

FCC / IC REPORT

Certification

Applicant Name: SOLiD, Inc.		Date of Issue: July 22, 2015
Address: 10, 9th Floor, SOLiD Spa	ce. Pangvoveok-ro 220.	Test Site/Location: HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea
•	si, Gyeonggi-do, 463-400,	Report No.: HCT-R-1507-F021-1
South Korea	.,.,.,,	HCT FRN: 0005866421
		IC Recognition No.: 5944A-3
FCC ID: IC: APPLICANT:	W6UHM25TDD 9354A-HM25TDD SOLiD, Inc.	
FCC/ IC Model(s):	MRDU-25TDD	
EUT Type:	RDU Module (25 TDD)	
FCC Frequency Ranges:	2497.8 MHz ~ 2565.4 MHz (LB) 2574.1 MHz ~ 2611.9 MHz (MB 2619.8 MHz ~ 2687.4 MHz (UB))
IC Frequency Ranges:	2500.0 MHz ~ 2565.4 MHz (LB) 2574.1 MHz ~ 2611.9 MHz (MB 2619.8 MHz ~ 2688.4 MHz (UB))
Conducted Output Power:	5 W (37 dBm)	
Date of Test:	June 29, 2015 ~ July 16, 2015	
FCC Rule Part(s):	CFR 47, Part 27	
IC Rules :	RSS-Gen (Issue 4, November 2	014), RSS-131 (Issue 2, July 2003)

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 Part 27 of the FCC Rules under normal use and maintenance.

Report prepared by : Yong Hyun Lee Engineer of RF Team

Report approved by : Sang Jun Lee Manager of RF Team

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1507-F021	July 17, 2015	- First Approval Report
HCT-R-1507-F021-1	July 22, 2015	- Modified a typo



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1. CLIENT INFORMATION

The EUT has been tested by request of

	SOLiD, Inc.		
Company	10, 9th Floor, SOLiD Space, Pangyoyeok-ro 220, Bundang-gu, Seongnam-si, Gyeonggi-do, 463-400, South Korea		
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	9354A-HM25TDD		
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IC Frequency Ranges: 2500.0 MHz ~ 2565.4 MHz (LB) 2574.1 MHz ~ 2611.9 MHz (MB) 2619.8 MHz ~ 2688.4 MHz (UB)			
Conducted Output Power:	5 W (37 dBm)		
Antenna Gain(s):	Manufacturer does not provide an antenna.		
Measurement standard(s):	ANSI/TIA-603-C-2004, KDB 971168 D01 v02r02 KDB 935210 D02 v03, KDB 935210 D05 v01, RSS-131 (Issue 2, July 2003)		
FCC Rule Part(s):	CFR Title 47 Part 27		
IC Rules Part(s):	RSS-Gen (Issue 4, November 2014), RSS-131 (Issue 2, July 2003)		
Place of Tests:	74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea. (IC Recognition No. : 5944A-3)		



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, Korea. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated February 28, 2014 (Registration Number: 90661).

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 27, RSS-GEN, RSS-131.

Description	Reference (FCC)	Reference (IC)	Results
RF Output Power	§2.1046; §27.50	RSS-131, Section 4.3 RSS-131, Section 6.2 SRSP-517	Compliant
Occupied Bandwidth	§2.1049	RSS-GEN, Section 6.6	Compliant
Passband Gain and Bandwidth & Out of Band Rejection	KDB 935210 D02 v03	RSS-131, Section 4.2 RSS-131, Section 6.1	Compliant
Spurious Emissions at Antenna Terminals	§2.1051, §27.53	RSS-131, Section 4.4 RSS-131, Section 6.3 RSS-131, Section 6.4	Compliant
Radiated Spurious Emissions	§2.1053, §27.53	-	Compliant
Frequency Stability	§2.1055, §27.54	RSS-131, Section 4.5 RSS-131, Section 6.5	Compliant

3.2. MODE OF OPERATION DURING THE TEST

The EUT was operated in a manner representative of the typical usage of the equipment.

During all testing, system components were manipulated within the confines of typical usage to maximize each emission.

The device does not supply antenna(s) with the system, so the dummy loads were connected to the RF output ports for radiated spurious emission testing.



4. STANDARDS ENVIRONMENTAL TEST CONDITIONS

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



5. TEST EQUIPMENT

Manufacturer	Model / Equipment	Cal Interval	Calibration Date	Serial No.
Agilent	E4438C /Signal Generator	Annual	09/11/2014	MY42082646
Agilent	N5182A /Signal Generator	Annual	04/07/2015	MY50141649
NANGYEUL CO., LTD.	NY-THR18750/ Temperature and Humidity Chamber	Annual	10/29/2014	NY-2009012201A
Agilent	N9020A /Signal Analyzer	Annual	04/10/2015	US46220219
WEINSCHEL	67-30-33 / Fixed Attenuator	Annual	11/04/2014	BU5347
Weinschel	AF9003-69-31 / Step Attenuator	Annual	10/24/2014	11787
DEAYOUNG ENT	DFSS60 / AC Power Supply	Annual	04/01/2015	1003030-1
Agilent	6674A / DC Power Supply	Annual	07/24/2014	3501A00901
HD	MA240/ Antenna Position Tower	N/A	N/A	556
EMCO	1050/ Turn Table	N/A	N/A	114
HD GmbH	HD 100/ Controller	N/A	N/A	13
MITEQ	AMF-6D-001180-35-20P/AMP	Annual	09/04/2014	1081666
Schwarzbeck	BBHA 9120D/ Horn Antenna	Biennial	09/01/2014	147
Schwarzbeck	VULB 9160/TRILOG Antenna	Biennial	11/17/2014	3150



6. RF OUTPUT POWER

FCC Rules

Test Requirements:

§ 2.1046 Measurements required: RF power output:

- § 2.1046 (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 currentand 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.
- § 2.1046 (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 asapplicable in § 2.1046 (b) (1-5). In all tests, the input level of the modulating signal shall besuch as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.
- § 2.1046 (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 envelopepower, as appropriate, on the basis of measured power in the radio frequency load attached tothe transmitter output terminals shall be shown. Under the test conditions specified, nocomponents of the emission spectrum shall exceed the limits specified in the applicable ruleparts as necessary for meeting occupied bandwidth or emission limitations.

§ 27.50 Power limits and duty cycle.

(h) The following power limits shall apply in the BRS and EBS:

(1) Main, booster and base stations.

(i) The maximum EIRP of a main, booster or base station shall not exceed 33 dBW+10log(X/Y) dBW, where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition, except as provided in paragraph (h)(1)(ii) of this section.

(ii) If a main or booster station sectorizes or otherwise uses one or more transmitting antennas with a non-omnidirectional horizontal plane radiation pattern, the maximum EIRP in dBW in a given direction shall be determined by the following formula: EIRP = 33 dBW+10 log(X/Y) dBW+10 log(360/beamwidth) dBW, where X is the actual channel width in MHz, Y is either (i) 6 MHz if prior to transition or the station is in the MBS following transition or (ii) 5.5 MHz if the station is in the LBS and UBS following transition, and beamwidth is the total horizontal plane beamwidth of the individual transmitting antenna for the station or any sector measured at the half-power points.

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Test Procedures:

Measurements were in accordance with the test methods section 3.5.2 of KDB 935210 D05 v01.

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

b) Configure to generate the AWGN (broadband) test signal.

c) The frequency of the signal generator shall be set to the frequency of (f0) as determined from 3.3.

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 (see 3.2), but not more than 0.5 dB below.

f) Measure the output power of the EUT and record (Power measurement with a spectrum analyzer).

g) Remove the EUT from the measurement setup and using the same signal generator settings, repeat the power measurement on the input signal to the EUT and record as input power.

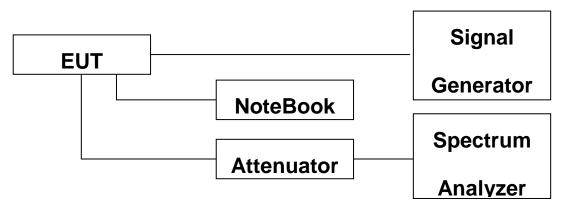
h) Repeat the procedure with the narrowband test signal.

i) Repeat the procedure for both test signals with input signal amplitude set to 3 dB above the AGC threshold level.

j) Repeat for all frequency bands authorized for use by the EUT.

Power measurement Method :

Guidance for performing input/output power measurements using a spectrum or signal analyzer is provided in 5.2 of KDB Publication 971168.



Block Diagram 1. RF Power Output Test Setup



IC Rules

Test Requirements:

SRSP-517

5. Technical Criteria

5.1 RadiatedPower Limitsand AntennaHeight Limits

5.1.1 Fixed and Base Stations

Fixedandbase stations (except fixed subscriber stations) are limited to a maximum permissible equivalent isotropically radiated power (e.i.r.p.) of 1640 W/MHz (i.e. no more than 1640 W e.i.r.p. in

any1 MHz band segment) with an antenna height above average terrain(HAAT)⁷up to 300 metres.

For all installations with antenna HAAT in excess of 300 metres, a corresponding reduction in e.i.r.p. accordingto Table2 shall be applied.

Table 2 — Reduction to Maximum Allowable E.I.R.P. for HAAT > 300 m			
HAAT (m) Reduction in maximum e.i.r.p. (dB)			
300 < HAAT ≤500	2		
500 < HAAT ≤1,000	5		
1,000 < HAAT ≤1,500	8		
1,500 < HAAT ≤2,000	10		

Note: 7 The height of the antenna above average terrain (HAAT) is the height of thecentre of

radiation of the antenna above the average elevation of the terrain between 3 and 16 km from the antenna, for an individual radial. The final HAAT (also known as the effective height of the antenna above average terrain (EHAAT)) is the average of the antenna heights above the average terrain (HAATs) for eight radials spaced every 45 degrees of azimuthstarting with true north.

RSS-131 6.2

The manufacturer's output power rating Prated MUST NOT be greater than Pmean for all types of enhancers.

Additional Power Back-off Condition for Multiple Carrier Operations:

An example of a single carrier operation is a band translator that incorporates an (IF) filter of a passband equal to one channel bandwidth. Another example of a single carrier operation is the use of an enhancer, before the connection to the antenna, to boost a low power transmitter (single carrier) to a higher power.

An example of a multiple carrier operation is the use of an enhancer to amplify off-air signals that contain the wanted carrier and two (or more) adjacent band carriers. If the enhancer passband is wide enough to pass more than the wanted channel bandwidth, the enhancer output stage will be



loaded by the multiple carriers.

Examination: with 3 carrier signals (of assumed equal level), the peak voltage will be 3 times the single carrier voltage. The corresponding Peak Envelope Power (PEP) will be 3²times greater than a single carrier or 9/4 = 2.25 times greater than 2 tones PEP. Therefore the permissible wanted signal operating point has to be backed off by 3.5 dB (i.e. **Ppermissible = Prated - 3.5 dB**). **Note 1:** All enhancers will be classified in the Radio Equipment List (REL) for a single carrier operation.

Note 2: For a multiple carrier operation, the rating must be reduced by 3.5 dB or more.

Note 3: If there are more than 3 carriers present at the amplifier input point, greater power back-off may be required. This can be examined on a case-by-case basis.

Test Procedures: RSS-131 4.3

4.3.1 Multi-channel Enhancer

The following subscript "o" denotes a parameter at the enhancer output point. Connect two signal generators to the input of the Device Under Test (DUT), via a proper impedance matching network (and preferably via a variable attenuator) so that the two input signals are equal sinusoids (and can be raised equally).

Connect a dummy load of suitable load rating to the enhancer output point. Connect also a spectrum analyser to this output point via a coupling network and attenuator, so that only a portion of the output signal is coupled to the spectrum analyser. The coupling attenuation shall be stated in the test report.

Set the two generator frequencies f1 and f2 such that they and their third-order intermodulation product frequencies, f3= 2f1-f2 and f4 = 2f2 - f1, are all within the passband of the DUT. Raise the input level to the DUT while observing the output tone levels, Po1 and Po2, and the intermodulation product levels, Po3 and Po4.

For enhancers rated 500 watts or less: Raise the input level to the DUT until the greater level of the intermodulation products at the enhancer output terminals, Po3 or Po4, equals -43 dBW.

For enhancers rated over 500 watts: Raise the input level to the DUT until the greater level of the intermodulation products at the enhancer output terminals, Po3 or Po4, is 67 dB below the level of either output tone level, Po1 or Po2.

Record all signal levels and their frequencies. Calculate the mean output power (Pmean) under this testing condition using Pmean = Po1 + 3 dB.

4.3.2 Single Channel Enhancer

A suitably modulated signal, representative of the technology for which certification is sought, is applied to the input of the amplifier. The input power level is increased until the manufacturer's rated input power level is achieved or until a 2 dB increase in input level results in a 1 dB increase in output level (i.e. compression begins). Record the output power in the 99% emission bandwidth using any suitable means.



Test Results:

LTE Band

Input Signal	Input Level (dBm)	Maximum Amp Gain
LTE 20 MHz	DL: -23 dBm	DL :60 dB

Single channel Enhancer

* Due to EUT's ALC function (Auto Level Control), even if input signal is increased,

The same output power is transmit.

[Downlink]

		Frequency	Output Power	
	Channel	(MHz)	(dBm)	(W)
	Low	2506.80	37.05	5.070
AGC threshold	Middle	2593.00	37.49	5.610
	High	2678.40	36.96	4.966
+3dB above	Low	2506.80	36.98	4.989
theAGC	Middle	2593.00	37.49	5.610
threshold	High	2678.40	36.97	4.977



Multi-channel Enhancer for IC

* Due to EUT's ALC function (Auto Level Control), even if input signal is increased,

The same output power is transmit.

[Downlink]

Frequency	Frequency	Output Power	
Channel	Channel (MHz)	Po1(dBm)	Pmean(dBm)
Low	2500.40	34.365	37.365
Middle	2593.00	34.383	37.383
High	2688.00	34.586	37.586

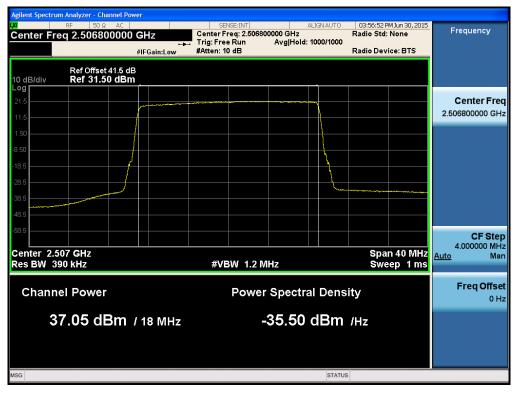
Additional Power Back-off Condition for Multiple Carrier Operations for IC

[Downlink]

Channel	1 Carrier (dBm)	3 Carrier (dBm)	Power Back-off (dB)
Middle	37.49	32.24	5.25

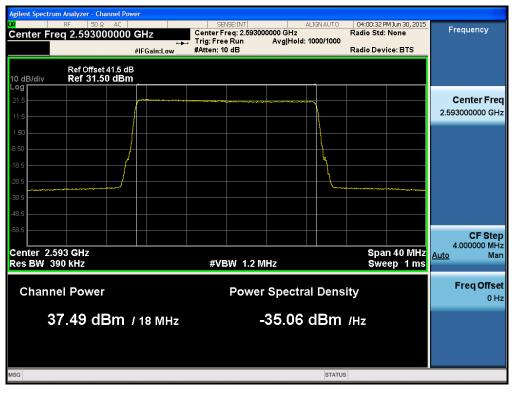


Plots of RF Output Power



[AGC threshold DownlinkLow]

[AGC threshold DownlinkMiddle]







[AGC threshold Downlink High]

[+3dB above the AGC threshold Downlink Low]

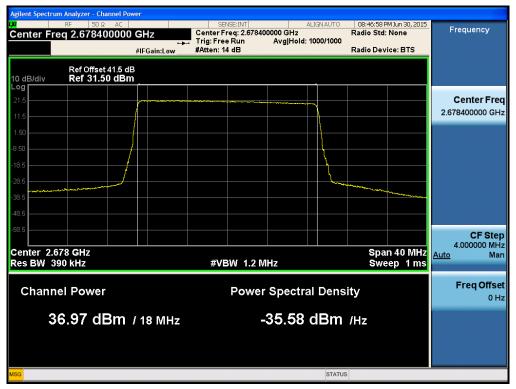






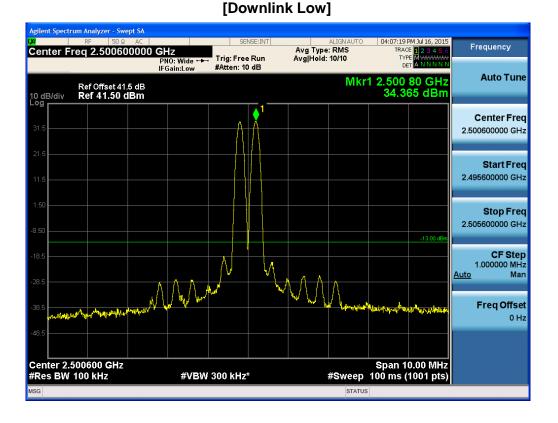
[+3dB above the AGC threshold Downlink Middle]

[+3dB above the AGC threshold Downlink High]

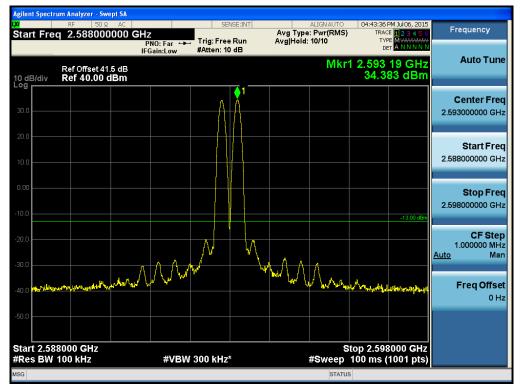




Multi-channel Enhancer for IC

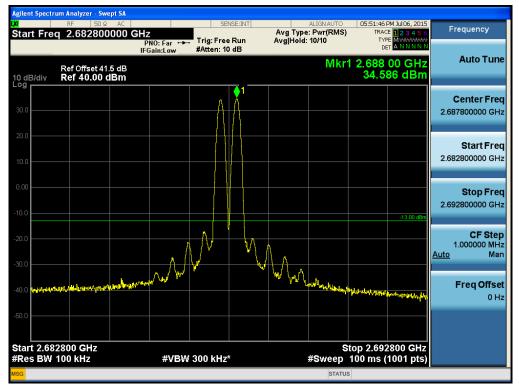


[Downlink Middle]





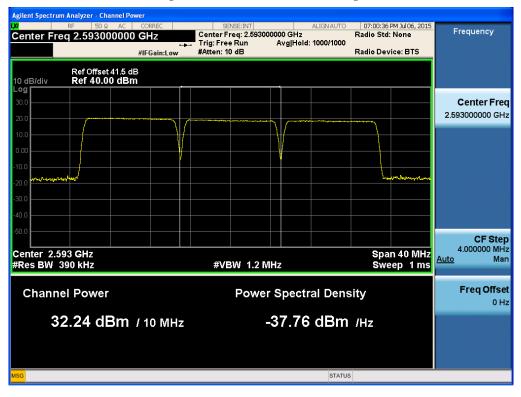
[Downlink High]





* Power Back-off for IC

[Downlink 3 Carrier Middle]





7. OCCUPIED BANDWIDTH

FCC Rules

Test Requirement(s): § 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 v01 and section 4.2 of KDB 971168 D01 v02r02.

Test is 99% OBW measured and used.

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 OBW.

f) The nominal resolution bandwidth (RBW) shall be in the range of 1% to 5 % of the anticipated OBW, and the VBW shall be \ge 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.

NOTE—Steps f) and g) may require iteration to enable adjustments within the specified tolerances.

h) The noise floor of the spectrum analyzer at the selected RBW shall be at least 36 dB below the reference level.

i) Set spectrum analyzer detection function to positive peak.

j) Set the trace mode to max hold.

k) Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.

I) Repeat steps e) to k) with the input signal connected directly to the spectrum analyzer (i.e., input signal measurement).

m) Compare the spectral plot of the input signal (determined from step I) to the output signal (determined from step k) 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.

n) Repeat for all frequency bands authorized for use by the EUT.

IC Rules

Test Requirements: RSS-GEN 6.6

When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal bandwidth shall be reported as the 99 % emission bandwidth, as calculated or measured.

Test Procedures: RSS-GEN 6.6

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

Video averaging is not permitted. A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

The trace data points are recovered and are directly summed in linear power level terms. There covered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded.

The difference between the two recorded frequencies is the 99% occupied bandwidth.



Test Results: The EUT complies with the requirements of this section.

LTE Band

Input Signal	Input Level (dBm)	Maximum Amp Gain	
LTE 20 MHz	DL: -23 dBm	DL : 60 dB	

[Downlink Output]

Channel	Frequency (MHz)	OBW (MHz)
Low	2506.80	17.861
Middle	2593.00	17.947
High	2678.40	17.895

[Downlink Input]

Channel	Frequency (MHz)	OBW (MHz)	
Low	2506.80	17.931	
Middle	2593.00	17.936	
High	2678.40	17.931	

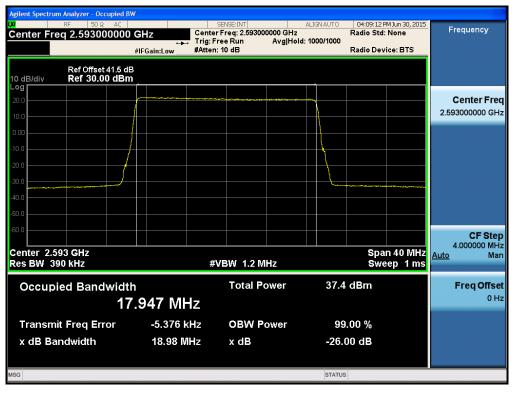


Plots of Occupied Bandwidth



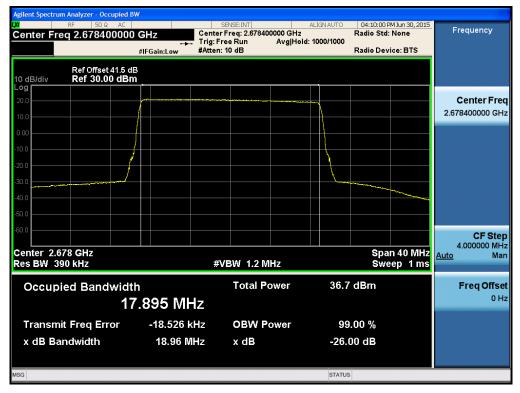
[Output DownlinkLow]

[Output Downlink Middle]

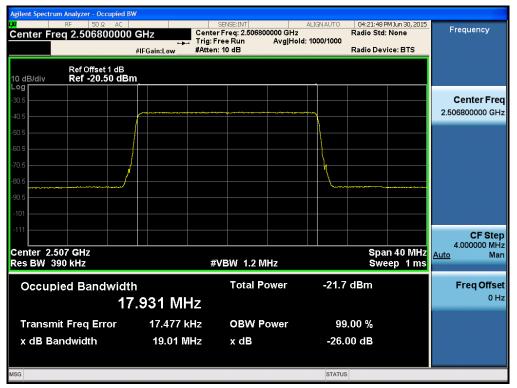




[Output Downlink High]



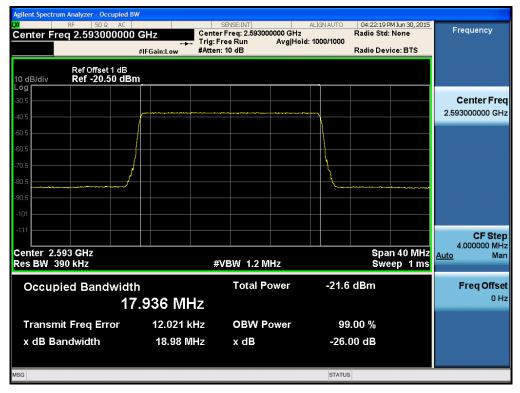
[Input Downlink Low]



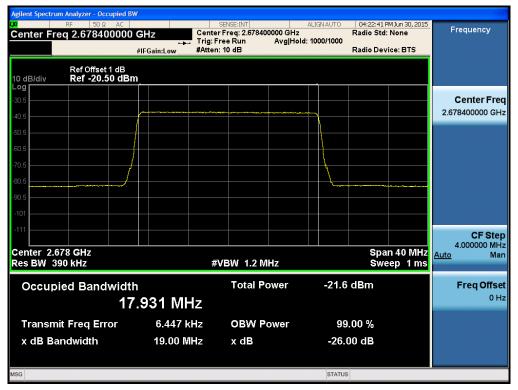


Model:MRDU-25TDD

[Input Downlink Middle]



[Input Downlink High]



8. PASSBAND GAIN AND BANDWIDTH & Out of Band Rejection

FCC Rules

Test Requirement(s): KDB 935210 D02 v03

Out of Band Rejection – Test for rejection of out of band signals. Filter freq. response plots are acceptable.

Test Procedures:

Measurements were in accordance with the test methods section 3.3 of KDB 935210 D05 v01.

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 from the center of the passband.

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 = approx. 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 of the spectrum analyzer to be 1 % to 5 % of the passband and the video bandwidth shall be set to \ge 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. Capture the frequency response of the EUT.

IC Rules

Test Requirements: RSS-131 6.1

The passband gain shall not exceed the nominal gain by more than 1.0 dB. The 20 dB bandwidth shall not exceed the nominal bandwidth that is stated by the manufacturer. Outside of the 20 dB bandwidth, the gain shall not exceed the gain at the 20 dB point.

Test Procedures: RSS-131 4.2

Adjust the internal gain control of the equipment under test to the nominal gain for which equipment certification is sought.

With the aid of a signal generator and spectrum analyzer, measure the 20 dB bandwidth of the amplifier (i.e. at the point where the gain has fallen by 20 dB). Measure the gain-versus-frequency response of the amplifier from the midband frequency f0 of the passband up to at



least f0 + 250% of the 20 dB bandwidth.

Signal generator sweep from the frequency more lower than the low frequency -250% to the frequency more higher than high frequency +250%.

Test Results: The EUT complies with the requirements of this section.

Input Level (dBm)	Maximum Amp Gain	
Input Signal : Sinusoidal		
DL: -23dBm	DL : 60 dB	



[Downlink]

	20 dB point frequency (MHz)	Output power (dBm)	Gain (dB)
Lower Band	2489.1 MHz ~ 2589.5 MHz	37.95	60.95
Middle Band	2529.4 MHz ~ 2648.5 MHz	37.88	60.88
Upper Band	2588.3 MHz ~ 2698.7 MHz	37.10	60.10

Plots of Passband Gain and Bandwidth & Out of Band Rejection

[Lower Band]



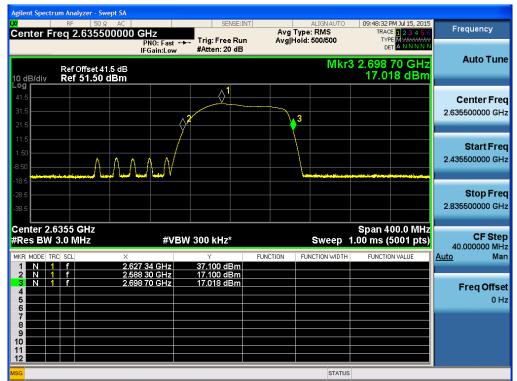




[Middle Band]

Agilent Spectrum Analyzer - Swept						
Center Freq 2.583000	AC 000 GHz	SENSE:	Avg Typ		09:37:33 PM Jul 15, 2015 TRACE 1 2 3 4 5 6	Frequency
Ref Offset 41.5 10 dB/div Ref 51.50 dB	PNO: Fast ⊂ IFGain:Low dB	Trig: Free Ru #Atten: 20 dB	n Avg Hol	d:>500/500 Mk	TYPE MWWWWW Det ANNNN 17.898 dBm	Auto Tune
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11.5 1.50 -8.50						Start Freq 2.333000000 GHz
-18.5						Stop Freq 2.833000000 GHz
Center 2.5830 GHz #Res BW 3.0 MHz	#VB	W 300 kHz*	FUNCTION	Sweep '	Span 500.0 MHz 1.00 ms (5001 pts) FUNCTION VALUE	
1 N 1 f 2 N 1 f 3 N 1 f 4 5 5 6 7 2 8 9 9 9 9 1	2.567 24 GHz 2.529 4 GHz 2.648 5 GHz	37.875 dBm 17.874 dBm 17.898 dBm				Freq Offset 0 Hz
10 11 12 MSG				STATUS		

[Upper Band]



9. SPURIOUS AND HARMONIC EMISSION AT ANTENNA TERMINAL

FCC Rules

Test Requirement(s): § 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.

§ 27.53 Emission limits

(m) For BRS and EBS stations, the power of any emissions outside the licensee's frequency bands of operation shall be attenuated below the transmitter power (P) measured in watts in accordance with the standards below. If a licensee has multiple contiguous channels, out-of-band emissions shall be measured from the upper and lower edges of the contiguous channels.

(2) For digital base stations, the attenuation shall be not less than 43 +10 log (P) dB, unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS No. 1 on the same terms and conditions as adjacent channel BRS or EBS licensees. Provided that a documented interference complaint cannot be mutually resolved between the parties prior to the applicable deadline, then the following additional attenuation requirements shall apply:

(i) If a pre-existing base station suffers harmful interference from emissions caused by a new or modified base station located 1.5 km or more away, within 24 hours of the receipt of a documented interference complaint the licensee of the new or modified base station must attenuate its emissions by at least 67 +10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block and shall immediately notify the complaining licensee upon implementation of the additional attenuation. No later than 60 days after the implementation of such additional attenuation, the licensee of the complaining base station must attenuate its base station emissions by at least 67 +10 log (P) dB measured at 3 megahertz, above or below, from the complaining base station function of such additional attenuation of the additional attenuation of the complaining base station must attenuate its base station emissions by at least 67 +10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the new or modified base station.



(ii) If a pre-existing base station suffers harmful interference from emissions caused by a new or modified base station located less than 1.5 km away, within 24 hours of receipt of a documented interference complaint the licensee of the new or modified base station must attenuate its emissions by at least 67 +10 log (P)-20 log (Dkm/1.5) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the complaining licensee, or if both base stations are co-located, limit its undesired signal level at the pre-existing base station receiver(s) to no more than -107 dBm measured in a 5.5 megahertz bandwidth and shall immediately notify the complaining licensee upon such reduction in the undesired signal level. No later than 60 days after such reduction in the undesired signal level, the complaining licensee must attenuate its base station emissions by at least 67 +10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the new or modified base station.

(iii) If a new or modified base station suffers harmful interference from emissions caused by a pre-existing base station located 1.5 km or more away, within 60 days of receipt of a documented interference complaint the licensee of each base station must attenuate its base station emissions by at least 67 +10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the other licensee.

(iv) If a new or modified base station suffers harmful interference from emissions caused by a pre-existing base station located less than 1.5 km away, within 60 days of receipt of a documented interference complaint: (a) The licensee of the new or modified base station must attenuate its OOBE by at least 67 +10 log (P)-20 log (Dkm/1.5) measured 3 megahertz above or below, from the channel edge of its frequency block of the other licensee, or if the base stations are co-located, limit its undesired signal level at the other base station receiver(s) to no more than -107 dBm measured in a 5.5-megahertz bandwidth; and (b) the licensee causing the interference must attenuate its emissions by at least 67 +10 log (P) dB measured at 3 megahertz, above or below, from the channel edge of its frequency block of the new or modified base station. (v) For all fixed digital user stations, the attenuation factor shall be not less than 43 +10 log (P) dB at the channel edge.

(4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log (P) dB$ on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log (P) dB$ on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that $43 + 10 \log (P) dB$ on all frequencies between

2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Test Procedures: Measurements were in accordance with the test methods section 3.5.2 of KDB 935210 D05 v01.

1. General

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/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, can be excluded from the test stipulated in step a).

2. EUT out-of-band/block emissions conducted measurement

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

NOTE—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 the two-tone test.

b) Set the signal generator to produce two AWGN signals as previously described (e.g., 4.1 MHz OBW).

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 of interest.

d) Set the composite power levels such that the input signal is just below the AGC threshold (see 3.2), 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. Alternatively, the composite power can be measured using an average power meter as described in KDB Publication 971168.

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 (typically 1 % of the emission bandwidth, 100 kHz, or 1 MHz)

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 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 (i.e., rms) mode.

I) 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 the procedure with the composite input power level set to 3 dB above the AGC threshold.

o) Reset the input signals frequencies to the lower edge of the frequency block or band under examination.

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. EUT spurious emissions conducted measurement

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 (e.g., 4.1 MHz OBW AWGN).

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 (see 3.2), 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 (e.g., reference bandwidth is typically 100 kHz or 1 MHz).
g) Set the VBW ≥ 3 × RBW.



h) Set the Sweep time = auto-couple.

i) Set the analyzer start frequency to the lowest radio frequency 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. NOTE—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.

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

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

I) 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 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 analyzer stop frequency to 10 times the highest frequency of the fundamental emission (see §2.1057). Note that 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 (i.e., 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 and provide tabular data, if required.

p) Repeat the procedure with the input test signals tuned to a middle band/block frequency/channel and then a high band/block frequency/channel.

q) Repeat entire procedure with the narrowband test signal.

r) Repeat for all authorized frequency bands/blocks used by the EUT.

IC Rules

Test Requirement(s): RSS-131 6.4

Spurious emissions of zone enhancers and translators shall be suppressed as much as possible.

Spurious emissions shall be attenuated below the rated power of the enhancer by at least:

43 + 10 Log10(Prated in watts), or 70 dB, whichever is less stringent.

Note: If the minimum standard is not met, check to see if the input signal generators have a high harmonic content.

Test Procedures: RSS-131 4.4

4.4.1 Multi-channel Enhancer

The spurious emissions of the equipment under test shall be measured using the twotone method in section 4.3.1, with the two tones Po1 and Po2 set to the required levels. Using a spectrum analyser with a resolution bandwidth set at 100 kHz, search for spurious emissions from 30 MHz to at least 5 times the highest RF passband frequency. The search may omit the band that contains the test tones and intermodulation products.

4.4.2 Single channel Enhancer

The enhancer shall be operated as described in section 4.3.2 during the search for spurious emissions.

Using a spectrum analyser with a resolution bandwidth set at 100 kHz, search for spurious emissions from 30 MHz to at least 5 times the highest RF passband frequency. The search may omit the band that contains the input signal.

Test Results: The EUT complies with the requirements of this section. There were no Detectable Spurious emissions for this EUT.



Single channel Enhancer Plots of Spurious Emission

Conducted Spurious Emissions (9 kHz - 150 kHz)

ctrum Analyzer - Swept SA 03:27:49 PM Jul 06, 2015 Frequency Avg Type: Pwr(RMS) Avg|Hold: 10/10 tart Freq 9.000 kHz Trig: Free Run #Atten: 10 dB TYF PNO: Far IFGain:Low DE Auto Tune Mkr1 10.410 kHz -41.379 dBm Ref Offset 41.5 dB Ref 10.00 dBm 10 dB/div **Center Freq** 79.500 kHz Start Freq 9.000 kHz Stop Freq 150.000 kHz VI Mw CF Step 14.100 kHz Mar Marine WANN <u>Auto</u> Man MA Freq Offset 0 Hz Start 9.00 kHz #Res BW 1.0 kHz Stop 150.00 kHz Sweep 174 ms (1001 pts) #VBW 3.0 kHz* DC Coupled

[Downlink Low]



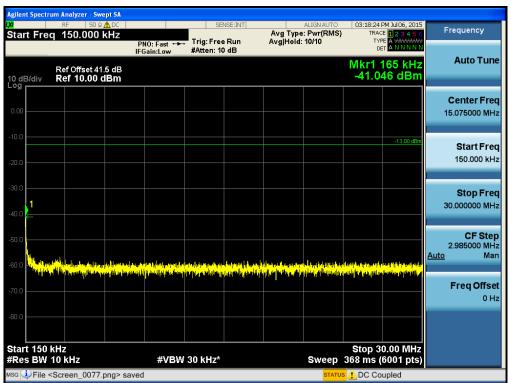


Model:MRDU-25TDD

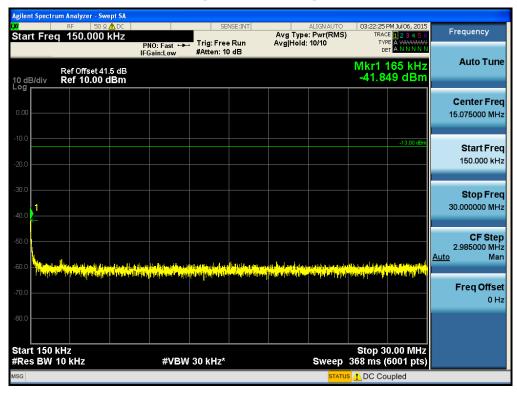




Conducted Spurious Emissions (150 kHz - 30 MHz)



[Downlink Low]





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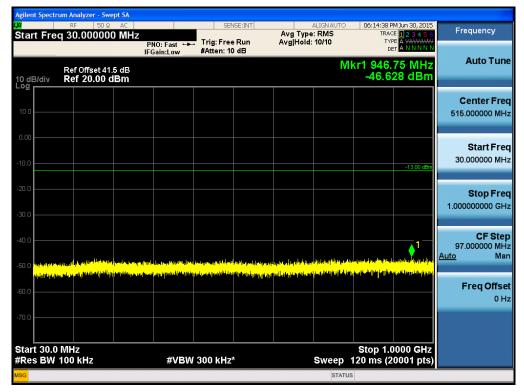




Conducted Spurious Emissions (30 MHz – 1 GHz)

[Downlink Low]

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Conducted Spurious Emissions (1 GHz – 26.5 GHz)

[Downlink Low]

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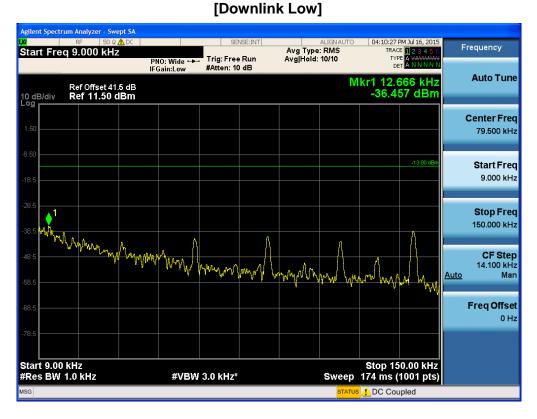
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-40.0 and statistic			ala de la contra de		de har herek altan, tete Teter har her hit version		han de stel ander de stel Name ander de stel stel stel stel stel stel stel ste			CF Step 149.380000 MHz
	hills with the	t otte oceal it. e.	ananda Milandaran	an india a maina a	and the second part of		l i controlle i		•••	Auto Mar
-50.0										
-60.0										Freq Offset 0 Hz
70.0										0112
-70.0										
								Stop 24	938 GHz	
Start 1 00	00 GHz									
			#VBW	3.0 MHz*	:		Sweep	2.00 ms (5001 pts)	
			#VBW	3.0 MHz*	*		Sweep STATUS	2.00 ms (5001 pts)	
#Res BW ^{MSG}		ept SA	#VBW	3.0 MHz*				2.00 ms (5001 pts)	
#Res BW ^{MSG} Agilent Spect XI	1.0 MHz rum Analyzer - Sw RF 50 Q	AC	#VBW	SEN	ISE:INT	Avg Type	STATUS ALIGN AUTO	2.00 ms (06:52:36 F	5001 pts)	Frequency
#Res BW ^{Asg} Agilent Spect	1.0 MHz rum Analyzer - Sw	AC 000 GHz P	#VBW NO: Fast ↔ Gain:Low	SEN	ISE:INT		STATUS ALIGN AUTO	2.00 ms (06:52:36 F	5001 pts)	Frequency
#Res BW ^{Isg} Agilent Spect	1.0 MHz rum Analyzer - Sw RF 50 Q	AC 000 GHz PI IFC	NO: Fast ↔	SEN	ISE:INT	Avg Type	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts) MJun 30, 2015 E 1 2 3 4 5 6 E A WWWWW T A NNNNN 3 1 GHz	
Agilent Spect	1.0 MHz rum Analyzer - Sw RF 50 Q 2q 2.691400	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN	ISE:INT	Avg Type	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts) MJun 30, 2015 E 1 2 3 4 5 6 A WWWWWW T A N N N N N	
Agilent Spect	1.0 MHz rum Analyzer - Sw RF 50 Q 2q 2.691400 Ref Offset 41	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN	ISE:INT	Avg Type	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts) MJun 30, 2015 E 1 2 3 4 5 6 E A WWWWW T A NNNNN 3 1 GHz	Auto Tune
Agilent Spect	1.0 MHz rum Analyzer - Sw RF 50 Q 2q 2.691400 Ref Offset 41	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN	ISE:INT	Avg Type	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts) MJun 30, 2015 E 1 2 3 4 5 6 E A WWWWW T A NNNNN 3 1 GHz	Auto Tune Center Fred
Agilent Spect	1.0 MHz rum Analyzer - Sw RF 50 Q 2q 2.691400 Ref Offset 41	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN	ISE:INT	Avg Type	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts) MJun 30, 2015 E 1 2 3 4 5 6 E A WWWWW T A NNNNN 3 1 GHz	Auto Tune Center Freq
#Res BW #sg Agilent Spect Start Fre 10 dB/div 10.0	1.0 MHz rum Analyzer - Sw RF 50 Q 2q 2.691400 Ref Offset 41	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN	ISE:INT	Avg Type	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts) MJun 30, 2015 E 1 2 3 4 5 6 E A WWWWW T A NNNNN 3 1 GHz	Auto Tune Center Freq 14.595700000 GHz Start Freq
#Res BW #sg Agilent Spect X Agilent Spect X IO dB/div 10.0 10.0	1.0 MHz rum Analyzer - Sw RF 50 Q 2q 2.691400 Ref Offset 41	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN	ISE:INT	Avg Type	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts) MJun 30, 2015 E 1 2 3 4 5 6 E A WWWWW T A NNNNN 3 1 GHz	Auto Tune Center Freq 14.595700000 GHz Start Freq
#Res BW wsg Agilent Spect y Start Fre 10 dB/div 0.00	1.0 MHz rum Analyzer - Sw RF 50 Q 2q 2.691400 Ref Offset 41	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN	ISE:INT	Avg Type	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts)	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz
#Res BW Agilent Spect Agilent Spect Comparison Com	1.0 MHz rum Analyzer - Sw RF 50 Q 2q 2.691400 Ref Offset 41	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN	ISE:INT	Avg Type	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts)	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq
#Res BW MSG Agilent Spect X Agilent Spect X IO dB/div Start Fre	1.0 MHz rum Analyzer - Sw RF 50 Q 2q 2.691400 Ref Offset 41	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN	ISE:INT	Avg Type	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts)	Auto Tune Center Frec 14.595700000 GHz Start Frec 2.691400000 GHz Stop Frec
10 dB/div 10 dB/div 10 0 -10 0 -20 0	1.0 MHz rum Analyzer - Sw RF 50 Q 2q 2.691400 Ref Offset 41	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN Trig: Free #Atten: 10	ISE:INT	Avg Type	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts)	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz
#Res BW Agilent Spect X Start Free 10.0 -10.0 -20.0 -30.0 -40.0	1.0 MHz rum Analyzer - Sw RF 50 Q Q 2.6914000 Ref Offset 41 Ref 20.00 d	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN Trig: Free #Atten: 10	SEINT dB	Avg Type Avg Hold:	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts)	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz CF Step 2.380860000 GHz
#Res BW Agilent Spect. X2 X3 X4 X4 X5 10 dB/div 000 -10.0 -20.0 -30.0 -30.0	1.0 MHz rum Analyzer - Sw RF 50 Q Q 2.6914000 Ref Offset 41 Ref 20.00 d	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN Trig: Free #Atten: 10	SEINT dB	Avg Type Avg Hold:	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts)	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz 2.380860000 GHz Auto Man
#Res BW Agilent Spect XI Start Free 10.0 -10.0 -20.0 -30.0 -40.0	1.0 MHz rum Analyzer - Sw RF 50 Q Q 2.6914000 Ref Offset 41 Ref 20.00 d	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN Trig: Free #Atten: 10	SEINT dB	Avg Type Avg Hold:	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts)	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz 2.380860000 GHz Auto Man
#Res BW Agient Spect 20 10 10.0 -10.0 -20.0 -30.0 -40.0 -50.0 -60.0	1.0 MHz rum Analyzer - Sw RF 50 Q Q 2.6914000 Ref Offset 41 Ref 20.00 d	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN Trig: Free #Atten: 10	SEINT dB	Avg Type Avg Hold:	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts)	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz 2.380860000 GHz Auto Man
#Res BW Agient Spect XX Start Free 10 dB/div 10 0 -10 0 -20 0 -30 0 -40 0 -50 0	1.0 MHz rum Analyzer - Sw RF 50 Q Q 2.6914000 Ref Offset 41 Ref 20.00 d	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN Trig: Free #Atten: 10	SEINT dB	Avg Type Avg Hold:	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P TRAC TYP DE 1 26.063	5001 pts)	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz CF Step 2.380860000 GHz
#Res BW Agilent Spect Agilent Spect Start Fre 10.0 -000 -10.0 -20.0 -30.0 -40.0 -50.0 -50.0 -70.0	1.0 MHz	AC 000 GHz PI IFC .5 dB	NO: Fast ↔	SEN Trig: Free #Atten: 10	SEINT dB	Avg Type Avg Hold:	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 F TRAC TVF 1 26.06: 26.4	5001 pts)	Start Free 2.691400000 GHz Stop Free 26.500000000 GHz CF Step 2.380860000 GHz Auto Mar Freq Offset
#Res BW Agiient Spect X1 X2 X3 X4 X5 X6 X7 X8 X9	1.0 MHz rum Analyzer - Sw RF 50 Ω Ref Offset 41 Ref 20.00 0 	AC 000 GHz PI IFC .5 dB	NO: Fast ↔ Sain:Low	SEN Trig: Free #Atten: 10		Avg Type Avg Hold:	ALIGNAUTO 2: RMS 10/10	2.00 ms (06:52:36 P 1 26:06: -26.4	5001 pts)	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz 2.380860000 GHz Auto Man



	<mark>rum Analyzer - Swe</mark> RF 50 Ω			SEN	SE:INT		ALIGN AUTO	06:53:35 P	M Jun 30, 2015	
	q 1.000000	000 GHz	NO: Fast 🔸			Avg Type Avg Hold:	RMS	TRAC	E 1 2 3 4 5 6 E A WWWWW T A N N N N N	Frequency
			Gain:Low	#Atten: 10	dB					Auto Tune
10 dB/div	Ref Offset 41. Ref 20.00 d						WIK	1 2.445 -35.8	40 GHz 37 dBm	
10.0										Center Fred 1.746900000 GHz
										1.740500000 011
0.00										Start Fred
-10.0									-13.00 dBm	1.000000000 GH:
									10.00 42.0	
-20.0										Stop Free
-30.0									1	2.493800000 GH:
40.0		Livera Badratia	ululu dia adda	والملاطنة فأعرضه	n dok kator mah	الموالية أنهجه والم	والمرادين والمالية والمراد	all de la différent	Land Breakfull	CF Ster
-40.0 Pitch		Induputati	والالسام التعم	AND IN THE REAL PROPERTY OF	(April of the	And a state of the second s	V Handreiten ver	allen line hele.	an faith an an taiseac	149.380000 MH Auto Mar
-50.0										
-60.0										Freq Offse
										0 Hz
-70.0										
Start 1.00)00 GH7							Ston 24	938 GHz	
#Res BW			#VBW	/ 3.0 MHz*	:		Sweep		5001 pts)	
MSG							STATUS			
	rum Analyzer - Swe									
L <mark>XI</mark>	rum Analyzer - Swe RF 50 ຊ ຊ 2.691400 (AC 000 GHz			SE:INT	Avg Type	ALIGN AUTO	06:54:09 P	M Jun 30, 2015 E 1 2 3 4 5 6	Frequency
L <mark>XI</mark>	RF 50 Ω	AC 000 GHz PI	NO: Fast ↔ Gain:Low		Run		ALIGN AUTO E: RMS E: 10/10	06:54:09 F TRAC TYF DE	E 123456 E A WWWW T A N N N N N	
x Start Fre	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(. Trig: Free	Run	Avg Type	ALIGN AUTO E: RMS E: 10/10	06:54:09 F TRAC TYF DE 1 25.665	E 123456 A WWWWW A NNNNN 97 GHz	
L <mark>XI</mark>	RF 50Ω eq 2.6914000	AC 000 GHz PI IF(. Trig: Free	Run	Avg Type	ALIGN AUTO E: RMS E: 10/10	06:54:09 F TRAC TYF DE 1 25.665	E 123456 E A WWWW T A N N N N N	Auto Tune
x Start Fre	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(. Trig: Free	Run	Avg Type	ALIGN AUTO E: RMS E: 10/10	06:54:09 F TRAC TYF DE 1 25.665	E 123456 A WWWWW A NNNNN 9 7 GHz	Auto Tuno Center Fred
Start Fre	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(. Trig: Free	Run	Avg Type	ALIGN AUTO E: RMS E: 10/10	06:54:09 F TRAC TYF DE 1 25.665	E 123456 A WWWWW A NNNNN 9 7 GHz	Auto Tuno Center Fred
Start Fre	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(. Trig: Free	Run	Avg Type	ALIGN AUTO E: RMS E: 10/10	06:54:09 F TRAC TYF DE 1 25.665	E 123456 A WWWWW A NNNNN 9 7 GHz	Auto Tune Center Free 14.595700000 GH:
Start Fre	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(. Trig: Free	Run	Avg Type	ALIGN AUTO E: RMS E: 10/10	06:54:09 F TRAC TYF DE 1 25.665	97 GHz 66 dBm	Auto Tune Center Frec 14.595700000 GH: Start Frec
10 dB/div 0 00	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(. Trig: Free	Run	Avg Type	ALIGN AUTO E: RMS E: 10/10	06:54:09 F TRAC TYF DE 1 25.665	E 123456 A WWWWW A NNNNN 9 7 GHz	Auto Tune Center Free 14.595700000 GH: Start Free
10 dB/div Log	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(. Trig: Free	Run	Avg Type	ALIGN AUTO E: RMS E: 10/10	06:54:09 F TRAC TYF DE 1 25.665	97 GHz 66 dBm	Auto Tune Center Free 14.595700000 GH: Start Free 2.691400000 GH: Stop Free
10 dB/div 0 00	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(. Trig: Free	Run	Avg Type	ALIGNAUTO E: RMS 10/10 Mkr	06:54:09 F TRAC TYF DE 1 25.665	97 GHz 66 dBm	Auto Tune Center Free 14.595700000 GH: Start Free 2.691400000 GH: Stop Free
10 dB/div 0 00	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(. Trig: Free	Run dB	Avg Type	ALIGN AUTO E: RMS E: 10/10	06:54:09 F TRAC TYF DE 1 25.665	97 GHz 66 dBm	Auto Tune Center Free 14.595700000 GH Start Free 2.691400000 GH Stop Free 26.500000000 GH
10 dB/div 10.0 10.0 -0.00 -20.0 -30.0 -40.0	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(Trig: Free #Atten: 10	Run dB	Avg Type Avg Hold:	ALIGNAUTO E: RMS 10/10 Mkr	06:54:09 F TRAC TYF DE 1 25.665	97 GHz 66 dBm	Auto Tune Center Free 14.595700000 GH: Start Free 2.691400000 GH: Stop Free 26.500000000 GH: CF Step 2.380860000 GH:
10 dB/div Log	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(Trig: Free #Atten: 10	Run dB	Avg Type Avg Hold:	ALIGNAUTO E: RMS 10/10 Mkr	06:54:09 F TRAC TYF DE 1 25.665	97 GHz 66 dBm	Auto Tune Center Frec 14.595700000 GH: Start Frec 2.691400000 GH: Stop Frec 26.500000000 GH: CF Step 2.380860000 GH:
10 dB/div 10.0 10.0 -0.00 -20.0 -30.0 -40.0	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(Trig: Free #Atten: 10	Run dB	Avg Type Avg Hold:	ALIGNAUTO E: RMS 10/10 Mkr	06:54:09 F TRAC TYF DE 1 25.665	97 GHz 66 dBm	Auto Tune Center Frec 14.595700000 GH: Start Frec 2.691400000 GH: Stop Frec 26.500000000 GH: 2.380860000 GH: Auto Mar Freq Offset
10 dB/div 10.0	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(Trig: Free #Atten: 10	Run dB	Avg Type Avg Hold:	ALIGNAUTO E: RMS 10/10 Mkr	06:54:09 F TRAC TYF DE 1 25.665	97 GHz 66 dBm	Auto Tune Center Free 14.595700000 GH: Start Free 2.691400000 GH: Stop Free 26.500000000 GH: 2.380860000 GH: Auto Mar
10 dB/div 10.0	RF 50 Ω 2 q 2.6914000 Ref Offset 41.	AC 000 GHz PI IF(Trig: Free #Atten: 10	Run dB	Avg Type Avg Hold:	ALIGNAUTO E: RMS 10/10 Mkr	06:54:09 F TRAC TYF DE 1 25.665	97 GHz 66 dBm	Auto Tune Center Frec 14.595700000 GH: Start Frec 2.691400000 GH: Stop Frec 26.500000000 GH: 2.380860000 GH: Auto Mar Freq Offset
10 dB/div 10.0 10.0 .10.0 .20.0 .20.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0 .40.0	Ref Offiset 41. Ref 20.00 d	AC 000 GHz PI IF(Trig: Free #Atten: 10	Run dB	Avg Type Avg Hold:	ALIGNAUTO E: RMS 10/10 Mkr	06:54:09 F TRAC TVF DT 1 25.665 -26.30	-13 00 dBm	Auto Tune Center Free 14.595700000 GH: Start Free 2.691400000 GH: Stop Free 26.500000000 GH: 2.380860000 GH: Auto Mar
10 dB/div 10.0	Ref Offset 41. Ref 20.00 d	AC 000 GHz PI IF(Trig: Free #Atten: 10	Run dB		ALIGNAUTO E RMS 10/10 Mkr	06:54:09 F TRAC TYPE TRAC TYPE TRAC TRAC TRAC TRAC TRAC TRAC TRAC TRAC	97 GHz 66 dBm	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz CF Step 2.380860000 GHz



Multi channel Enhancer Plots of Spurious Emission for IC Conducted Spurious Emissions (9 kHz – 150 kHz)





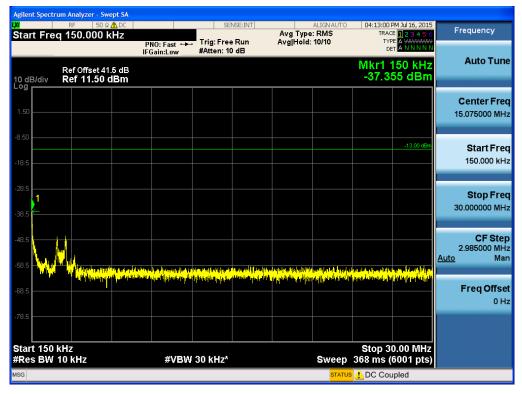


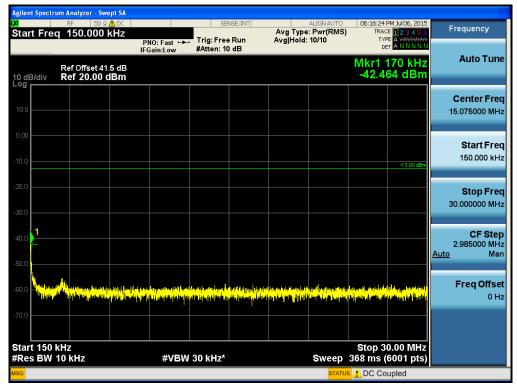




Conducted Spurious Emissions (150 kHz – 30 MHz)

[Downlink Low]









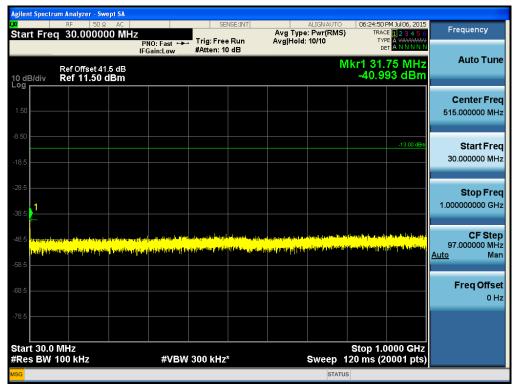
Agilen	nt Spectri	um Analyzer											
<mark>IXI</mark> Stai	rt Ero	RF a 150.0	50 Q 🚹 D			SEI	NSE:INT		ALIGNAUTO : Pwr(RMS)		PM Jul 06, 2015 E 1 2 3 4 5 6		Frequency
Stal		q 150.0		PI	IO: Fast 🔸	Trig: Free #Atten: 10		Avg Hold:		TY			
10 di Log	B/div	Ref Offse Ref 20.									150 kHz 27 dBm		Auto Tune
10.0													Center Freq 15.075000 MHz
0.00 -10.0											-13.00 dBm		Start Freq 150.000 kHz
-20.0 -30.0												:	Stop Freq 30.000000 MHz
-40.0 -50.0	1											<u>Auto</u>	CF Step 2.985000 MHz Man
-60.0	Vijedaj	Managa ang sa	haladada da Angelera (Maria)	and didda a Nga nga nga nga	a bia ba data Pingen per Paji	yalin balanti Yalin balanti	n stulien i stille. Ny typen i st	felina di dishiran Tana di Alaman	ling and the second		tehi sehen dalam tehi sehen dalam		Freq Offset 0 Hz
	t 150										0.00 MHz		
	s BW	10 kHz			#VBW	30 kHz*				_	6001 pts)		
MSG									STATU	<mark>s 🦺</mark> DC Co	upled		



Conducted Spurious Emissions (30 MHz - 1 GHz)

ent Spectrum Analyzer - Swept SA 24 PM Jul 16, 2015 Avg Type: RMS Avg|Hold: 10/10 Frequency Start Freq 30.000000 MHz RACE Trig: Free Run #Atten: 10 dB TYPE A DET A PNO: Fast 🔸 IFGain:Low Auto Tune Mkr1 889.95 MHz -46.635 dBm Ref Offset 41.5 dB Ref 11.50 dBm 10 dB/div **Center Freq** 515.000000 MHz Start Freq 30.000000 MHz Stop Freq 1.000000000 GHz ۵ CF Step 97.000000 MHz Man <u>Auto</u> **Freq Offset** 0 Hz Start 30.0 MHz #Res BW 100 kHz Stop 1.0000 GHz Sweep 120 ms (20001 pts) #VBW 300 kHz* STATUS

[Downlink Low]





Model:MRDU-25TDD

Agilent	t Spectru	n Analyzer - Sw									
<mark>IXI</mark> Star	t Erea	RF 50 Ω			SE	NSE:INT	Avg Type	ALIGNAUTO : Pwr(RMS)	TRAG	PM Jul 06, 2015	Frequency
Citt	t n oq	50.00000	P	NO: Fast 🔸 Gain:Low	Trig: Free #Atten: 10		Avg Hold:		Υ ΤΥ D	PE A WWWWW ET A N N N N N	
				Salu:Low	HACEN. N	040		M		52 MHz	Auto Tuno
10 dE		Ref Offset 41 Ref 11.50 (21 dBm	
Log											
1.50											Center Freq 515.000000 MHz
1.50											515.00000 MHz
-8.50											
										-13.00 dBm	Start Freq
-18.5											30.000000 MHz
-28.5											Stop Freq
-38.5											1.00000000 GHz
		↓ ¹									
-48.5	<mark>libert pit (</mark> an	and a state of the	the statistic the stat	. In a stall being	este pretektivlet en	alan ana ana ang ang ang ang ang ang ang a		a shelf.	ter and stands but		CF Step 97.000000 MHz
	and philon in a	a di ang dala si dala ja ji	(Sector Delivery)	No. of Los Los Report	in a principalitation of the	Contraction of the second	ومروبها وتعيينه محاليا	and and a second se	المتريل بتحتم والك		Auto Man
-58.5											
-68.5											Freq Offset
-00.5											0 Hz
-78.5											
Star	: 30.0 I								Stop 1	0000 GHz	
		00 kHz		#VBW	300 kHz	*		Sweep		0001 pts)	
MSG								STATU	-		



Conducted Spurious Emissions (1 GHz -26.5 GHz)

[Downlink Low]

	<mark>rrum Analyzer - Swe</mark> RF 50 Ω			SE	NSE:INT		ALIGN AUTO	04:16:28	PM Jul 16, 2015	_
	eq 1.0000000	000 GHz	IO: Fast ↔	Trig: Free	e Run	Avg Type Avg Hold:	RMS	TRAC TYP	E 1 2 3 4 5 6 E A WWWWW T A N N N N N	Frequency
			ain:Low	#Atten: 10	0 dB		Mkr		00 GHz	Auto Tune
10 dB/div Log	Ref Offset 41.9 Ref 11.50 d	5 dB I Bm						-31.0	49 dBm	
										Center Freq
1.50										1.748500000 GHz
-8.50									-13.00 dBm	Otert Free
-18.5										Start Freq 1.000000000 GHz
									1,	
-28.5									-	Stop Freq 2.497000000 GHz
-38.5	n de finister en finister finister finister I de finister finister finister finister finister finister finister					ha hita ha hit i		i de la d		2.497000000 GH2
-48.5	dede to sole a serie d	a a l'ante								CF Step 149.700000 MHz
-58.5										Auto Man
										Erog Offect
-68.5										Freq Offset 0 Hz
-78.5										
Start 1.00								Stop 2 /	970 GHz	
#Res BW			#VBW	/ 3.0 MHz	*		Sweep	2.00 ms (5001 pts)	
MSG							STATUS	5		
	rum Analyzer - Swe			SE	NSEINT		ALIGNALITO	04:17:20	PM 1116 2015	
LXI	rum Analyzer - Swe RF 50 ລ ອ ຊ 2.691400 0	AC 000 GHz	10: Fast ↔	Trig: Free		Avg Type Avg Hold:		TRAC	PM Jul 16, 2015 E 1 2 3 4 5 6 E A WWWWW	Frequency
LXI	RF 50 Ω eq 2.6914000	AC DOO GHZ PN IFG	IO: Fast ↔ ain:Low		e Run		e: RMS 10/10	TRAC TYP Di	E 1 2 3 4 5 6 E A Majajaj T A N N N N N	Frequency Auto Tune
Start Fre	RF 50 Ω	AC DOO GHz PN IFG 5 dB		Trig: Free	e Run		e: RMS 10/10	TRAC TYP DE 1 25.51	E 1 2 3 4 5 6	
Start Fre	RF 50 Ω 2 q 2.6914000 Ref Offset 41.4	AC DOO GHz PN IFG 5 dB		Trig: Free	e Run		e: RMS 10/10	TRAC TYP DE 1 25.51	E 123456 A WWWWW A NNNNN B 5 GHz	Auto Tune
Start Fre	RF 50 Ω 2 q 2.6914000 Ref Offset 41.4	AC DOO GHz PN IFG 5 dB		Trig: Free	e Run		e: RMS 10/10	TRAC TYP DE 1 25.51	E 123456 A WWWWW A NNNNN B 5 GHz	Auto Tune
Start Fre	RF 50 Ω 2 q 2.6914000 Ref Offset 41.4	AC DOO GHz PN IFG 5 dB		Trig: Free	e Run		e: RMS 10/10	TRAC TYP DE 1 25.51	E 123456 A WWWWW A NNNNN B 5 GHz	Auto Tune Center Freq 14.595700000 GHz
10 dB/div	RF 50 Ω 2 q 2.6914000 Ref Offset 41.4	AC DOO GHz PN IFG 5 dB		Trig: Free	e Run		e: RMS 10/10	TRAC TYP DE 1 25.51	3 5 GHz 74 dBm	Auto Tune Center Freq 14.595700000 GHz
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IO dB/div 1.50 -8.50 -18.5 -18.5	RF 50 2 eq 2.6914000 Ref Offset 41. Ref 11.50 d	AC DOO GHz PN IFG 5 dB	ain:Low	Trig: Free #Atten: 11	e Run 0 dB	AvgjHold:	e: RMS 10/10	TRAC TYP DE 1 25.51	3 5 GHz 74 dBm	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq
IO dB/div 1.50	RF 50 2 eq 2.6914000 Ref Offset 41. Ref 11.50 d	AC 000 GHz PN IFG 5 dB Bm	ain:Low	Trig: Free #Atten: 11	e Run 0 dB	AvgjHold:	e: RMS 10/10	TRAC TYP DE 1 25.51	3 5 GHz 74 dBm	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz CF Step
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Image: Constraint of the second sec	RF 50 2 eq 2.6914000 Ref Offset 41. Ref 11.50 d	AC 000 GHz PN IFG 5 dB Bm	ain:Low	Trig: Free #Atten: 11	e Run 0 dB	AvgjHold:	e: RMS 10/10	TRAC TYP DE 1 25.51	3 5 GHz 74 dBm	Start Freq 2.691400000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz CF Step 2.380860000 GHz Auto Man
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Image: Constraint of the second sec	RF 50 2 eq 2.6914000 Ref 0ffset 41. Ref 11.50 d	AC 000 GHz PN IFG 5 dB Bm	ain:Low	Trig: Free #Atten: 11	e Run 0 dB	AvgjHold:	e: RMS 10/10	1 25.511 -24.8	-1300 dBm	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz 2.380860000 GHz Auto Man
W Start Free 10 dB/div 1.50 1.50 -8.50 -18.5 -28.5 -38.5 -48.5 -68.5 -78.5 Start 2.68	RF 50 2 eq 2.6914000 Ref 0ffset 41. Ref 11.50 d	AC 000 GHz PN IFG 5 dB Bm		Trig: Free #Atten: 11	e Run D dB	Avg Hold:	ERMS 10/10	TRAC TWO 1 25.511 -24.8	3 5 GHz 74 dBm	Start Freq 2.691400000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz CF Step 2.380860000 GHz Auto



	rum Analyzer - Swe									
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1.50										1.746900000 GHz
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Start Fre	RF 50 Ω 2 q 2.6914000 Ref Offset 41.8	AC COF DOO GHZ PN IFG 5 dB	NO: Fast 🔸	, Trig: Free	Run	Avg Type	e: RMS 10/10	TRAC TYF DE 1 25.61	E 1 2 3 4 5 6 E A WWWWW T A N N N N N O 1 GHz	Auto Tune Center Fred
Start Fre	RF 50 Ω 2 q 2.6914000 Ref Offset 41.8	AC COF DOO GHZ PN IFG 5 dB	NO: Fast 🔸	, Trig: Free	Run	Avg Type	e: RMS 10/10	TRAC TYF DE 1 25.61	E 1 2 3 4 5 6 E A WWWWW T A N N N N N O 1 GHz	Auto Tune Center Fred
Start Fre	RF 50 Ω 2 q 2.6914000 Ref Offset 41.8	AC COF DOO GHZ PN IFG 5 dB	NO: Fast 🔸	, Trig: Free	Run	Avg Type	e: RMS 10/10	TRAC TYF DE 1 25.61	E 1 2 3 4 5 6 E A WWWWW T A N N N N N O 1 GHz	Auto Tune Center Fred 14.595700000 GHz Start Fred
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21 Start Fre 10 dB/div 1.50 1.50 	RF 50 Ω 2 q 2.6914000 Ref Offset 41.8	AC COP 2000 GHz PP PP IFC 5 dB Bm	NO: Fast → Sain:Low	Trig: Free #Atten: 10	Run dB		:: RMS 10/10 Mkr	TRAC TYF DE 1 25.61	2 3 4 5 6 E A WWWWW 7 A NNNNN 3 1 GHz 89 dBm	Auto Tune Center Frec 14.595700000 GHz Start Frec 2.691400000 GHz Stop Frec 26.500000000 GHz
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XI Start Free 10 dB/div	RF 50 Ω 2 q 2.6914000 Ref Offset 41.8	AC COP 2000 GHz PP PP IFC 5 dB Bm	NO: Fast → Sain:Low	Trig: Free #Atten: 10	Run dB		:: RMS 10/10 Mkr	TRAC TYF DE 1 25.61	2 3 4 5 6 E A WWWWW 7 A NNNNN 3 1 GHz 89 dBm	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz 2.380860000 GHz Auto Man
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XI XI Start Free 10 dB/div Log 1.50 -8.50 -18.5 -38.5 -48.5 -58.5 -68.5	RF 50 Ω 2 q 2.6914000 Ref Offset 41.8	AC COP 2000 GHz PP PP IFC 5 dB Bm	NO: Fast → Sain:Low	Trig: Free #Atten: 10	Run dB		:: RMS 10/10 Mkr	TRAC TYF DE 1 25.61	2 3 4 5 6 E A WWWWW 7 A NNNNN 3 1 GHz 89 dBm	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz 2.380860000 GHz Auto Man
X X Start Free 10 dB/div -0 g 1.50 -8.50 -8.50 -38.5 -38.5 -68.5 -68.5 -78.5 -78.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5 -58.5	Ref Offiset 41. Ref 11.50 d	AC COP 2000 GHz PP PP IFC 5 dB Bm	NO: Fast → Sain: Low	Trig: Free #Atten: 10	Run dB	Avg Type Avg Hold:	E RMS 10/10 Mkr	TRAC TYP OT 1 25.611 -26.61	-1300 dBm	Auto Tune Center Freq 14.595700000 GHz Start Freq 2.691400000 GHz Stop Freq 26.500000000 GHz 2.380860000 GHz Auto Man
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	RF 50 Ω			SEI	VSE:INT		ALIGN AUTO	06:42:36	PM Jul 06, 2015	Frequency
Start Fre	q 1.000000	P	NO: Fast 🔸	. Trig: Free		Avg Type Avg Hold:		TRAC TYP	E 1 2 3 4 5 6 E A WWWWWW T A N N N N N	Frequency
10 dB/div Log	Ref Offset 41 Ref 11.50	.5 dB	Gain:Low	#Atten: 10	dB		Mkr	1 2.367	42 GHz 29 dBm	Auto Tune
1.50										Center Fred 1.746900000 GHz
-8.50									-13.00 dBm	Start Fred 1.00000000 GHz
-28.5									↓1	Stop Fred 2.493800000 GHz
-38.5	l na she fa kanta kata Aliyot ya lala kata	in di la più di dia di Mana periodia di mana Mana periodia di mana di				teletar en				CF Step
-58.5										149.380000 MH i z <u>Auto</u> Mar Freq Offset
-68.5										0 Hz
Start 1.00								Stop 2.4	938 GHz	
			VBW	3.0 MHz*			Sweep 3	2.00 ms (5001 pts)	
#Res BW			VBW	3.0 MHz*			Sweep :			
#Res BW ISG Agilent Specti	1.0 MHz rum Analyzer - Sw						STATUS		5001 pts)	
#Res BW ISG Igilent Specto	1.0 MHz	AC CO 000 GHz P	RREC	SEI		Avg Type Avg Hold	STATUS	06:43:34 TRAC		Frequency
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Kes BW Kejlent Spectr X Start Free 10 dB/div 1.50	1.0 MHz	AC CO 000 GHz P IFC .5 dB	RREC	. Trig: Free	Run	Avg Type	ALIGN AUTO a: RMS : 10/10	06:43:34 TRAC TYJ DI 1 25.51	5001 pts) PM Julo6, 2015 E 1 2 3 4 5 6 E A WWWWW T A NNNN D 2 GHz	Auto Tuno Center Fred
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#Res BW Agient Spectr. Agient Spectr. XI Start Free -18.5 -28.5 -38.5 -38.5	1.0 MHz	AC COLOR COLOR	RREC	. Trig: Free #Atten: 10	e Run 0 dB	Avg Type Avg Hold:	ationauto er RMS 10/10 Mkr	06:43:34 TRAC TYJ DI 1 25.51	5001 pts)	Auto Tune Center Frec 14.595700000 GH: Start Frec 2.691400000 GH: Stop Frec 26.500000000 GH: 2.380860000 GH: Auto Mar Freq Offset
#Res BW Agient Spect Start Fre 10 dB/div -8 50 -8 50 -28 5 -38 5 -48 5 -58 5	1.0 MHz	AC COLOR COLOR	RREC	. Trig: Free #Atten: 10	e Run 0 dB	Avg Type Avg Hold:	ationauto er RMS 10/10 Mkr	06:43:34 TRAC TYJ DI 1 25.51	5001 pts)	Auto Tune Center Frec 14.595700000 GH: Start Frec 2.691400000 GH: Stop Frec 26.500000000 GH: CF Step 2.380860000 GH:

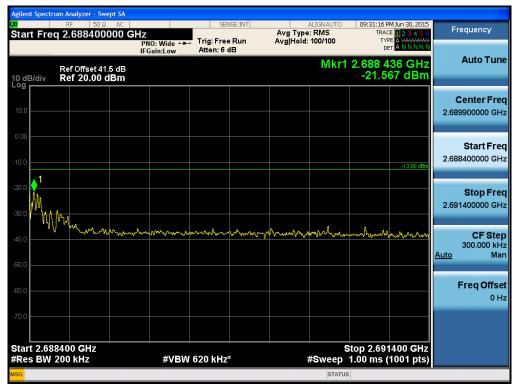




Intermodulation Spurious Emissions for FCC



[Downlink Low]



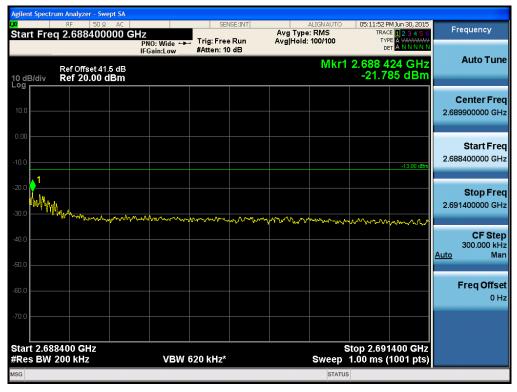




Single channel Enhancer Band Edge



[Downlink Low]

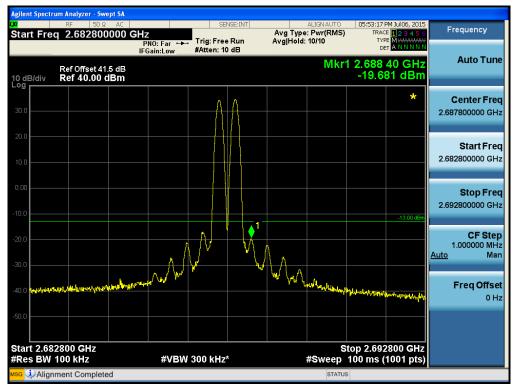




Multi channel Enhancer Band Edge for IC



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10. RADIATED SPURIOUS EMISSIONS

Test Requirement(s): § 2.1053 Measurements required: Field strength of spurious radiation.

§ 2.1053 (a) Measurements shall be made to detect spurious emissions that may be Radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of § 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.

§ 2.1053 (b): The measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.

(2) All equipment operating on frequencies higher than 25 MHz.

(3) All equipment where the antenna is an integral part of, and attached directly to The transmitter.

(4) Other types of equipment as required, when deemed necessary by the Commission.

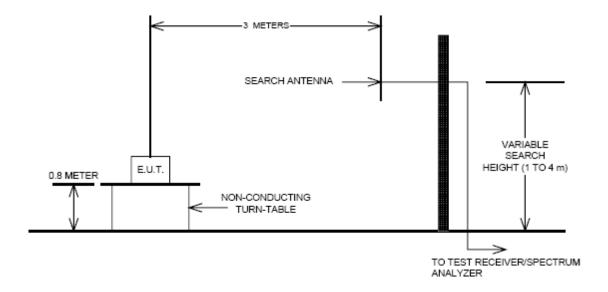
Test Procedures: As required by 47 CFR 2.1053, *field strength of radiated spurious measurements* were made in accordance with the procedures of ANSI/TIA-603-C-2004 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".

Radiated emission measurements were performed inside a 3 meter semi-anechoic chamber. The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360and the receiving antenna scanned from 1-3m in order to capture the maximum



emission. A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated. The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried. out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10th or 40GHz, whichever was the lesser, were investigated.

Radiated Spurious Emissions Test Setup





Test Result:

Note.

Input signal is the CW signal.

Harmonics were not found.

[Downlink]

Voltage	Тх		Substitute	Ant. Gain			EIRP	Margin
supplied to	Freq.(MHz)	Freq.(MHz)	Level	(dBi)	C.L	Pol.	(dBm)	(dB)
EUT	Fieq.(MHZ)		[dBm]					
	2506.8							
120 Vac	2593.0			No Pea	k Found			
	2678.4							

Voltage supplied to EUT	Tx Freq.(MHz)	Freq.(MHz)	<u>Substitute</u> Level [dBm]	Ant. Gain (dBi)	C.L	Pol.	EIRP (dBm)	Margin (dB)			
-48 Vdc	2506.8										
	2593.0	No Peak Found									
	2678.4										

11. FREQUENCY STABILITY OVER TEMPERATURE AND VOLTAGE VARIATIONS

FCC Rules

Test Requirement(s): §2.1055(a)(1), § 27.54

Test Procedures:

As required by 47 CFR 2.1055, *Frequency Stability measurements* were made at the RF output terminals using a Spectrum Analyzer.

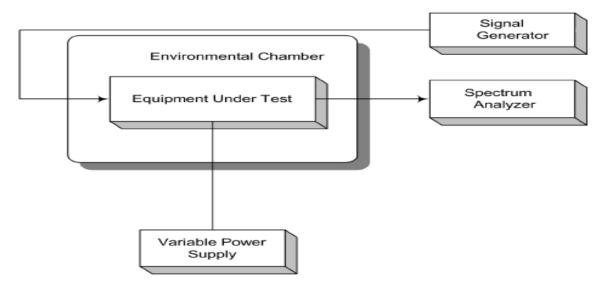
The EUT was placed in the Environmental Chamber.

A CW signal was injected into the EUT at the appropriate RF level. The frequency counter option on the Spectrum Analyzer was used to measure frequency deviations.

The frequency drift was investigated for every 10 °C increment until the unit is stabilized then recorded the reading in tabular format with the temperature range of -30 to 50 °C.

Voltage supplied to EUT is 110 Vac reference temperature was done at 20°C. The voltage was varied by \pm 15 % of nominal

Test Setup:



IC Rules

Test Requirement(s): RSS-131 6.5

A band translator is essentially a repeater station and should introduce as little frequency error as possible. The frequency stability should therefore meet the objectives of the overall land mobile or cellular service for which it serves. Better frequency stability than the minimum standard cited below will therefore be required in some cases.

The frequency stability shall be within 1.5 parts per million (0.00015%).

Test Procedures: RSS-131 4.5

In addition, the local oscillator frequency stability of the band translator shall be reported.

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage.

The following temperature and supply voltage ranges apply:

(a) at 10 degree intervals of temperatures between -30 °C and +50 °C, and at the manufacturer's rated-supply voltage; and

(b) at +20 °C temperature and 15% supply voltage variations.



Test Results:

The E.U.T was found in compliance for Frequency Stability and Voltage Test

Frequency Stability and Voltage Test Results

Voltage	Temp.	Frequency	Frequency	Deviation	ppm					
(%)	(°C)	(Hz)	Error (Hz)	(Hz)						
	+20(Ref)	2593000000. 4	0.4	0.0	0.0					
	-30	2592999999. 8	-0.2	-0.6	0.0					
	-20	2593000000. 1	0.1	-0.3	0.0					
	-10 2592999999.6		-0.4	-0.8	0.0					
100%	0	2592999999. 9	-0.1	-0.5	0.0					
	+10	2592999999. 7	-0.3	-0.7	0.0					
	+30	2592999999.6	-0.4	-0.8	0.0					
	+40	2593000000. 1	0.1	-0.3	0.0					
	+50	2592999999. 8	-0.2	-0.6	0.0					
115%	+20	2593000000. 2	0.2	-0.2	0.0					
85%	+20	2592999999. 9	-0.1	-0.5	0.0					

Reference: 120 Vac at 20°C **Freq.** = 2593.00 MHz