

TEST REPORT

MOBILE MICROWAVE VIDEO TRANSMITTER

FCC ID: FC3NST2G7G

MODEL: NST270T1CAJ3

APPLICANT: VISLINK, Inc.

March 18, 2015

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SECTION 1 INTRODUCTION

GENERAL INFORMATION – 2.1033

Applicant:	Vislink, Inc. 101 Billerica Avenue, Building 6 North Billerica, MA 01862 Tel. 978-671-5700 Attn: Sal Blatti, Compliance Manager Email: sal.blatti@vislink.com
FCC ID:	FC3NST2G7G
Installation and Operating Manual:	NewStream User and Technical Manual
Equipment Description:	Mobile Video Transmitter – see below
Block Diagram:	See Technical Description, below
Equipment model:	NST270T1CAJ3
Frequency Range (MHz):	2025 – 2500MHz and 6425 – 7125MHz
Rated RF Power:	2025 – 2500MHz 8.0 Watts (+39 dBm) 6425 – 7125MHz 5.0 Watts (+37 dBm)
FCC Part numbers:	§ 74; subpart F: 74.602(h)(4)(i)(1), (2), and (3). § 78; subpart D, 78.101, 78.102, 78.104, 78.111 §101; subpart H: 101.601 & 101.602
Frequency Tolerance:	0.0005%
Emission Designators:	12M0D7W, 17M0D7W, 25M0D7W

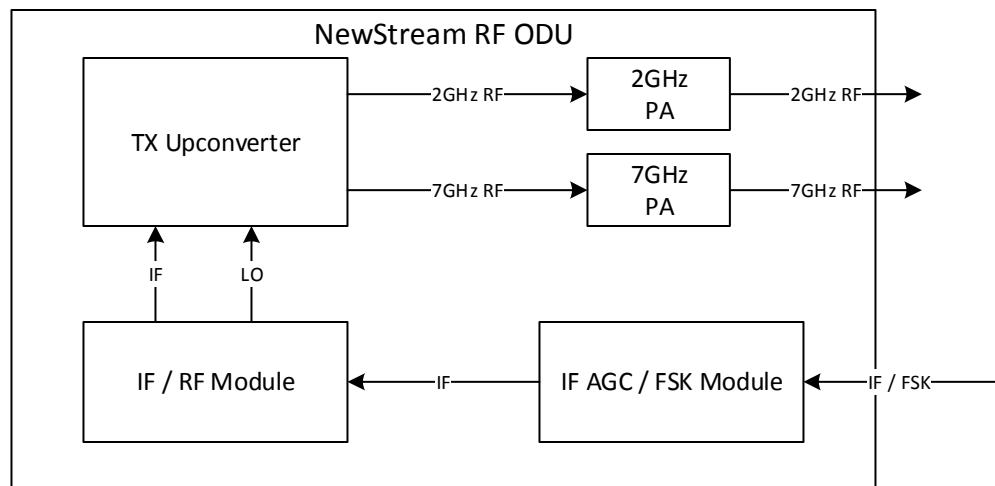
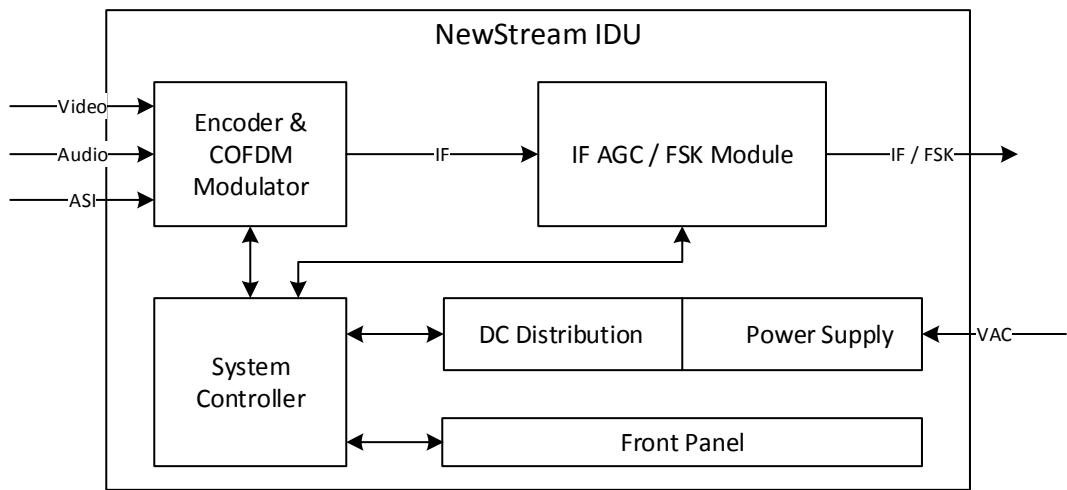
The data provided in this document will show that the Vislink/Microwave Radio Communications NewStream transmitter is in compliance with 47 CFR Parts 74, 78 and 101 for use by eligible Broadcast Auxiliary, CARS, and Private Operational Fixed Point-to-Point Radio Service licensees in the 2025 – 2500MHz and 6425 – 7125MHz mobile band as provided for in the relevant FCC part number referenced above. Radiated and EMC emission tests were conducted by Curtis-Straus a Bureau Veritas Company in their laboratory facility in Littleton, MA while the part 74, 78 and 101 emission testing was conducted in the Vislink/Microwave Radio Communications facility in North Billerica, MA.

The NewStream was designed to comply with applicable technical regulations of § 74 subpart F, § 78 subpart D, and §101 subpart H for the transmission of video, audio, and data by a mobile transmitter. Typical applications may include surveillance, command center operations, emergency restoration, broadcast remote and news gathering, cable TV remote and news gathering, or other video, voice and data requirements as deemed necessary and appropriate for a specific task assignment.

Technical Description:

The NewStream FC3NST2G7G is a 2-box, mobile transmitter, designed to be adaptable to a wide range of field applications; particularly those requiring ruggedized, vehicular mounted equipment. The transmitter accepts a wide range of SMPTE based video input signals, including HD-SDI, SDI, ASI, and NTSC. Raw video, audio, and data are delivered to an integral Encoder which feeds a COFDM-DVB-T modulator, operating in the 2K carrier mode. The I and Q outputs of the COFDM modulator intermediate frequency are supplied to a RF unit where the IF signal is up-converted to the operating band of 2025 - 2500 MHz or 6425 - 7125 MHz and amplified to the factory set limit to meet the requirements of part § 74 and § 78 or 5W for part § 101.

Block Diagram:



Frequency Plans:

The specific operating frequency is determined by a high stability wide band VCO. The VCO set-up voltage is controlled by a microprocessor that is factory programmed to provide channel plans in accordance with the rules as specified in part §74, 78, or 101.

Channel	2GHz Center Frequency (MHz)	7GHz Center Frequency (MHz)
1	2031.500	6887.500
2	2043.500	6912.500
3	2055.500	6937.500
4	2067.500	6962.500
5	2079.500	6987.500
6	2091.500	7012.500
7	2103.500	7037.500
8	2458.500	7062.500
9	2475.250	7087.500
10	2491.750	7112.500
11		6437.500
12		6462.500
13		6487.500
14		6512.500

Table 1 – NewStream Factory channel plan center frequencies

SPECIFICATIONS

RF OUTDOOR UNIT (ODU):

- RF Connector input: Type N female (950MHz)
- RF Connectors output: Type N female (2 and 7GHz)
- Impedance: 50 Ohms
- Return loss: 17 dB minimum (output)
- Output stability: ± 1.0 dB, - 20° to + 55° C
- Harmonics: ≤ 60 dBc
- PA protection: Capable of operation into infinite VSWR, no time limit.
- Frequency Step Size: 250 KHz
- Frequency Stability: .0005%
- RF power output: 8W@ 2GHz and 5W@ 7GHz
- Input Power: 48VDC
- Input Power connector: 12P Cannon

INDOOR UNIT (IDU):

- Input Power: 90 to 240VAC
- Power Consumption: 2A
- IF Connector Out: Type N female (950MHz)
- Input signals:
 - SDI Video
 - Composite Video
 - ASI
 - Analog Audio
 - Digital Audio
- Monitor Ports:
 - ASI
 - L-band

NOTE: Additional details are in the User and Technical Manual, attached to this report.

SECTION 2 MEASUREMENTS

TECHNICAL DATA SUMMARY

Frequency band: Operating frequency range is 2025 – 2500 MHz or 6425 – 7125 MHz

Modulation Type: COFDM; QPSK, 16QAM, 64QAM.

Licensed for: Broadcast Auxiliary Service under CFR 47 part §74: subpart F
Cable Television Relay Service under CFR 47 part §78: subpart D
Fixed Point to Point Microwave Service under CFR 47 part §101.601 & 603B

Channel spacing: 12, 17, or 25MHz (see section 1.0 for details)

FCC ID: FC3NST2G7G

Equipment Description: Mobile Video Transmitter

Equipment model: NST270T1CAJ3

Frequency Tolerance: 0.0005 %

Emission Designators: 12M0D7W, 17M0D7W, 25M0D7W

RF Power Output Measurement per 2.1046

Applicable specifications: 12 Watts (+ 40.8dBm) per §74.638(a)
20 Watts (+ 43dBm) per §78.638(a)
5 Watts (+ 37dBm) per §101.601 & 603B

The RF power measured 2GHz band 12 and 17 MHz channels, as required for this application, is shown below:

Channel	Frequency (MHz)	Transmit Power Conducted 2GHz Band	Channel Bandwidth
1	2031.5	39.7dBm (9.3W)	12 MHz
2	2043.5	39.6dBm (9.1W)	12 MHz
3	2055.5	39.7dBm (9.3W)	12 MHz
4	2067.5	39.4dBm (8.7W)	12 MHz
5	2079.5	39.4dBm (8.7W)	12 MHz
6	2091.5	39.3dBm (8.6W)	12 MHz
7	2103.5	39.4dBm (8.7W)	12 MHz
8	2458.5	39.8dBm (9.5W)	17 MHz
9	2475.25	39.7dBm (9.3W)	17 MHz
10	2491.75	39.6dBm (9.1W)	17 MHz

The RF power measured for 7GHz 25 MHz channels, as required for this application, is shown below:

Channel	Frequency (MHz)	Transmit Power Conducted 7GHz band	Channel Bandwidth
1	6887.500	36.6dBm (4.5W)	25 MHz
2	6912.500	36.5dBm (4.4W)	25 MHz
3	6937.500	36.8dBm (4.8W)	25 MHz
4	6962.500	36.6dBm (4.5W)	25 MHz
5	6987.500	36.2dBm (4.2W)	25 MHz
6	7012.500	36.9dBm (4.9W)	25 MHz
7	7037.500	36.4dBm (4.4W)	25 MHz
8	7062.500	36.8dBm (4.8W)	25 MHz
9	7087.500	36.8dBm (4.8W)	25 MHz
10	7112.500	37.0dBm (5.0W)	25 MHz
11	6437.500	36.1dBm (4.1W)	25 MHz
12	6462.500	36.2dBm (4.2W)	25 MHz
13	6487.500	36.5dBm (4.4W)	25 MHz
14	6512.500	36.8dBm (4.8W)	25 MHz

Table 2 – Power measurement

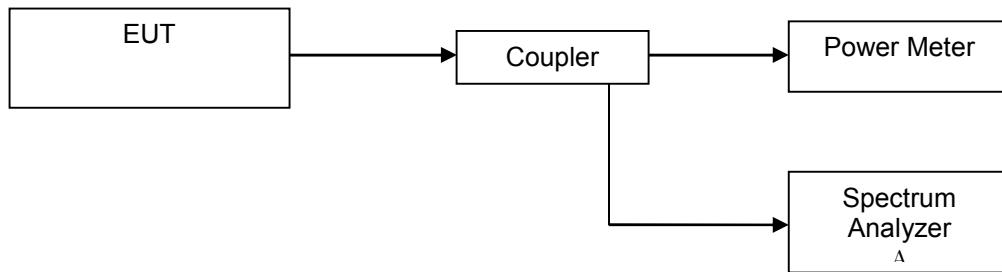
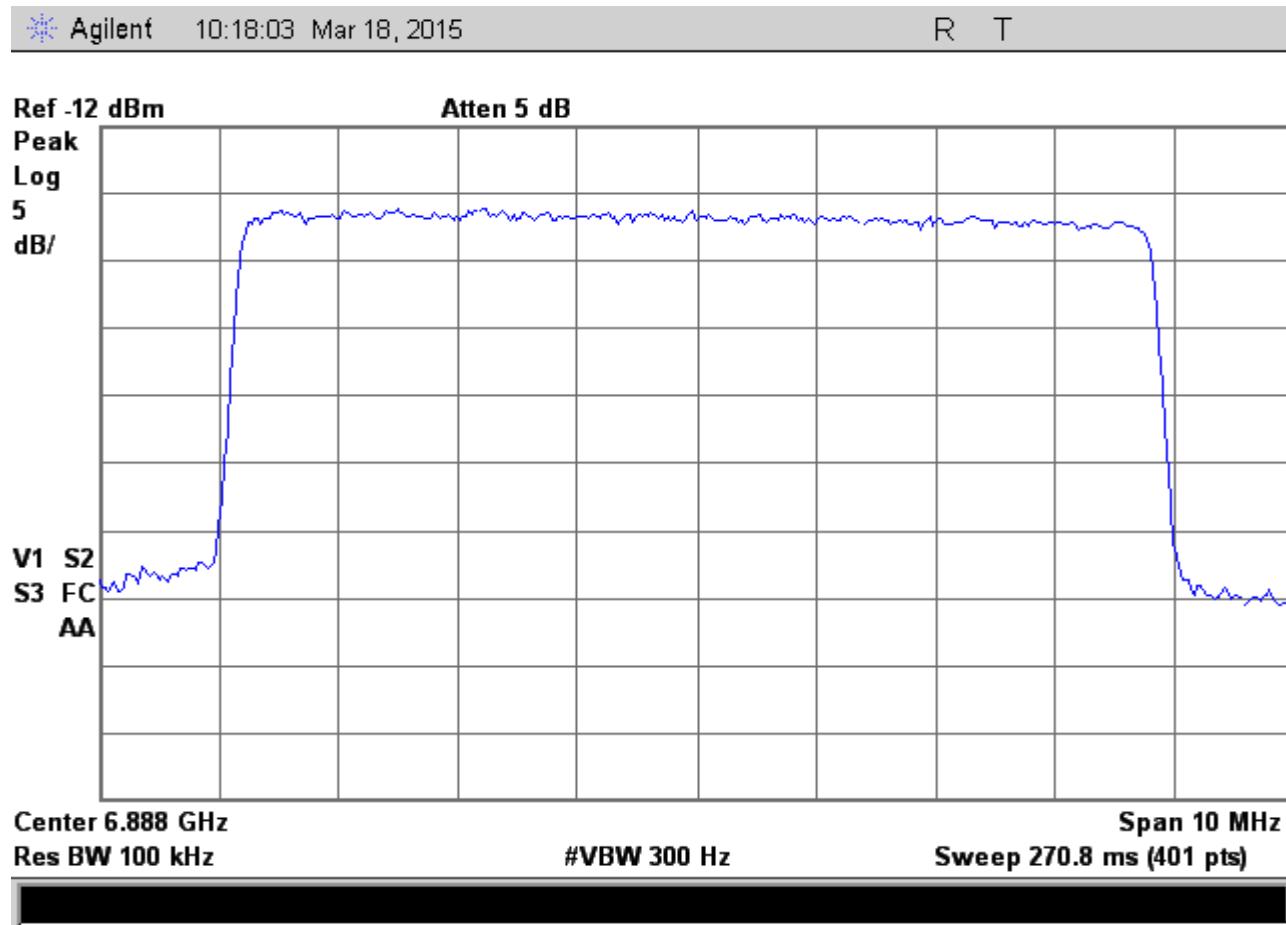


Figure 1 - Test Setup for Power Measurements

SECTION 2 – MODULATION CHARACTERISTICS PER 2.1047

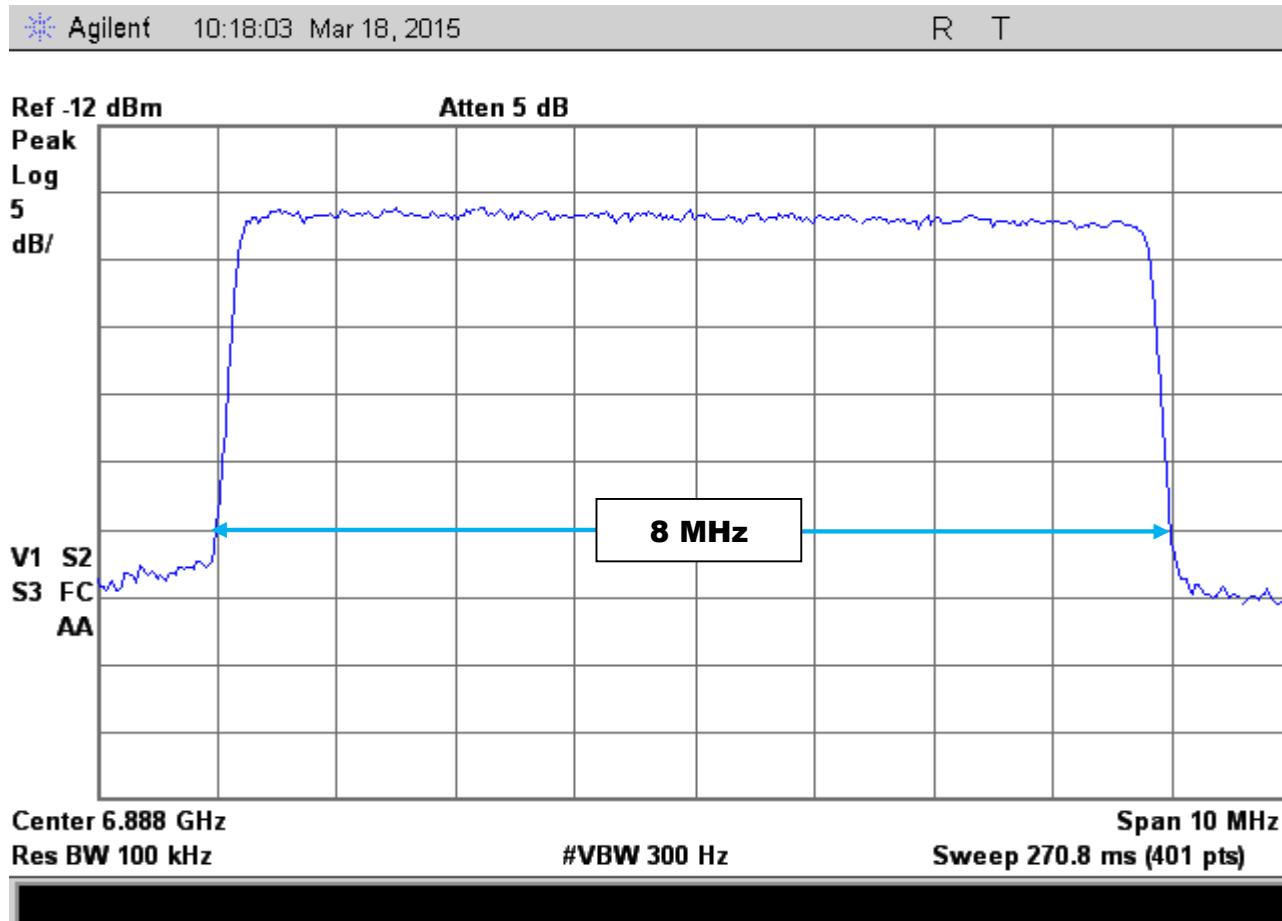
Measurement Frequency: 6887.5 MHz

Data: The unit under test is designed to be modulated by a combination of digital video, audio, and auxiliary data. The COFDM modulated spectrum shown in the image below shows compliance with the 8 MHz pedestal option in the DVB-T standard for the 2K carrier mode, per ETSI EN 300 744 V1.51. These carriers may be modulated in QPSK, 16QAM, or 64 QAM formats with no change in occupied bandwidth, as the symbol rate is fixed to maintain the same bandwidth.



SECTION 2 - OCCUPIED BANDWIDTH 2.1049

To measure the occupied bandwidth, the equipment was set up as shown below, and the transmitter was modulated with a digital COFDM pedestal of 7.61MHz (8MHz). The output of the transmitter was viewed on a spectrum analyzer. The current COFDM standard adopted by Vislink is the ETSI EN 300 744 V1.2.1 (2001-01) for framing structure, channel coding and modulation. Since the spectrum is digitally modulated, at the center frequency, calculations were performed by establishing a reference at FO (6887.5 MHz) and the amplitude readings were calculated from a CW signal input to the transmitter.



Occupied Bandwidth with 8MHz COFDM Pedestal

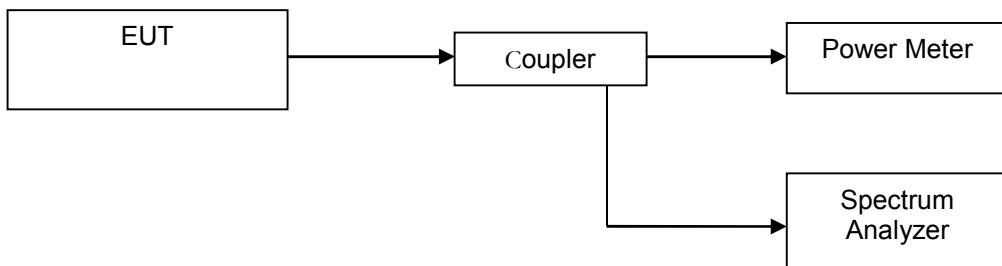


Figure 3 - Test Setup for Emission Mask, Occupied Bandwidth, and Spurious Emission Measurement

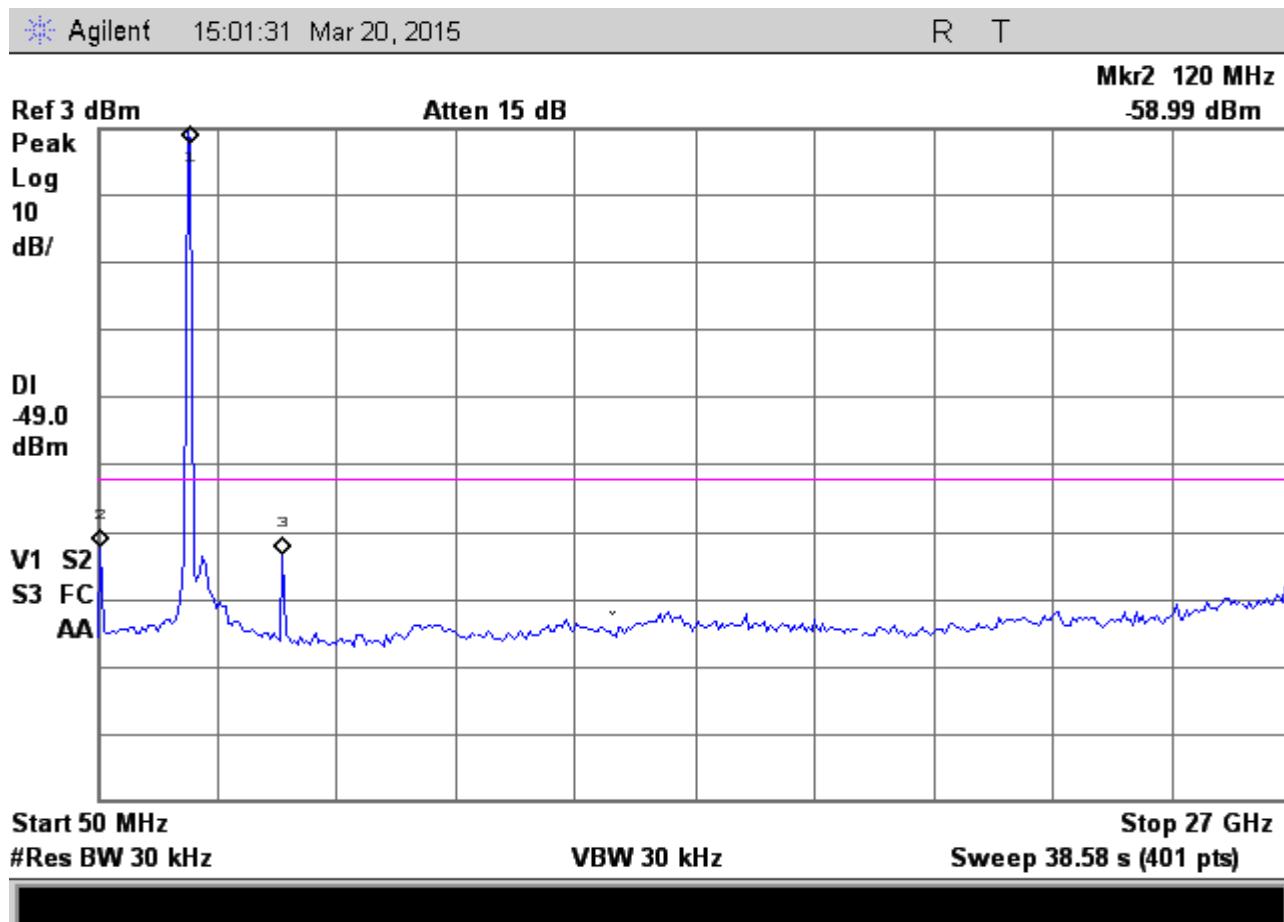
SECTION 2 SPURIOUS EMISSIONS AT THE ANTENNA TERMINAL: 2.1051

2GHz

Applicable Specifications: §74.637(a)(2)(i)

On any frequency removed from the assigned frequency above 250% of the authorized bandwidth: 80 dB or $43 + 10 \log(P)$ dB, whichever is the lesser attenuation, 2GHz Spurious Limit is -52dBm.

The Antenna conducted spurious emissions test were performed with the transmitter frequency set to 2103.5MHz, and with a measured output power of 8W (+39dBm). The spectrum analyzer was first tuned to a reference carrier level at the fundamental operating frequency. The output spectrum was then slowly scanned up to 27GHz. Special attention was given to those frequencies that correspond to the possible harmonic and sub – harmonics.



NewStream 2GHz Spurious Emission Plot RF Power = 39dBm / 8.0W
NOTE: Display line @ -49dB represents the spurious limit (-49dB – Ref 3dB = -52dBm)

Frequencies to be investigated:

- Marker 2 117.37MHz @-57.1dBm
- Marker 3 4230.6MHz @-60.1dBm

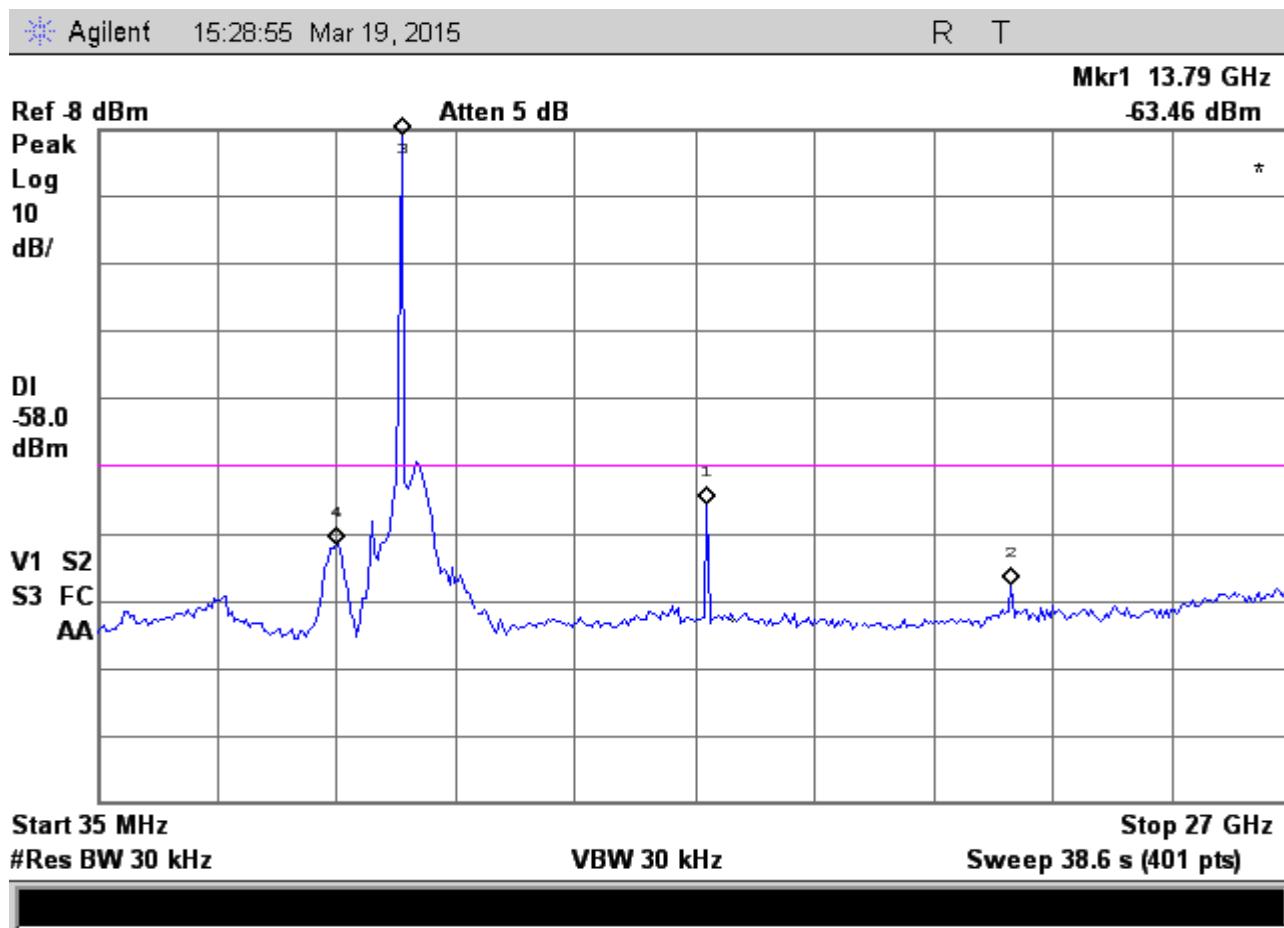
The FCC limits for Spurious emissions conducted at the antenna port per CFR 47 §2.1051 has been met.

7GHz

Applicable Specifications: §74.637(a)(2)(i)

On any frequency removed from the assigned frequency above 250% of the authorized bandwidth: 80 dB or $43 + 10 \log(P)$ w, whichever is the lesser attenuation, 7GHz Spurious Limit is -50dBm.

The Antenna conducted spurious emissions test were performed with the transmitter frequency set to 6887.5MHz, and with a measured output power of 5W (+37dBm). The spectrum analyzer was first tuned to a reference carrier level at the fundamental operating frequency. The output spectrum was then slowly scanned up to 27GHz. Special attention was given to those frequencies that correspond to the possible harmonic and sub – harmonics.



NewStream 7GHz Spurious Emission Plot RF Power = 37dBm / 5W
NOTE: Display line @ -58dB represents the spurious limit (-58dB – Ref -8dB = -50dBm)

Frequencies to be investigated:

- Marker 1 1378.7MHz @-63dBm
- Marker 2 20.663GHz @-75dBm
- Marker 4 5.428GHz @-69.4dBm

The FCC limits for Spurious emissions conducted at the antenna port per CFR 47 §2.1051 has been met.

SECTION 2 CONTINUED- EMISSION MASK PER 74.637

Applicable Specifications: §74.637(a)(2)(i)

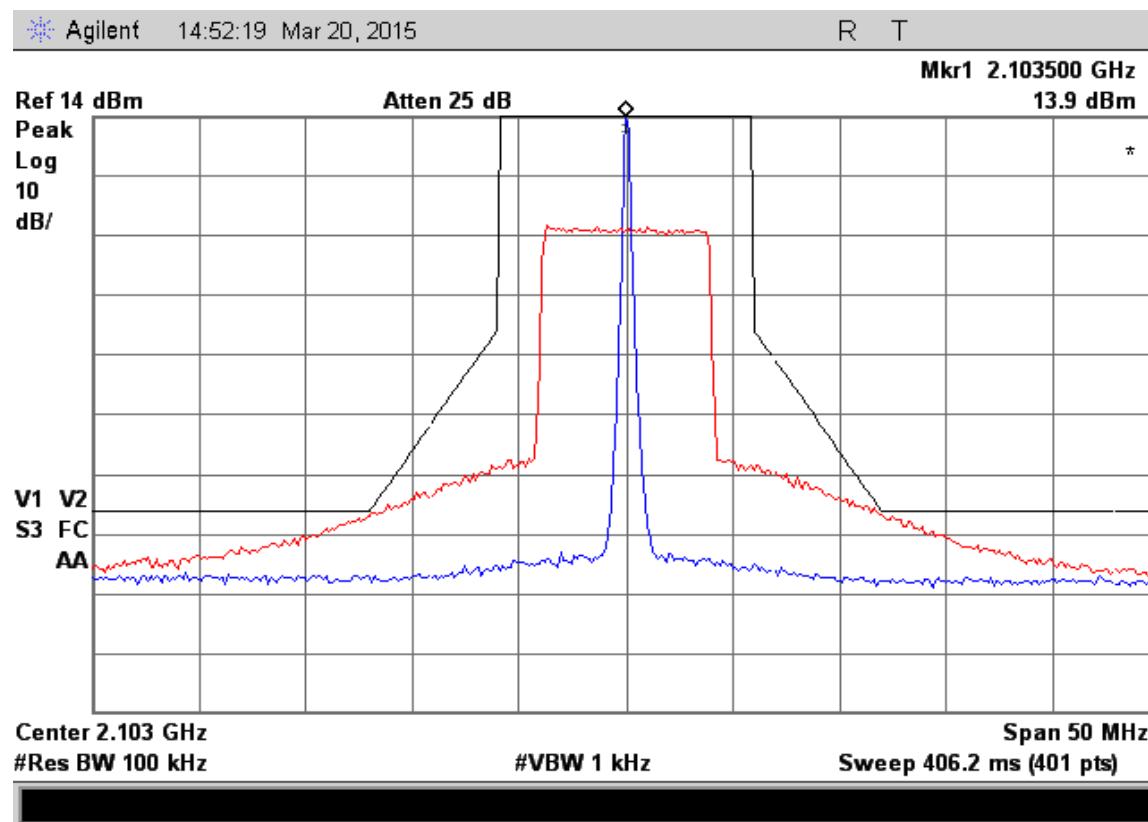
(i) For operating frequencies below 15 GHz, in any 4 KHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent up to and including 250 percent of the authorized bandwidth: As specified by the following equation but in no event less than 50 decibels:

$A = 35 + 0.8(P - 50) + 10 \log_{10} B$. (Attenuation greater than 80 decibels or to an absolute power of less than --13dBm/1MHz is not required.) where:

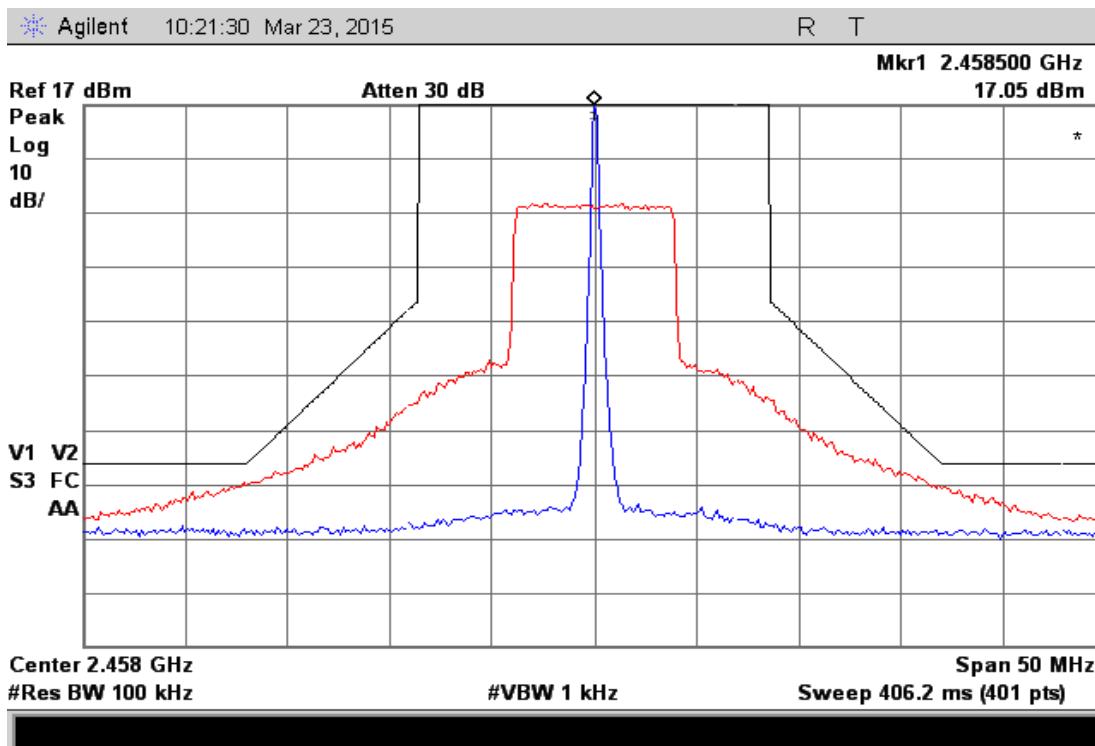
A = Attenuation (in decibels) below the mean output power level.

P = Percent removed from the center frequency of the transmitter bandwidth.

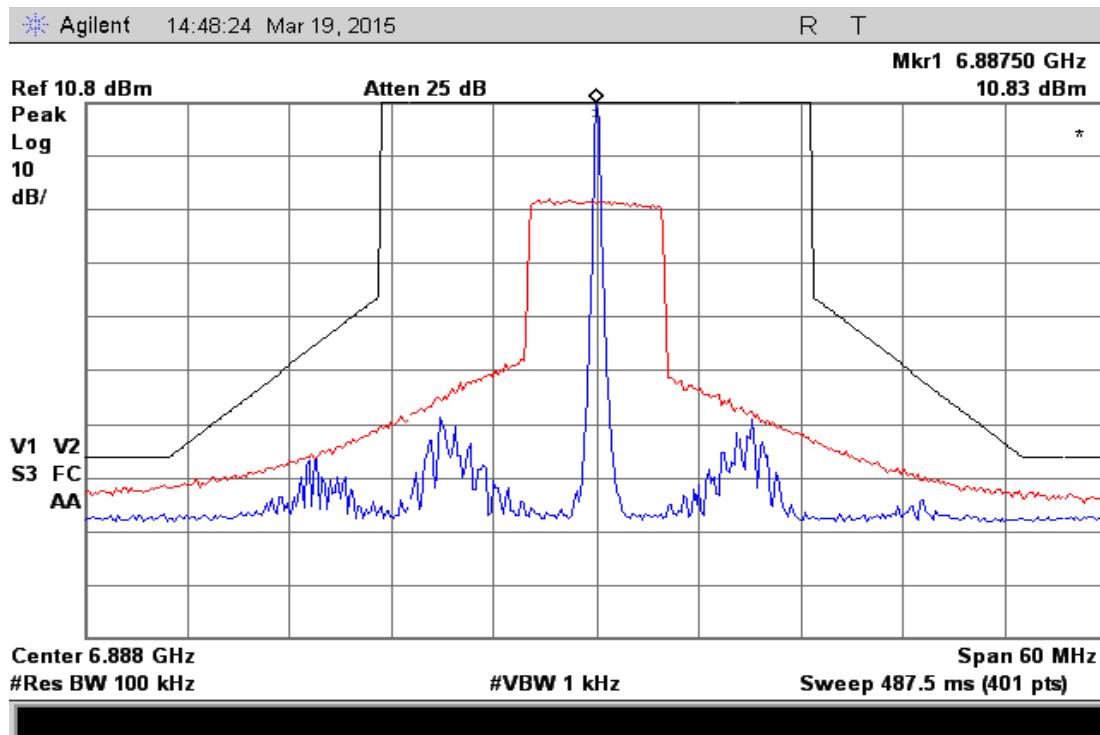
B = Authorized bandwidth in MHz



NewStream 12MHz Emission Plot: RF Power = 39dBm / 8W



NewStream 17MHz Emission Plot: RF Power = 39dBm / 8W



NewStream 25MHz Emission Plot: RF Power = 37dBm / 5W

SECTION 2 - FREQUENCY STABILITY OVER TEMPERATURE & VOLTAGE- 2.1055

The NewStream (FC3NST2G7G) was set-up to transmit CW signal. The measurement was made at the antenna port using a microwave frequency counter. Measurements were made to determine the transmitter frequency stability over the temperature range -20° C to +50 °C. The transmitter was allowed to stabilize a minimum of 30 minutes before measurement.

Measurements were also made to determine transmitter frequency stability versus primary supply variation of the DC input voltage range of 18V to 36V.

- The 2GHz desired Center Frequency for this test is 2103500000Hz
- The 7GHz desired Center Frequency for this test is 6887500000Hz

The limit per §74.661 is 50PPM (.005%)

See figure 4 for test set-up.

Temperature	2GHz Measure Frequency (Hz)	Δ (%) Limit .005%	7GHz Measure Frequency (Hz)	Δ (%) Limit .005%
-20° C	2103501100	.000052	6887500900	.000042
-10° C	2103500900	.000042	6887500500	.000024
0° C	2103500800	.000038	6887500400	.000019
+10° C	2013500200	.000009	6887500100	.000005
+20° C	2103500100	.000005	6887499800	.000009
+30° C	2013499900	.000005	6887499500	.000024
+40° C	2103499600	.000019	6887499200	.000038
+50° C	2103499200	.000038	6887499000	.000048

Voltage (AC)	Measure Frequency (Hz)	Δ (%) Limit .005%	7GHz Measure Frequency (Hz)	Δ (%) Limit .005%
90	2103500200	0.000009	6887499400	.000019
100	2103500200	0.000009	6887499400	.000019
110	2103500200	0.000009	6887499400	.000019
120	2103500200	0.000009	6887499400	.000019
130	2103500200	0.000009	6887499400	.000019
140	2103500200	0.000009	6887499400	.000019
150	2103500200	0.000009	6887499400	.000019
160	2103500200	0.000009	6887499400	.000019
170	2103500200	0.000009	6887499400	.000019
180	2103500200	0.000009	6887499500	.000024
190	2103500200	0.000009	6887499500	.000024
200	2103500300	0.000014	6887499500	.000024
210	2103500300	0.000014	6887499600	.000024
220	2103500300	0.000014	6887499600	.000024
230	2103500300	0.000014	6887499600	.000024
240	2103500300	0.000014	6887499600	.000024

SECTION 2 - FIELD STRENGTH OF SPURIOUS RADIATION 2.1053

The case radiated spurious emission tests were conducted by Curtis-Straus a Bureau Veritas Company, located in Littleton, Massachusetts. The NewStream was set-up in a 3m anechoic chamber, all cables connected and was transmitting at normal RF power. This report represents spurious emissions observed and calculated to be acceptable according to rule part: 2.153 and FCC Part 15, subpart B.

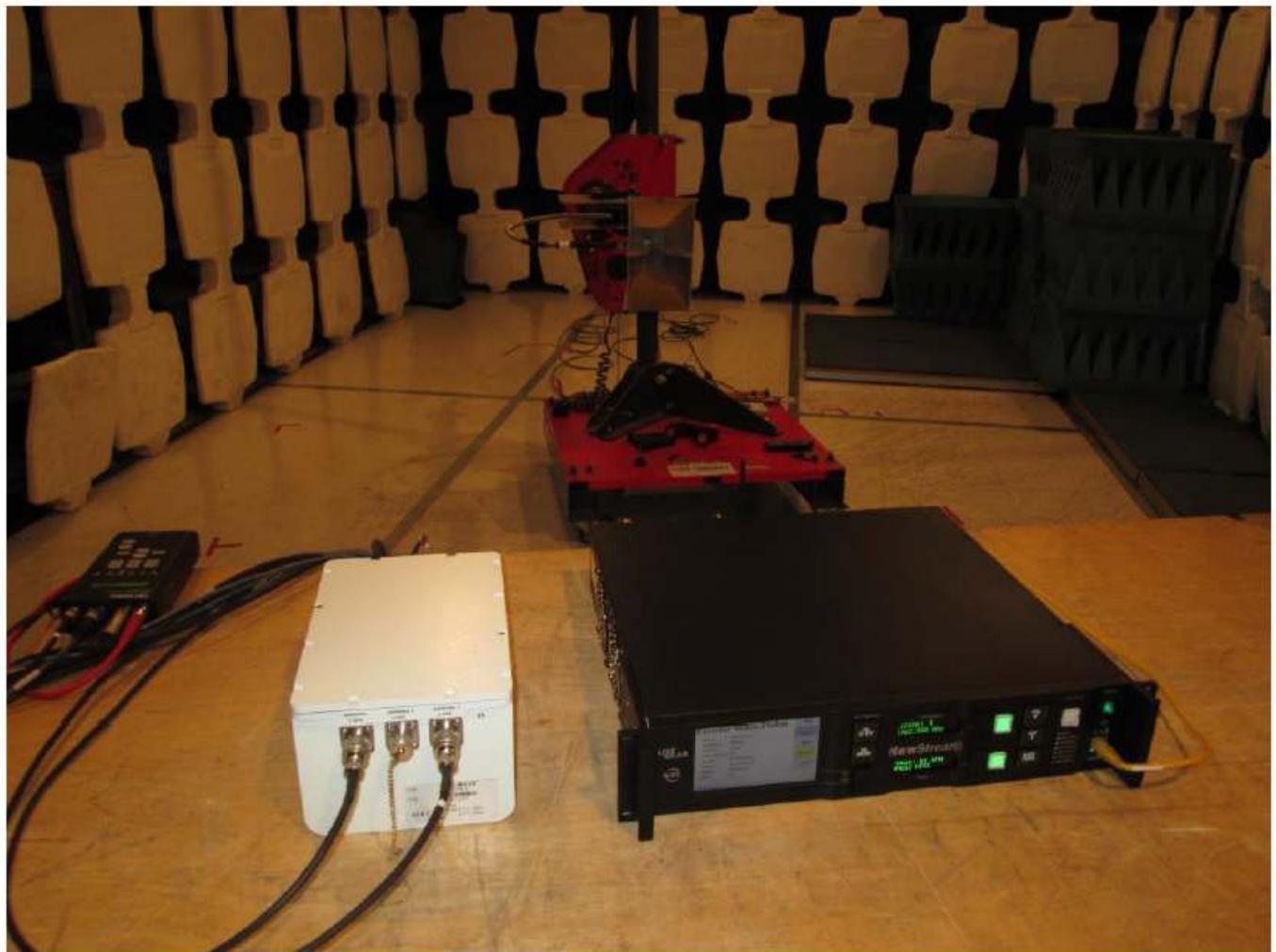
Radiated Emissions Results:

Radiated Emissions Table																		
Date: 22-May-14	Company: Microwave Radio Communications LLC				Work Order: 00384													
Engineer: Ryan Brown	EUT Desc: New Stream 9009539				EUT Operating Voltage/Frequency: 120V/60Hz													
Temp: 25.5°C	Humidity: 33%				Pressure: 1003mBar													
Frequency Range: 30-1000MHz						Measurement Distance: 3 m												
Notes:						EUT Max Freq: 6962.5MHz												
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dB μ V/m)	---			FCC Class A								
							Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)						
V	66.4	57.2	25.4	8.3	0.6	40.7	—	—	—	49.5	-8.8	Pass						
V	147.6	55.3	25.3	13.1	0.8	43.9	—	—	—	54.0	-10.1	Pass						
H	212.15	57.1	25.4	11.2	1.1	44.0	—	—	—	54.0	-10.0	Pass						
V	212.16	54.2	25.4	11.2	1.1	41.1	—	—	—	54.0	-12.9	Pass						
H	221.57	58.6	25.4	11.5	1.1	45.8	—	—	—	56.9	-11.1	Pass						
H	288.75	57.7	25.2	13.8	1.2	47.5	—	—	—	56.9	-9.4	Pass						
H	376.77	57.8	24.6	15.7	1.4	50.3	—	—	—	56.9	-6.6	Pass						
V	767.2	41.1	24.0	21.4	2.0	40.5	—	—	—	56.9	-16.4	Pass						
Table Result: Pass by -6.6 dB						Worst Freq: 376.77 MHz												
Test Site: EMI Chamber 2			Cable 1: Asset #1786			Cable 2: Asset #1506			Cable 3: —									
Analyzer: Gold			Preamp: Red			Antenna: Red-White			Preselector: —									

Radiated Emissions Table																		
Date: 22-May-14	Company: Microwave Radio Communications LLC				Work Order: 00384													
Engineer: Ryan Brown	EUT Desc: New Stream 9009539				EUT Operating Voltage/Frequency: 120V/60Hz													
Temp: 25.5°C	Humidity: 33%				Pressure: 1003mBar													
Frequency Range: 1-6GHz						Measurement Distance: 3 m												
Notes:						EUT Max Freq: 6962.5MHz												
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class A High Frequency - Peak		FCC Class A High Frequency - Average							
									Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)	Limit (dB μ V/m)	Margin (dB)	Result (Pass/Fail)				
V	2850.0	48.6	34.8	22.6	29.4	4.3	59.7	45.9	80.0	-20.3	Pass	60.0	-14.1	Pass				
V	1125.0	39.26	25.6	22.3	26.0	2.6	45.6	31.9	80.0	-34.4	Pass	60.0	-28.1	Pass				
V	3112.0	40.46	36.5	22.3	31.1	4.5	53.8	49.8	80.0	-26.2	Pass	60.0	-10.2	Pass				
V	4062.0	37.09	23.0	21.4	32.4	5.2	53.3	39.2	80.0	-26.7	Pass	60.0	-20.8	Pass				
V	5562.0	36.08	23.5	20.6	34.6	6.3	56.4	43.8	80.0	-23.6	Pass	60.0	-16.2	Pass				
Table Result: Pass by -10.2 dB						Worst Freq: 3112.0 MHz												
Test Site: EMI Chamber 2			Cable 1: Asset #1786			Cable 2: Asset #1506			Cable 3: —									
Analyzer: Gold			Preamp: Asset #1517			Antenna: Black Horn			Preselector: —									

Radiated Emissions Table

Date: 22-May-14 Engineer: Ahmed Ahmed Temp: 26°C		Company: Microwave Radio Communications LLC EUT Desc: New Stream 9009539 Humidity: 30%		Work Order: 00384 EUT Operating Voltage/Frequency: 120V/60Hz Pressure: 1005mBar																
Frequency Range: 6-18GHz			Measurement Distance: 1 m																	
Notes:					EUT Max Freq: 6962.5MHz															
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dB μ V)	Average Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dB μ V/m)	Adjusted Avg Reading (dB μ V/m)	FCC Class A High Frequency - Peak	FCC Class A High Frequency - Average										
V	9120.0	41.23	37.3	19.8	38.4	7.2	67.0	63.1	89.5	-22.5	Pass	69.5	-6.4	Pass						
H	9120.0	40.5	33.0	19.8	38.4	7.2	66.3	58.8	89.5	-23.2	Pass	69.5	-10.7	Pass						
Table Result:		Pass by -6.4 dB				Worst Freq: 9120.0 MHz														
Test Site: EMI Chamber 2			Cable 1: Asset #1786			Cable 2: Asset #1506			Antenna: Black Horn											
Analyzer: Gold			Preamp: Asset #1517																	



Conducted Emissions Results:

AC Conducted Emissions Data Table

Notes:						Frequency Range: 0.15-30MHz						EUT Input Voltage/Frequency: 120V/60Hz					
Frequency (MHz)	Quasi-Peak Readings		Average Readings		LISN Factors		Cable Factor (dB)	ATTN Factor (dB)	FCC Class A			FCC Class A					
	QP1 (dB μ V)	QP2 (dB μ V)	AVG1 (dB μ V)	AVG2 (dB μ V)	L1 (dB)	L2 (dB)			QP Limit (dB μ V)	Margin (dB)	Result (Pass/Fail)	AVG Limit (dB μ V)	Margin (dB)	Result (Pass/Fail)			
0.15	30.6	30.2	25.8	21.8	-0.1	-0.1	0.0	-20.4	79.0	-27.9	Pass	60.0	-19.6	Pass			
0.23	30.5	30.0	17.4	18.6	-0.1	-0.1	-0.1	-20.4	79.0	-28.0	Pass	60.0	-28.9	Pass			
4.51	22.1	23.0	18.2	18.7	-0.1	0.0	-0.1	-20.4	73.0	-29.5	Pass	60.0	-20.8	Pass			
8.53	19.3	24.7	12.8	13.1	-0.1	0.0	-0.1	-20.4	73.0	-27.7	Pass	60.0	-26.3	Pass			
19.97	27.0	21.5	16.1	13.9	-0.1	-0.1	-0.3	-20.3	73.0	-24.5	Pass	60.0	-23.2	Pass			
13.38	24.1	23.0	19.6	18.3	-0.1	-0.1	-0.2	-20.4	73.0	-28.2	Pass	60.0	-19.8	Pass			

Result: Pass **Worst Margin:** -19.6 dB **Frequency:** 0.150 MHz

Measurement Device: LISN ASSET 1726(Line 1) LISN ASSET 1727(Line 2) **Cable:** CEMI-11 **Spectrum Analyzer:** Black

Attenuator: 20dB Atten-4 **Site:** CEMI2



SECTION 3 - QUALITY DECLARATION

QUALITY SYSTEM ISO 9000



Page 1 of 1

This approval is subject to the company maintaining its system to the required standard, which will be monitored by NQA, USA, an accredited organization under the ANSI-ASQ National Accreditation Board.

SECTION 4 TRANSMITTER PHOTOS

FC3NST2G7G
NewStream Transmitter Photo's
MANUFACTURERS PART # NST270T1CAJ3

External Front View

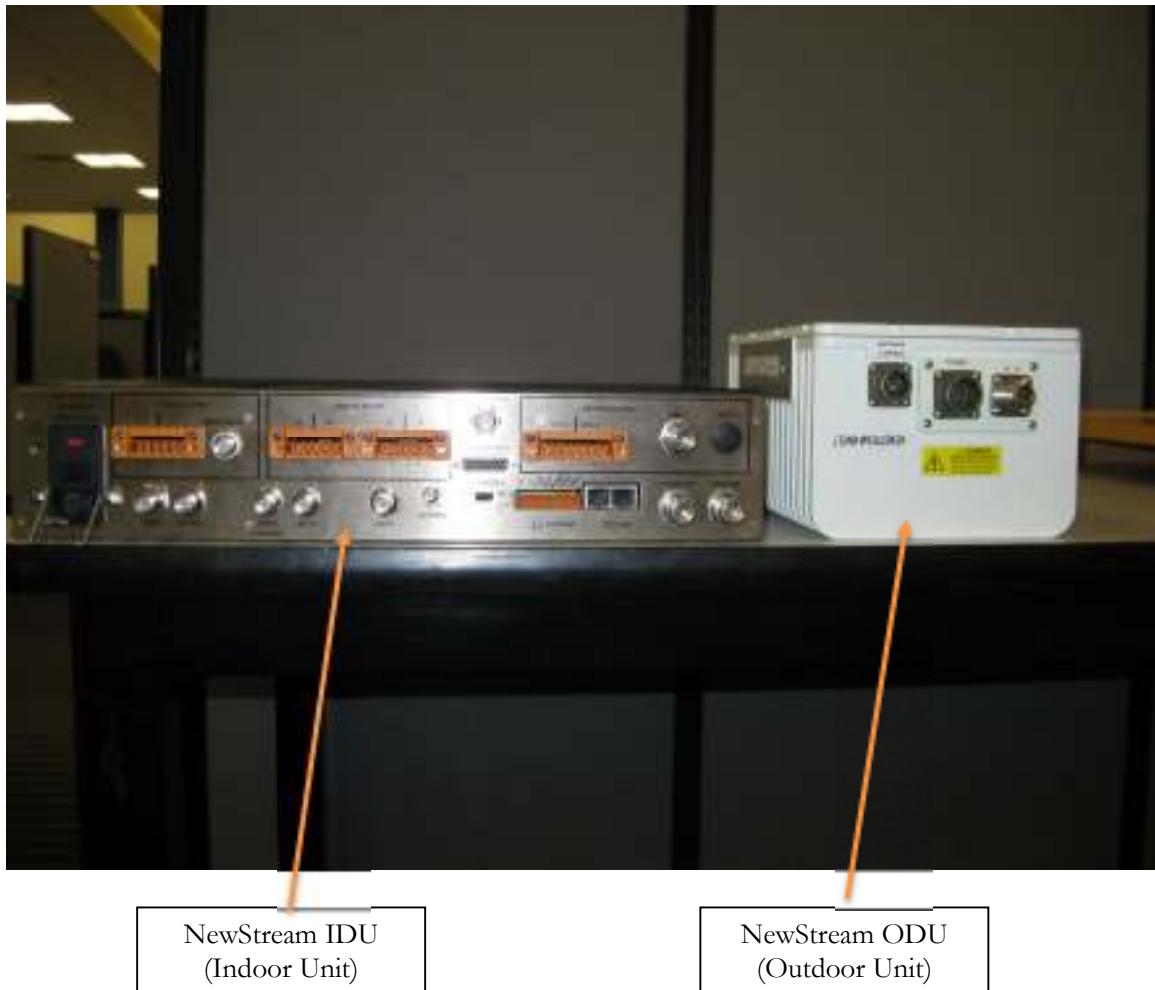


NewStream IDU
(Indoor Unit)

NewStream ODU
(Outdoor Unit)

FC3NST2G7G
NewStream Transmitter Photo's
MANUFACTURERS PART # NST270T1CAJ3

External Rear View

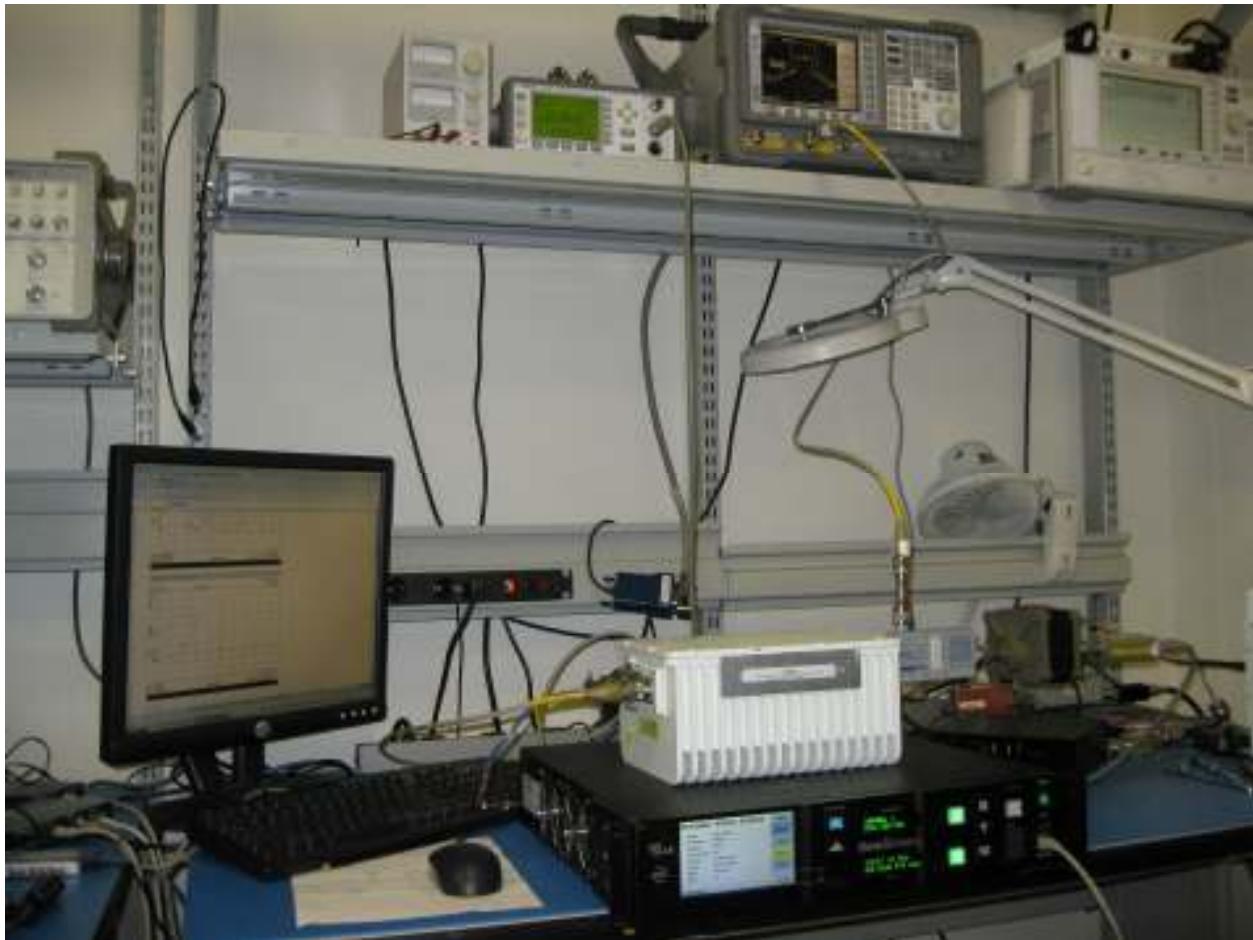


FC3NST2G7G
NewStream Transmitter Photo's
MANUFACTURERS PART # NST270T1CAJ3

Label Information



SECTION 5 - TEST SET UP PHOTOS



TEST EQUIPMENT LIST

MODEL	SERIAL #	DESCRIPTION	MANUFACTURER
FLK52	33624-65	THERMOMOTER	FLUKE
E4419B	MY45101749	POWER METER	HP
8481B	00389	POWER SENSSOR	HP
T30C	22779-06	TEMP. CHAMBER	TENNEY
FLK177	95210385	MULTIMETER	FLUKE
5350B	33625-269	FREQ. COUNTER	HP
E4407B	MY44210942	SPECTRUM ANALYZER	HP

Temperature chamber output power and frequency stability



SECTION 6 MPE CALCULATIONS

6 Operating in Safety

Guidelines for safe operation are derived from OET bulletin 65, August 1997, as recommended by the Federal Communications Commission (FCC).

WARNING *High levels of RF power are present in the unit. Exposure to RF or microwave power can cause burns and may be harmful to health. Remove power from the unit before disconnecting any RF cables and before inspecting damaged cables and/or antennas. Avoid standing in front of high gain antennas (such as a dish antenna) and never look into the open end of a waveguide or cable where RF power may be present.*

The NewStream, operated without an antenna will not create RF energy exceeding 1.0 mW/cm², the FCC limit for exposure. Connecting an antenna to the unit greatly enhances the potential for harmful exposure, and you must maintain a certain distance from the radiator. The following table shows the Maximum Permissible Exposure (MPE) safe distances from the antenna when operating at normal RF power level 8W@2GHz and 5W@7GHz.

The NewStream Transmitter per §2.1091 (Radiofrequency radiation exposure evaluation) is categorized as a mobile device.

NewStream 2GHz @ 8W

Antenna Gain (dBi)	0	2	5	11	20
Safe Distance (cm)	25	32	45	90	252
Safe Distance (in)	9.84	12.6	17.71	35.42	99.19

NewStream 7GHz @ 5W

Antenna Gain (dBi)	0	2	5	11	20
Safe Distance (cm)	20	25	36	71	200
Safe Distance (in)	7.87	9.84	14.17	27.95	78.72

Note Hazardous RF radiation limits and recommended distances may vary by country. Observe all applicable state and federal regulations when using this transmitter.

To perform calculations to understand the safe exposure margin (MPE), use the following formula suggested by OET 65. The calculations provided are for common antennas often used in the mobile microwave environment.

Calculating MPE

$$\text{EIRP} = P * (10 ^ (G / 10)) = (\text{antilog of } G/10) * P$$

P = RF power delivered to the antenna in mW

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna in centimeters

S = MPE in mW/cm² (milliwatts per square centimeters)

Conversions

dB_i to numeric gain = Antilog (dB_i/10)

Feet to centimeters = Feet * 30.48

Centimeters to Feet = cm * .0328

$4\pi = 12.57$

User Input

RF power delivered to the antenna = Watts

Antenna gain (referenced to isotropic antenna) = dB_i

Distance from the center of radiation = Feet

Calculation steps:

1. [P] RF power input. Watts to milliwatts = Watts * 1000
2. [G] Antenna gain dB_i. Numeric gain = Antilog (dB_i/10)
3. [EIRP] Multiply P * G
4. [R] Centimeters to feet = Centimeters * .0328
5. Square R
6. Multiply R² * 4π
7. [S] Divide (R² * 4π) into EIRP

S = Power Density in milliwatts per square centimeters.

Note At frequencies above 1500 MHz, S must not be greater than 1.

Reference

FCC OET Bulletin 65, August 1997 - Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields

Vislink, in accordance with the requirements set forth by the FCC, provides this information as a guide to the user and assumes the users of this equipment are licensed and qualified to operate the equipment per the guidelines and recommendations contained within the product user guides and in accordance with any FCC rules that may apply.

SECTION 7 TEST FACILITIES

TEST FACILITIES:

Vislink / MICROWAVE RADIO COMMUNICATIONS 978-671-5700
101 Billerica Avenue
N. Billerica, MA. 01862

Curtis-Straus a Bureau Veritas Company 978-486-8880
One Distribution Center Circle
Littleton, MA 01460

Prepared by: Sal Blatti
Compliance Manager

THE MANUFACTURER HEREBY DECLares THAT IT WILL TAKE ALL MEASURES TO
INSURE THE COMPLIANCE OF THE PRODUCT DETAILED IN THIS TECHNICAL FILE WITH
THE FCC

Sal Blatti
Compliance Manager