliyaliyada aliyada a</mark>	ha a dhadha ann a' bhlan an inn _{Ann} a dealan an 1911 an an amh ann an	na la facel a disconsidirazioni di consecto di consecto di consecto di Angli da pagna dagone presegi tergeneri bile ny regi	nst at sell of his stration of Party is a solution of a light pole (new family tip) (tense my rit for y)	n de la strander en de la d Presentação de la declara de	CF Step 74.790000 MHz <u>Auto</u> Man
-80.0					Freq Offset 0 Hz
-90,0					

Agilent Spectrum Analyzer - Swept SA	copper line visit		2022
Center Freq 782.900000		ALIGN AUTO 08:37:32 AM Apr 06, Avg Type: Pwr(RMS) TRACE 123 Avg Hold: 10/10 TYPE A WW	455 Frequency
	IFGain:Low #Atten: 30 dB	Mkr1 787.88 M	
10 dB/div Ref 20.00 dBm		-47.508 di	Bm
10.0			Center Freq 782.900000 MHz
0,00			-
-10,0			Start Freq 777.900000 MHz
-20.0		-23.0	o dem Stop Freq
-30.0			787.900000 MHz
÷40,0			CF Step 1.000000 MHz
-50.0 ฟิฟฟาปลายางการเป็นสายประกา	where we	ananalisha manananananananananananananananananana	Auto Man
-60.0			Freq Offset 0 Hz
-70,0			
Start 777.900 MHz #Res BW 10 kHz	#VBW 30 kHz*	Stop 787.900 M Sweep 123 ms (1001	









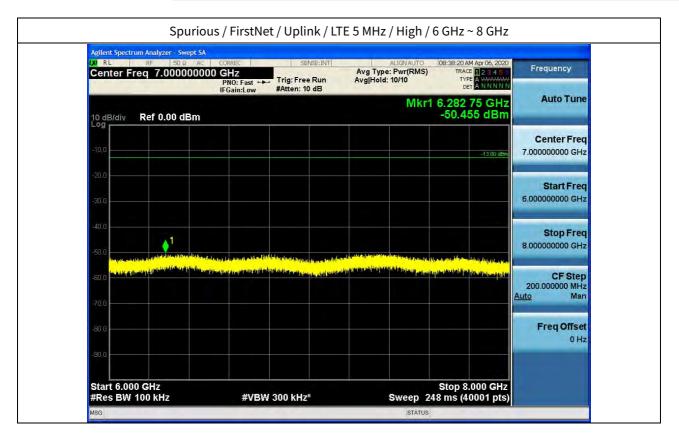


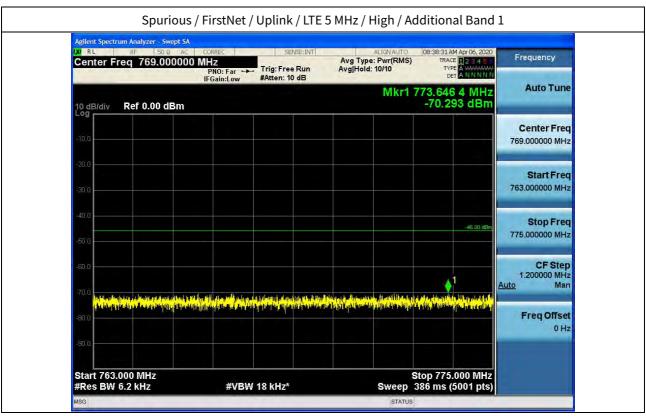
07 RL RF 50Ω AC Center Freq 3.0000000		TYPE A WATATALANA	requency
10 dB/div Ref 0.00 dBm	IFGain:Low #Atten: 10 dB	B6 75 GHz 938 dBm	Auto Tune
-10,0			Center Fred
-20.0		2.00	Start Freq
-40.0		4.00	Stop Freq
within many strends and an and proved the	a dalam miliki na kana kaki ka na dala mangan pangan pangan pangan pangan pangan pangan pangan pangan pangan p Pangan pangan pangan Pangan pangan	and confident dent of the second s	CF Step 0.000000 MHz Man
-80.0			Freq Offset
.90.0 Start 2.000 GHz		p 4.000 GHz	

Iteration #Atten: 10 dB Det MINNN Mkr1 5.908 80 GHz -49.866 dBm Auto Tune 10 dB/div Ref 0.00 dBm -49.866 dBm Center Freq 5.00000000 GHz -100 -1300 dm -1300 dm -1300 dm -1300 dm -100 -1300 dm -1300 dm -1300 dm -1300 dm -1300 dm -100 -1300 dm -1300 dm	Start 4.000 GHz			op 6.000 GHz
If Gains Low #Atten: 10 dB Det ANNNN Mkr1 5.908 80 GHz -49.866 dBm Auto Tune 10 dB/div Ref 0.00 dBm -49.866 dBm 10.0 -1300 dBm -49.866 dBm 20.0 -1300 dBm -1300 dBm 40.0 -1300 dBm -1300 dBm -20.0 -1300 dBm -1300 dBm -20.0 -1300 dBm -1300 dBm -20.0 -1300 dBm -1300 dBm -40.0 -13	-80.0			
Individual Individual Individual Individual Individual Auto Tune 10 dB/div Ref 0.00 dBm -49.866 dBm -49.866 dBm Center Freq 10.0 -1300 dBm -1300 dBm -1300 dBm -1300 dBm Center Freq 20.0 -1300 dBm -1300 dBm -1300 dBm -1300 dBm Center Freq 30.0 -1300 dBm -1300 dBm -1300 dBm -1300 dBm Center Freq 40.0 -1300 dBm -1300 dBm -1300 dBm -1300 dBm -1300 dBm 40.0 -1300 dBm -1300 dBm -1300 dBm -1300 dBm -1300 dBm -20.0 -1300 dBm -1300 dBm -1300 dBm -1300 dBm -1300 dBm -20.0 -1300 dBm -1300 dBm -1300 dBm -1300 dBm -1300 dBm -20.0 -1300 dBm -1300				200.00000 MF
Inc. day #Atten: 10 dB Der ANNNN Inc. day #Atten: 10 dB Mkr1 5.908 80 GHz -49.866 dBm Auto Tune 10 dB/div Ref 0.00 dBm -49.866 dBm Center Freq -10.0 -1300 dBm -3300 dBm 5.000000000 GHz -20.0 -3300 dBm -3300 dBm 5.000000000 GHz -40.0 -3300 dBm -3300 dBm -3300 dBm		ان در این به معنی این با این این این این این این این این این ای	and the second state of the second state of the second second second second second second second second second	CF Ste
Ind. rds Per ANNNN IFGaint.ow #Atten: 10 dB Per ANNNN Mkr1 5.908 80 GHz -49.866 dBm Auto Tune 10 dB/div Ref 0.00 dBm -49.866 dBm -i0.0 -13.00 dBm -13.00 dBm -20.0 -13.00 dBm -13.00 dBm				6.00000000 GH
Inc. rask #Atten: 10 dB Det ANNNN If Gain:Low #Atten: 10 dB Det ANNNN Mkr1 5.908 80 GHz -0g Auto Tune -10.0 -49.866 dBm -10.0 -13.00 dBm				
IFGain:Low #Atten: 10 dB Det ANNNN Mkr1 5.908 80 GHz Auto Tune 10 dB/div Ref 0.00 dBm -49.866 dBm				
IFGain:Low #Atten: 10 dB DET A N N N N		m		9.866 dBm
M RL IRF SD Q AC CORREC SENSE:INT AligNauto 08:38:10 AM Apr 06, 2020 Frequency Center Freq 5.000000000 GHz Avg Type: Pwr(RMS) TRACE 12:34.5 5 Frequency		00000 GHz PNO: Fast ↔ Trig: Free Run	Avg Type: Pwr(RMS) Avg Hold: 10/10	TRACE 123455 TYPE A WWWWW DET A N N N N



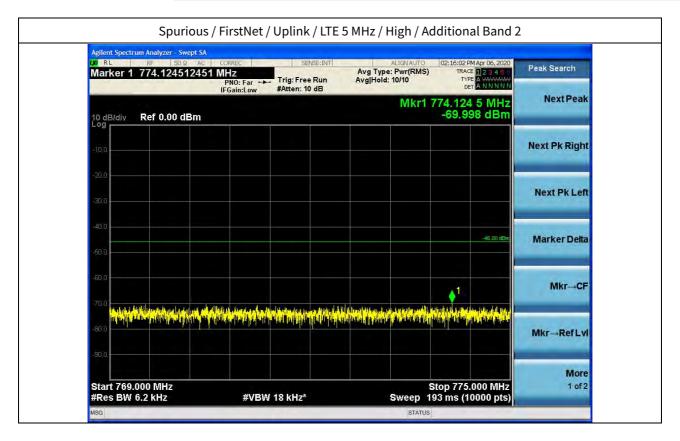


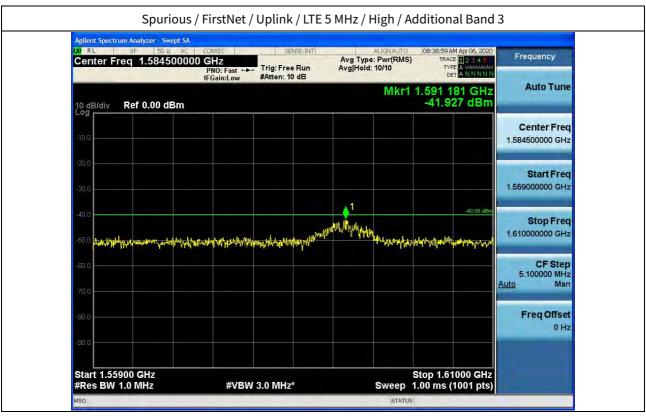






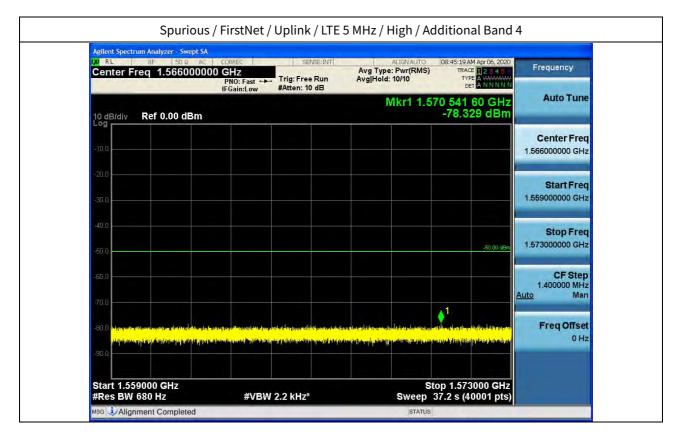


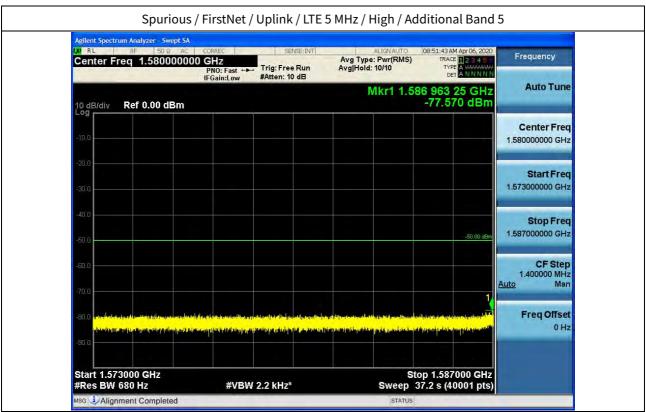






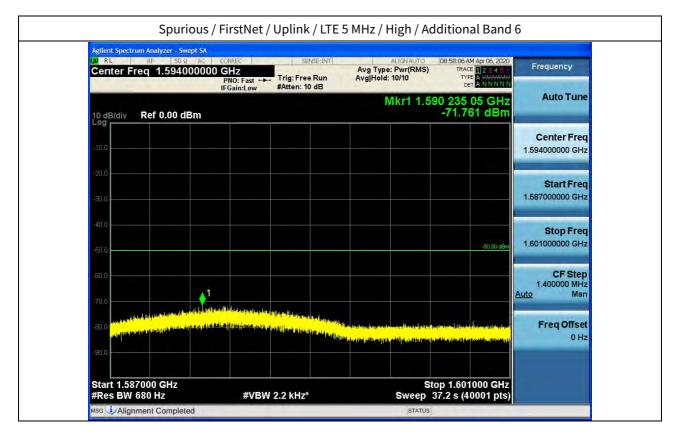


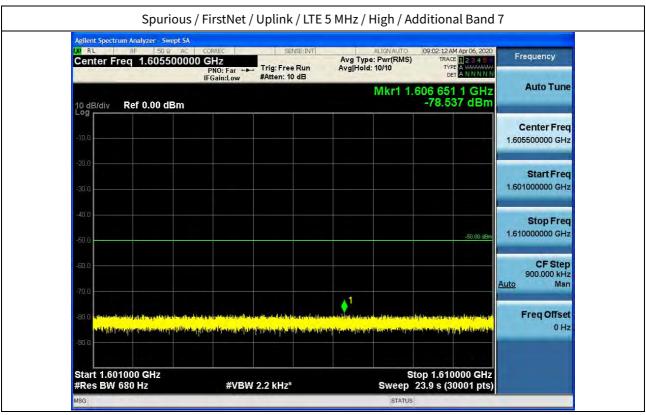






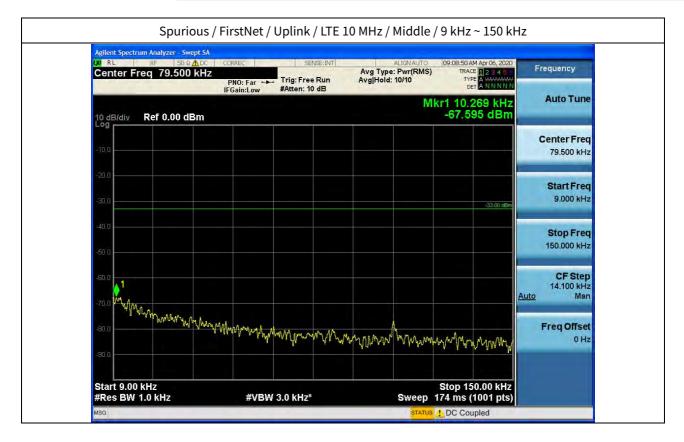


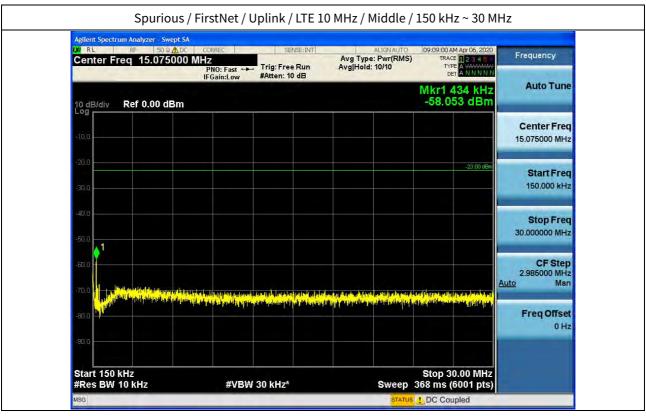




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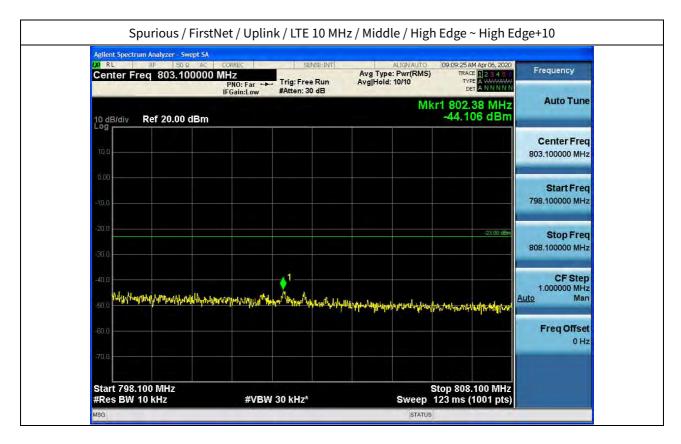


(x) RL RF 50Ω AC Center Freq 403.95000		ALIGNAUTO 09:09:09 AM Apr 06, 202 Avg Type: Pwr(RMS) TRACE 12:44 Avg Hold: 10/10 Type Avg Hold: 10/10 Det ANN N	Frequency
10 dB/div Ref 0.00 dBm		Mkr1 762.19 MH: -50.735 dBn	
-10.0		-13 00 dBr	Center Freq 403.950000 MHz
-20.0			Start Freq 30.000000 MHz
-40.0			Stop Freq
-50.0 Nelski og om til bestalski konstalser -50.0 (Halada på gifte, dag to stadog Albed	n a faith a' ann ann an ann an ann air ains d'ains a' suid ann an Anna. Nga faith ann ann an Anna Stàirtean ann ann an Anna Anna Anna Anna Anna	tan kalandar tariha da sa karan ya karan ya karan ya kata kalan kata kata kata kata kata kata kata ka	
-70.0			Auto Man Freq Offset
-90.0			0 Hz

Agilent Spectrum Analyzer - Swept SA W RL RF 50 Ω AC Center Freq 782.900000	O MHZ PNO: Far ↔ Trig: Free Run	AvalHold: 10/10 TYPE	Apr 06, 2020 2 3 4 5 5 4 WWWWW A N N N N N
10 dB/div Ref 20.00 dBm	IFGain:Low #Atten: 30 dB	Mkr1 787.19 -46.311	9 MHz Auto Tune
10.0			Center Freq 782.900000 MHz
-10.0			Start Freq 777.900000 MHz
-20.0			-23.00 dBm Stop Freq 787,900000 MHz
-30.0			CF Step 1.000000 MHz
-50.0 provingentingentypperturbation	anterstrational production and the application of the second strategy and	ar break long a solid of the all and a solid and the all has	Auto Man
-60.0			Freq Offset 0 Hz
Start 777.900 MHz #Res BW 10 kHz	#VBW 30 kHz*	Stop 787.90 Sweep 123 ms (10	00 MHz







Agilent Spectrum Analyzer - Swept SA			
Center Freq 1.40405000	00 GHz PNO: East ↔ Trig: Free Run	ALIGN AUTO 09:09:34 AM Apr 06, 2 Avg Type: Pwr(RMS) TRACE 2 4 Avg[Hold: 10/10 TYPE A NNN DET A NNN	Frequency
	IFGain:Low #Atten: 10 dB	Mkr1 808.34 MH	Auto Tom
10 dB/div Ref 0.00 dBm		-44.410 dB	
LOG			Center Freq
-10,0		-13.00)	1.404050000 GHz
-20.0			Charle English
-30.0			Start Freq 808.100000 MHz
-40.0			Stop Freq
-50.0			2.000000000 GHz
	to plant an article let betation of beta to the desire of the products	, bala di katilan di katila bala katila k	CF Step
	ne ne general frankreder (utbere die seische beiden bei dan beiden er beiden er beiden er beiden er beiden er b	<mark>Pallonten Julijeren innen eren af en </mark>	119.190000 MHz Auto Man
-70,0			
-80,0			Freq Offset
-90.0			
Start 808.1 MHz #Res BW 100 kHz	#VBW 300 kHz*	Stop 2.0000 GI Sweep 148 ms (30001 p	lz





