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Radio Test Report

FCC Part 90
758 to 768 MHz

Flexi Zone Micro BTS (Base Transceiver Station)
model FWPF

FCC ID:	2AD8UFZMFWPF01
COMPANY:	Nokia Solutions and Networks 2000 W Lucent Ln Naperville, IL 60563
TEST SITE(S):	National Technical Systems 41039 Boyce Road. Fremont, CA. 94538-2435
PROJECT NUMBER:	PR069704-00
REPORT DATE:	April 5, 2018
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Testing Cert #0214.26

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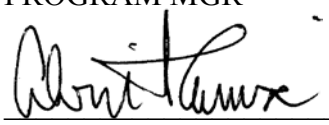
VALIDATING SIGNATORIES

PROGRAM MGR



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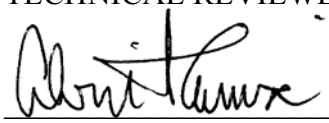

Alvin Ilarina
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REVISION HISTORY

Rev#	Date	Comments	Modified By
1	April 5, 2018	First release	

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SCOPE

Tests have been performed on the Nokia Solutions and Networks Flexi Zone Micro BTS (Base Transceiver Station) model FWPF, pursuant to the relevant requirements of the following standard(s) in order to obtain device certification against the regulatory requirements of the Federal Communications Commission and Innovation Science and Economic Development Canada.

- Code of Federal Regulations (CFR) Title 47 Part 2
- CFR 47 Part 90 (Private Land Mobile Radio Service) Subpart R

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in National Technical Systems test procedures:

ANSI C63.4:2014
ANSI TIA-603-D June 2010
FCC KDB 971168 Licensed Digital Transmitters

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

National Technical Systems is accredited by the A2LA, certificate number 0214.26, to perform the test(s) listed in this report, except where noted otherwise.

The test results recorded herein are based on a single type test of the Nokia Solutions and Networks Flexi Zone Micro BTS (Base Transceiver Station) model FWPF and therefore apply only to the tested sample. The sample was selected and prepared by Francisco Avalos of Nokia Solutions and Networks.

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, the device requires certification. Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested sample of Nokia Solutions and Networks Flexi Zone Micro BTS (Base Transceiver Station) model FWPF complied with the requirements of the standards and frequency bands declared in the scope of this test report.

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

DEVIATIONS FROM THE STANDARDS

No deviations were made from the published requirements listed in the scope of this report.

TEST RESULTS

FCC Part 90

FCC	Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics				
§2.1033 (c) (5) § 90.532	Frequency range(s)	760.50MHz – 765.50MHz (5M LTE) 763.00 (10MHz LTE)	758 to 769 MHz	Pass
§2.1033 (c) (4) § 2.1047 § 90.535	Modulation Type	QPSK, 16QAM, 64QAM, 256QAM (5MHz and 10MHz LTE)	Digital	Pass
§2.1033 (c) (6) §2.1033 (c) (7) § 2.1046 § 90.542	RF power output at the antenna terminals	5.7 W	1000W ERP	Pass
§ 2.1049 § 90.543(d)	Occupied Bandwidth	4.91 MHz (5MHz LTE) 8.940 MHz (10MHz LTE)	< Channel size	Pass
Transmitter spurious emissions				
§ 2.1051 § 2.1057 § 90.543(e)	At the antenna terminals	-37 dBm	-16 dBm	Pass
§ 2.1053 § 2.1057 § 90.543(e)	Field strength	39.2 dBµV/m @ 105.73 MHz (-45.2 dB) 52.9 dBµV/m @ 3802.9 MHz (-31.5 dB)	84.4 dBµV/m	Pass
§ 90.543(e)(1)	Maximum emissions in 769-775 MHz and 799-805MHz bands	-20.7 dBm	-16 dBm	Pass
§ 90.543(f)	Emissions in band 1559-1610 MHz	-96 dBW	-70dBW/MHz EIRP	Pass
Other details				
§ 2.1055 § 90.539	Frequency stability	100 ppb	22 ppb	Pass
Notes:				

EXTREME CONDITIONS

Frequency stability is determined over extremes of temperature and voltage. The extremes of voltage were 85 to 115 percent of the nominal value.

The extremes of temperature were -30°C to +50°C as specified in FCC §2.1055(a)(1).

MEASUREMENT UNCERTAINTIES

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2) and were calculated in accordance with NAMAS document NIS 81 and M3003.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF frequency	Hz	25 to 7,000 MHz	1.7×10^{-7}
RF power, conducted	dBm	25 to 7,000 MHz	± 0.52 dB
Conducted emission of transmitter	dBm	25 to 40,000 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 40,000 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 40,000 MHz	± 2.5 dB
Radiated emission (field strength)	dBμV/m	25 to 1,000 MHz 1 to 40 GHz	± 3.6 dB ± 6.0 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Nokia Solutions and Networks Flexi Zone Micro BTS is a Micro Base Transceiver Station, model FWPF which operates over 3GPP frequency band 14 (BTS Tx/Rx: 758 to 768 MHz/ 788 to 798MHz). The FWPF has two co-located transmitters with each transmit port supporting 5 watts maximum rated RF output power. The FWPF can be operated as MIMO. Multi-carrier operation is not supported. The electrical rating of the EUT is 90 - 265 Volts, 50-60 Hz, 1.7-2.0 Amps.

The sample was received on February 21, 2018 and tested on February 21 and 22 and March 9 and 26, 2018. The EUT consisted of the following component(s):

Company	Model	Description	Serial Number	IC UPN/FCC ID
Nokia Solutions and Networks	FWPF	Base Transceiver Station	Prototype	2AD8UFZMFWPF01

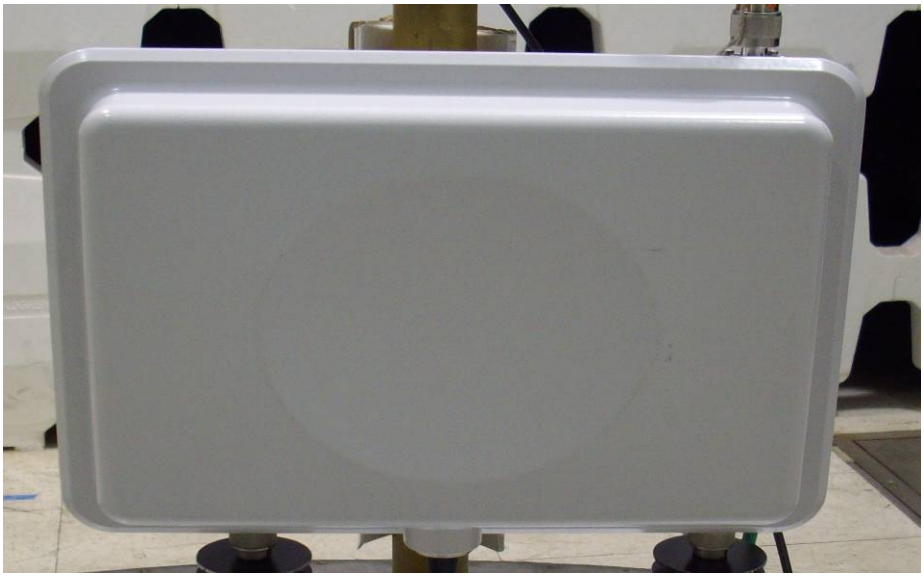
OTHER EUT DETAILS

The highest internal source of an EUT is defined as the highest frequency generated or used within the EUT or on which the EUT operates or tunes. In some cases, the highest internal source determines the frequency range of test for radiated emissions. The highest internal source of the EUT was declared as: 1800 MHz.

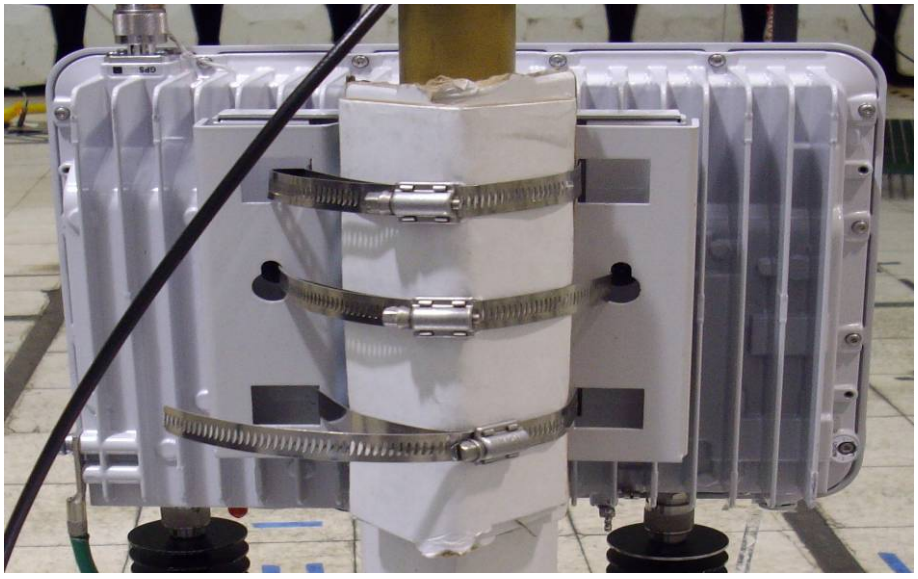
The FWPF supports four downlink modulation types for LTE (QPSK, 16QAM, 64QAM and 256QAM). The FWPF supports three LTE channel bandwidths (5 MHz, and 10 MHz).

The FWPF has external interfaces including AC power, ground, TX/RX (Ant), Ethernet “B”, Ethernet “C”, USB port, GPS and Bluetooth. The FWPF with applicable installation kit may be pole or wall mounted. Bluetooth interface has modular FCC and IC approval.

DETAILED EUT PHOTOGRAPHS



Front View



Rear View

ENCLOSURE

The EUT enclosure is primarily constructed of heavy duty aluminum. It measures approximately 12.0 x 4.0 x 12.0 cm.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at National Technical Systems.

SUPPORT EQUIPMENT

A laptop was used to control and configure the EUT during testing.

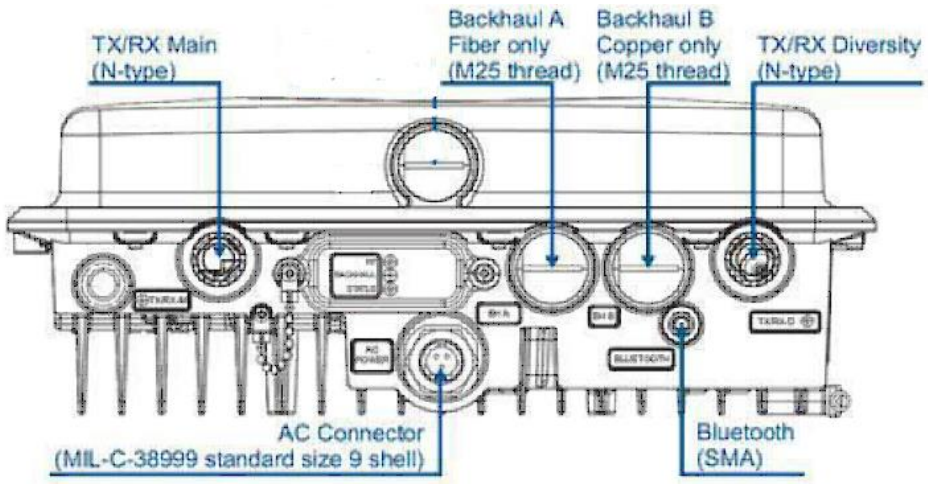
EUT INTERFACE PORTS

The I/O cabling configuration during testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Tx/ Rx Main	GPS	Coax	Shielded	30
AC Connector	Main Power	3 Wire	Unshielded	0.8

EUT OPERATION

During testing, the EUT was configured to continuously transmit at maximum power on the channel noted.



TESTING

GENERAL INFORMATION

Antenna port measurements were taken at the National Technical Systems test site located at 41039 Boyce Road, Fremont, CA 94538-2435.

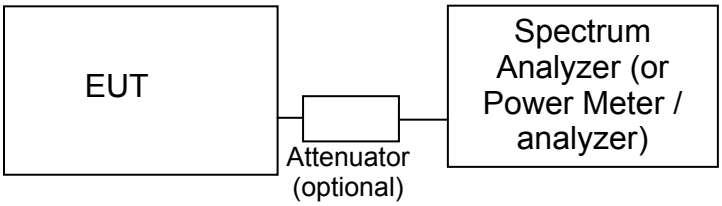
Radiated spurious emissions measurements were taken at the National Technical Systems Anechoic Chambers and/or Open Area Test Site(s) listed below. The sites conform to the requirements of ANSI C63.4: 2003 *American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz* and CISPR 16-1-4:2007 - *Specification for radio disturbance and immunity measuring apparatus and methods Part 1-4: Radio disturbance and immunity measuring apparatus Ancillary equipment Radiated disturbances*. They are on file with the FCC and Innovation Science and Economic Development Canada.

Site	Designation / Registration Numbers		Location
	FCC	Canada	
Chamber 4	US0027	IC 2845B-4	41039 Boyce Road Fremont, CA 94538-2435

Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements.

RF PORT MEASUREMENT PROCEDURES

Conducted measurements are performed with the EUT's rf input/output connected to the input of a spectrum analyzer, power meter or modulation analyzer. When required an attenuator, filter and/or dc block is placed between the EUT and the spectrum analyzer to avoid overloading the front end of the measurement device. Measurements are corrected for the insertion loss of the attenuators and cables inserted between the rf port of the EUT and the measurement equipment.



Test Configuration for Antenna Port Measurements

For devices with an integral antenna the output power and spurious emissions are measured as a field strength at a test distance of (typically) 3m and then converted to an eirp using a substitution measurement (refer to RADIATED EMISSIONS MEASUREMENTS). All other measurements are made as detailed below but with the test equipment connected to a measurement antenna directed at the EUT.

OUTPUT POWER

Output power is measured using a power meter and an average sensor head, a spectrum analyzer or a power meter and peak power sensor head as required by the relevant rule part(s). Where necessary measurements are gated to ensure power is only measured over periods that the device is transmitting.

Power measurements made directly on the rf power port are, when appropriate, converted to an EIRP by adding the gain of the highest gain antenna that can be used with the device under test, as specified by the manufacturer.

BANDWIDTH MEASUREMENTS

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS-GEN. The measurement bandwidth is set to be at least 1% of the instrument's frequency span.

CONDUCTED SPURIOUS EMISSIONS

Initial scans are made using a peak detector (RBW=VBW) and using scan rates to ensure that the EUT transmits before the sweep moves out of each resolution bandwidth (for transmit mode measurements). Where the limits are expressed as an average power the spectrum analyzer is tunes to that frequency with a narrow span (wide enough to capture the emission and its sidebands) and the resolution and video bandwidths are adjusted as required by the reference measurement standards. For transmitter measurements the appropriate detector (average, peak, normal, sample, quasi-peak) is used when making measurements for licensed devices. For receiver conducted spurious measurements the detector is set to peak.

TRANSMITTER MASK MEASUREMENTS

The transmitter mask measurements are made using resolution bandwidths as specified in the pertinent rule part(s). Where narrower bandwidths are used the measurement is corrected to account for the reduced bandwidth by either using the adjacent channel power function of the spectrum analyzer to sum the power across the required measurement bandwidth. The frequency span of the analyzer is set to ensure the fundamental signal and all significant sidebands are displayed.

The top of the mask may be set by the total output power of the signal, the power of the unmodulated signal or the peak value of the signal in the reference bandwidth being used for the mask measurement.

FREQUENCY STABILITY

The EUT is placed inside a temperature chamber with all support and test equipment located outside of the chamber. The temperature is varied across the specified frequency range in 10 degree increments with frequency measurements made at each temperature step. The EUT is allowed enough time to stabilize at each temperature variation.

The spectrum analyzer is configured to give a 5- or 6-digit display for the marker-frequency function. The spectrum analyzer's built-in frequency counter is used to measure the maximum deviation of the fundamental frequency at each temperature. Where possible the device is set to transmit an unmodulated signal. Where this is not possible the frequency drift is determined by finding a stable point on the signal (e.g. the null at the centre of an OFDM signal) or by calculating a centre frequency based on the upper and lower XdB points (where X is typically 6dB or 10dB) on the signal’s skirts.

TRANSIENT FREQUENCY BEHAVIOR:

The TIA/EIA 603 procedure is used to determine compliance with transient frequency timing requirements as the radio is keyed on and off.

The EUTs RF output is connected via a combiner/splitter to the test receiver/spectrum analyzer and to a diode detector. The test receiver or spectrum analyzer video output is connected to an oscilloscope, which is triggered by the output from the diode detector.

Plots showing Ton, T1, and T2 are made when turning on the transmitter and showing T3 when turning off the transmitter.

RADIATED EMISSIONS MEASUREMENTS

Receiver radiated spurious emissions measurements are made in accordance with ANSI ANSI C63.4:2003 by measuring the field strength of the emissions from the device at a specific test distance and comparing them to a field strength limit. Where the field strength limit is specified at a longer distance than the measurement distance the measurement is extrapolated to the limit distance.

Transmitter radiated spurious emissions are initially measured as a field strength. The eirp or erp limit as specified in the relevant rule part(s) is converted to a field strength at the test distance and the emissions from the EUT are then compared to that limit. Emissions within 20dB of this limit are the subjected to a substitution measurement.

All radiated emissions measurements are performed in two phases. A preliminary scan of emissions is conducted in either an anechoic chamber or on an OATS during which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed across the complete frequency range of interest and at each operating frequency identified in the reference standard. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. Initial scans are made using a peak detector (RBW=VBW) and using scan rates to ensure that the EUT transmits before the sweep moves out of each resolution bandwidth (for transmit mode).

During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit. For transmitter spurious emissions, where the limit is expressed as an effective radiated power, the eirp or erp is converted to a field strength limit.

Final measurements are made on an OATS or in a semi-anechoic chamber at the significant frequencies observed during the preliminary scan(s) using the same process of rotating the EUT and raising/lowering the measurement antenna to find the highest level of the emission. The field strength is recorded and, for receiver spurious emissions, compared to the field strength limit. For the final measurement the appropriate detectors (average, peak, normal, sample, quasi-peak) are used. For receiver measurements below 1GHz the detector is a Quasi-Peak detector, above 1GHz a peak detector is used and the peak value (RB=VB=1MHz) and average value (RB=1MHz, VB=10Hz) are recorded.

For transmitter spurious emissions, the radiated power of all emissions within 20dB of the calculated field strength limit are determined using a substitution measurement. The substitution measurement is made by replacing the EUT with an antenna of known gain (typically a dipole antenna or a double-ridged horn antenna), connected to a signal source. The output power of the signal generator is adjusted until the maximum field strength from the substitution antenna is similar to the field strength recorded from the EUT. The erp of the EUT is then calculated.

INSTRUMENTATION

An EMI receiver as specified in CISPR 16-1-1 is used for radiated emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 7000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary.

For measurements above the frequency range of the receivers and for all conducted measurements a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis.

Measurement bandwidths for the test instruments are set in accordance with the requirements of the standards referenced in this document.

Software control is used to correct the measurements for transducer factors (e.g. antenna) and the insertion loss of cables, attenuators and other series elements to obtain the final measurement value. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are exported in a graphic and/or tabular format, as appropriate.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the EUT antenna port or receiving antenna and the test receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A combination of biconical, log periodic or bi-log antennas are used to cover the range from 30 MHz to 1000 MHz. Broadband antennas or tuned dipole antennas are used over the entire 25 to 1000 MHz frequency range as the reference antenna for substitution measurements.

Above 1000 MHz, a dual-ridge guide horn antenna or octave horn antenna are used as reference and measurement antennas.

The antenna calibration factors are included in site factors that are programmed into the test receivers and instrument control software when measuring the radiated field strength.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height.

Table mounted devices are placed on a non-conductive table at a height of 80 centimeters above the floor. Floor mounted equipment is placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. The EUT is positioned on a motorized turntable to allow it to be rotated during testing to determine the angel with the highest level of emissions.

SAMPLE CALCULATIONS

SAMPLE CALCULATIONS - CONDUCTED SPURIOUS EMISSIONS

Measurements are compared directly to the conducted emissions specification limit (decibel form). The calculation is as follows:

$$R_r - S = M$$

where:

R_r = Measured value in dBm
S = Specification Limit in dBm
M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS –RADIATED FIELD STRENGTH

Measurements of radiated field strength are compared directly to the specification limit (decibel form). The receiver and/or control software corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor is sued when measurements are made at a test distance that is different to the specified limit distance by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB
D_m = Measurement Distance in meters
D_s = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

SAMPLE CALCULATIONS –RADIATED POWER

The erp/eirp limits for transmitter spurious measurements are converted to a field strength in free space using the following formula:

$$E = \frac{\sqrt{30\ P\ G}}{d}$$

where:

E = Field Strength in V/m
P = Power in Watts
G = Gain of isotropic antenna (numeric gain) = 1
D = measurement distance in meters

The field strength limit is then converted to decibel form (dBuV/m) and the margin of a given emission peak relative to the limit is calculated (refer to *SAMPLE CALCULATIONS –RADIATED FIELD STRENGTH*).

When substitution measurements are required (all signals with less than 20dB of margin relative to the calculated field strength limit) the eirp of the spurious emission is calculated using:

$$P_{EUT} = P_S - (E_S - E_{EUT})$$

and

$$P_S = G + P_{in}$$

where:

P_S = effective isotropic radiated power of the substitution antenna (dBm)
P_{in} = power input to the substitution antenna (dBm)
G = gain of the substitution antenna (dBi)
E_S = field strength the substitution antenna (dBm) at eirp P_S
E_{EUT} = field strength measured from the EUT

Where necessary the effective isotropic radiated power is converted to effective radiated power by subtracting the gain of a dipole (2.2dBi) from the eirp value.

RECEIVER RADIATED SPURIOUS EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from receivers as detailed in FCC Part 15.109, RSS-210 Table 2, RSS-GEN Table 1 and RSS-310 Table 3. Note that receivers operating outside of the frequency range 30 MHz – 960 MHz are exempt from the requirements of 15.109.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radiated Emissions, 30 - 18,000 MHz, 21-Feb-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Filtek	Filter, 1 GHz High Pass	HP12/1000-5BA	957	5/10/2017	5/10/2018
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	9/29/2016	9/29/2018
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	10/12/2016	10/12/2018
Com-Power	Preamplifier, 30-1000 MHz	PA-103	1632	1/30/2018	1/30/2019
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1756	7/8/2017	7/8/2018
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	8/31/2017	8/31/2018
Hewlett Packard	Spectrum Analyzer (SA40) Purple 9 kHz - 40 GHz,	8564E (84125C)	2415	3/1/2017	3/1/2018
Conducted Emissions - AC Power Ports, 21-Feb-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1549	5/30/2017	5/30/2019
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1756	7/8/2017	7/8/2018
Fischer Custom Comm	LISN, 25A, 150kHz to 30MHz, 25 Amp,	FCC-LISN-50-25-2-09	2000	9/25/2017	9/25/2018
Radiated Spurious Emissions, 30 - 8000 MHz, 22-Feb-18					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Filtek	Filter, 1 GHz High Pass	HP12/1000-5BA	957	5/10/2017	5/10/2018
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	9/29/2016	9/29/2018
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	10/12/2016	10/12/2018
Com-Power	Preamplifier, 30-1000 MHz	PA-103	1632	1/30/2018	1/30/2019
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1756	7/8/2017	7/8/2018
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	8/31/2017	8/31/2018
Hewlett Packard	Spectrum Analyzer (SA40) Purple 9 kHz - 40 GHz,	8564E (84125C)	2415	2/16/2018	2/16/2019
Radio Antenna Port (Power and Spurious Emissions), 22-Feb-18					
Agilent Technologies	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	7/31/2017	7/31/2018
Radiated Emissions, 1559 - 1610 MHz, 09-Mar-18					
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/30/2016	6/30/2018
Filtek	Filter, 1 GHz High Pass	HP12/1000-5BA	957	5/10/2017	5/10/2018
Hewlett Packard	Spectrum Analyzer (SA40) Red 30 Hz -40 GHz	8564E (84125C)	1148	10/14/2017	10/14/2018
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	2199	8/30/2017	8/30/2018

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radio Antenna Port (Power and Spurious Emissions), 26-Mar-18					
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	5/22/2017	5/22/2018
Envirotronics	Temperature/Humidity chamber	SH16C	3195		N/A
Radiated Emissions, 30 - 1,000 MHz, 26-Mar-18					
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	10/12/2016	10/12/2018
Com-Power	Preamplifier, 30-1000 MHz	PA-103	1632	1/30/2018	1/30/2019
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1756	7/8/2017	7/8/2018
Radiated Emissions, 1000 - 8,000 MHz, 26-Mar-18					
EMCO	Antenna, Horn, 1-18 GHz	3115	1561	7/8/2016	7/8/2018
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	8/31/2017	8/31/2018
Hewlett Packard	Spectrum Analyzer (SA40) Purple 9 kHz - 40 GHz,	8564E (84125C)	2415	2/16/2018	2/16/2019

Appendix B Test Data

TL069704-00 EMC Pages 24 - 91

Client:	Nokia Solutions and Networks	PR Number:	PR069704-00
Product	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
System Configuration:		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Engineer:	Alvin ILARINA
Emissions Standard(s):	FCC Part 90R	Class:	
Immunity Standard(s):		Environment:	Radio

EMC Test Data

For The

Nokia Solutions and Networks

Product

FlexiZone Micro BTS

Date of Last Test: 3/26/2018

RF Output Power

RF output power has been measured in both Peak and RMS Average terms for each transmit chain at the center channel for all modulations and bandwidth modes. Peak to average ratio (PAR) has been calculated as described in Section 5.7.2 of KDB971168 D01 v02r02 and all results are presented in tabular form below.

		LTE-QPSK			LTE-16QAM			LTE-64QAM			LTE-256QAM		
		Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)
Port 1													
Center	5M	44.55	**37.72**	6.83	44.53	37.69	6.84	44.61	36.65	7.96	43.49	35.78	7.71
Channel	10M	44.81	36.85	7.96	44.81	37.21	7.6	44.74	36.53	8.21	44.2	35.92	8.28
Port 2													
Center	5M	44.47	37.37	7.1	44.46	37.33	7.13	44.54	37.14	7.4	44.01	36.5	7.51
Channel	10M	44.79	37.28	7.51	44.77	36.9	7.87	44.76	37.14	7.62	43.78	35.58	8.20

Based on the results above, Port 1 had the highest RMS average power and therefore it was selected for all the remaining antenna port tests on the product.

Subsequently output power levels on lowest and highest channels in both channel bandwidths were tested only at Port 1 and results presented below.

		LTE-QPSK			LTE-16QAM			LTE-64QAM			LTE-256QAM		
		Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)	Peak (dBm)	Average (dBm)	PAR (dB)
Port 1													
Low	5M	44.44	36.71	7.73	44.35	37.22	7.13	44.43	36.88	7.55	43.85	36.09	7.76
Channel	10M												
Port 1													
High	5M	44.34	36.36	7.98	44.29	36.02	8.27	44.37	36.54	7.83	43.31	35.64	7.67
Channel	10M												

All corresponding plots included on the following pages. Total path loss of 39.7dB (Attenuator Loss: 39dB, RF cable loss: 0.7dB) accounted in via reference level offset to the spectrum analyzer .

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

FCC Part 90 subpart R

Power, Occupied Bandwidth, Frequency Stability and Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

General Test Configuration

With the exception of the radiated spurious emissions tests, all measurements are made with the EUT's rf port connected to the measurement instrument via an attenuator or dc-block if necessary. All amplitude measurements are adjusted to account for the attenuation between EUT and measuring instrument. For frequency stability measurements the EUT was place inside an environmental chamber.

Radiated measurements are made with the EUT located on a non-conductive table, 3m from the measurement antenna.

Ambient Conditions:

Temperature: 18-23 °C
Rel. Humidity: 35-40 %

Summary of Results

Run #	Test Performed	Limit	Pass / Fail	Result / Margin
1	Output Power	1000W	Pass	5.7 W
2	Band Edge / Block Edge	-16 dBm	Pass	- 4.7 dB
3	Occupied Bandwidth	< Channel size	Pass	4.91 MHz 8.940 MHz
4	Spurious Emissions (conducted)	- 16dBm	Pass	- 20 dB
5	Emissions in band 1559-1610 MHz	- 70dBW/MHz	Pass	- 24 dB
7	Frequency Stability	100 ppb	Pass	22 ppb

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Run #1: Output Power

Date of Test: 2/22/2018 Config. Used: 1

Test Engineer: Rafael Varelas Config Change: None

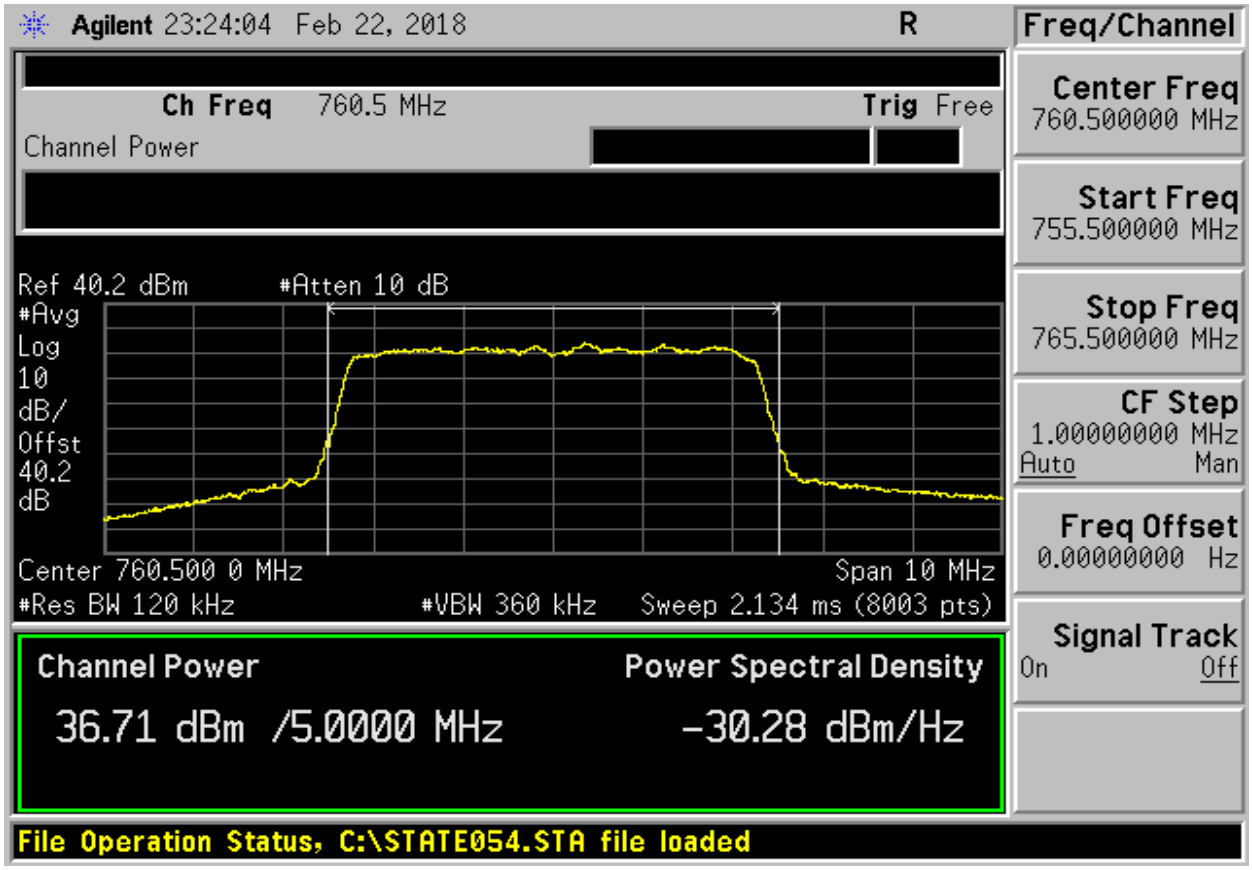
Test Location: FT Chamber #4 EUT Voltage: 120V/60Hz

Power Setting[2]	Frequency (MHz)	Output Power (dBm) [1]	Output Power mW	Antenna Gain (dBi)	Result	ERP dBm	ERP W
5M							
QPSK	760.5	36.71	4688.1	2.0	Pass	38.7	4.531
16QAM	760.5	37.22	5272.3	2.0	Pass	39.2	5.095
64QAM	760.5	36.88	4875.3	2.0	Pass	38.9	4.711
256QAM	760.5	36.09	4064.4	2.0	Pass	38.1	3.928
QPSK	763.0	37.72	5915.6	2.0	Pass	39.7	5.717
16QAM	763.0	37.69	5874.9	2.0	Pass	39.7	5.677
64QAM	763.0	36.65	4623.8	2.0	Pass	38.7	4.468
256QAM	763.0	35.78	3784.4	2.0	Pass	37.8	3.657
QPSK	765.5	36.36	4325.1	2.0	Pass	38.4	4.180
16QAM	765.5	36.02	3999.4	2.0	Pass	38.0	3.865
64QAM	765.5	36.54	4508.2	2.0	Pass	38.5	4.357
256QAM	765.5	35.64	3664.4	2.0	Pass	37.6	3.541
10M							
QPSK	763.0	37.28	5345.6	2.0	Pass	39.3	5.166
16QAM	763.0	36.90	4897.8	2.0	Pass	38.9	4.733
64QAM	763.0	37.14	5176.1	2.0	Pass	39.1	5.002
256QAM	763.0	35.58	3614.1	2.0	Pass	37.6	3.493

Note 1:	Output power measured using a spectrum analyzer (see plots below) with RBW=120kHz, VB=360kHz, RMS detector
Note 2:	Power setting - the software power setting used during testing, included for reference only.

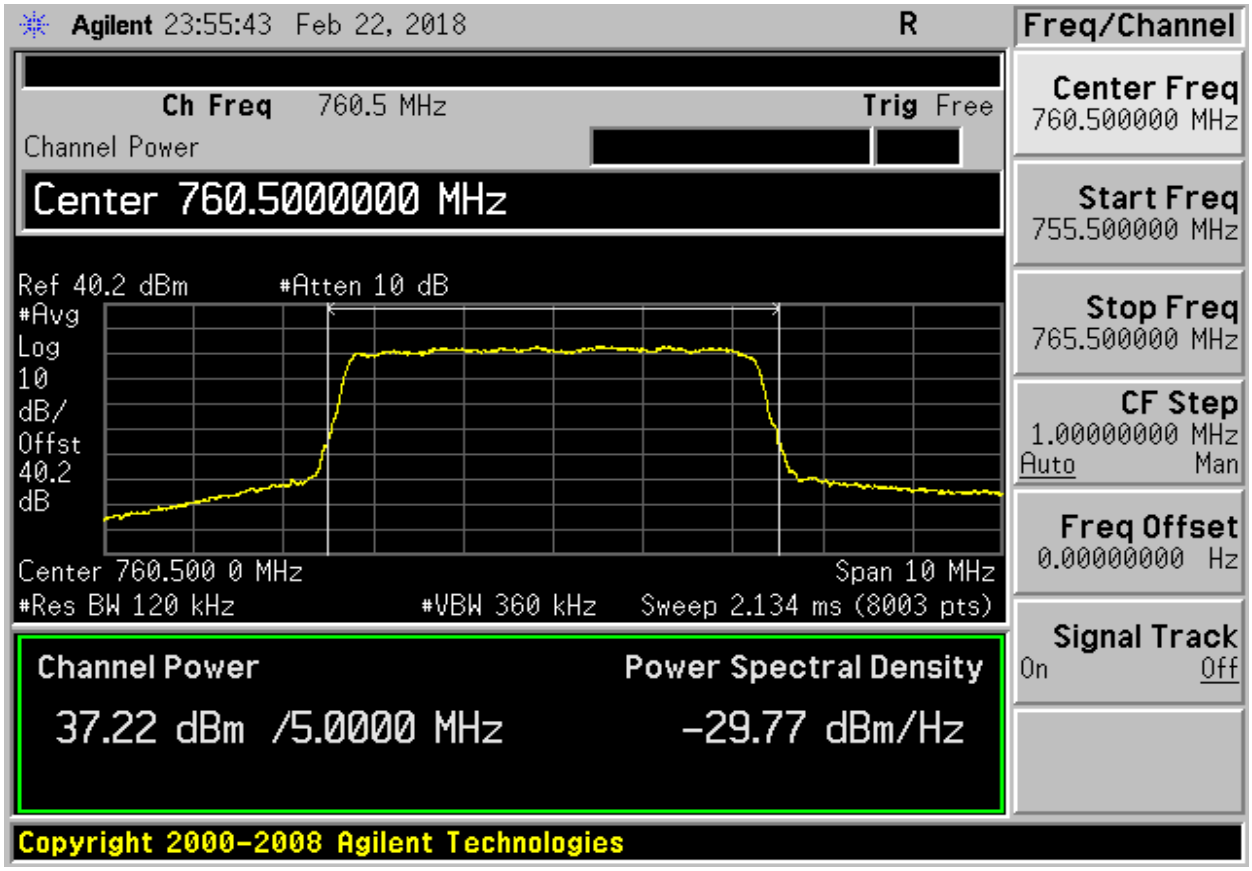
Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Low Channel (5 MHz)
1car_QPSK_5MHz_Low_chnl_port1_avg_pwr



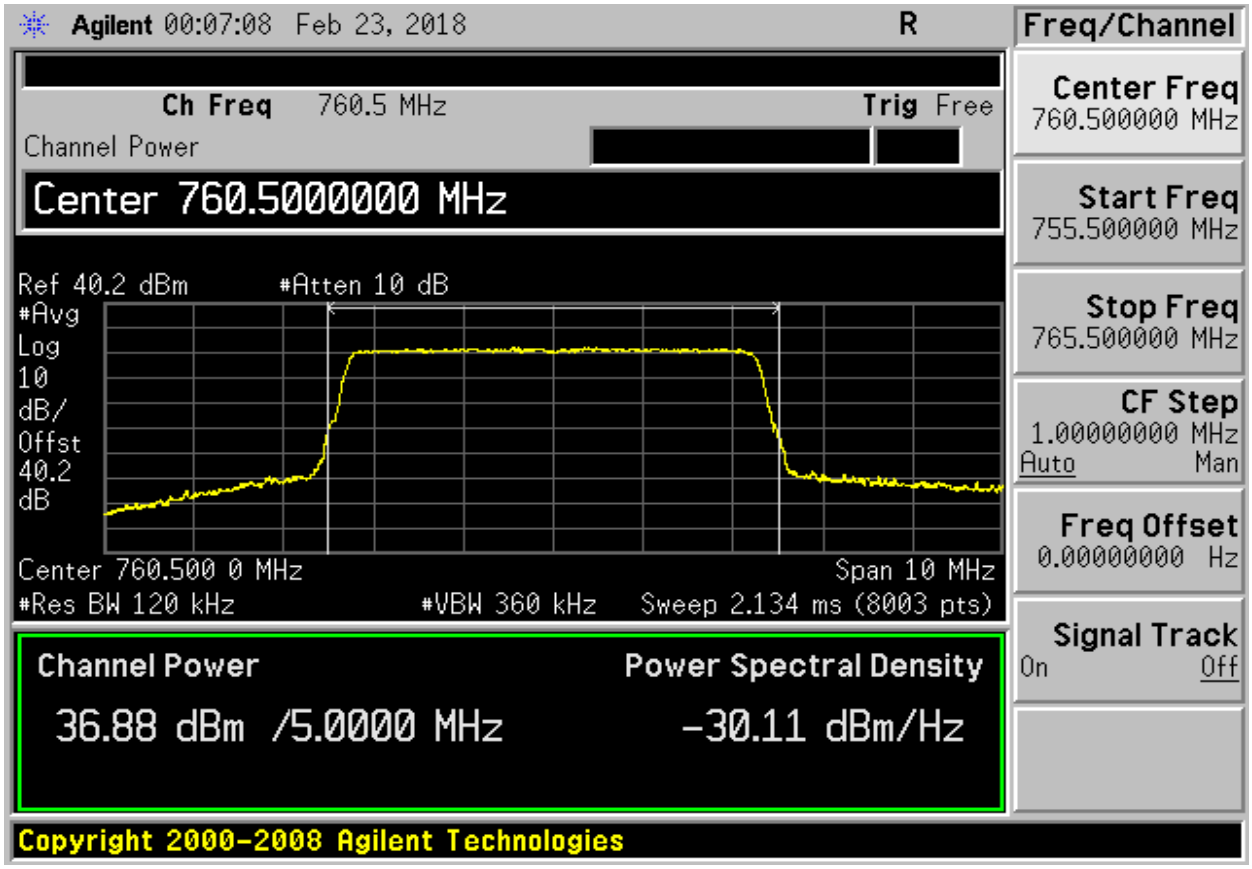
Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Low Channel (5 MHz)
1car_16QAM_5MHz_Low_chnl_port1_avg_pwr



Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

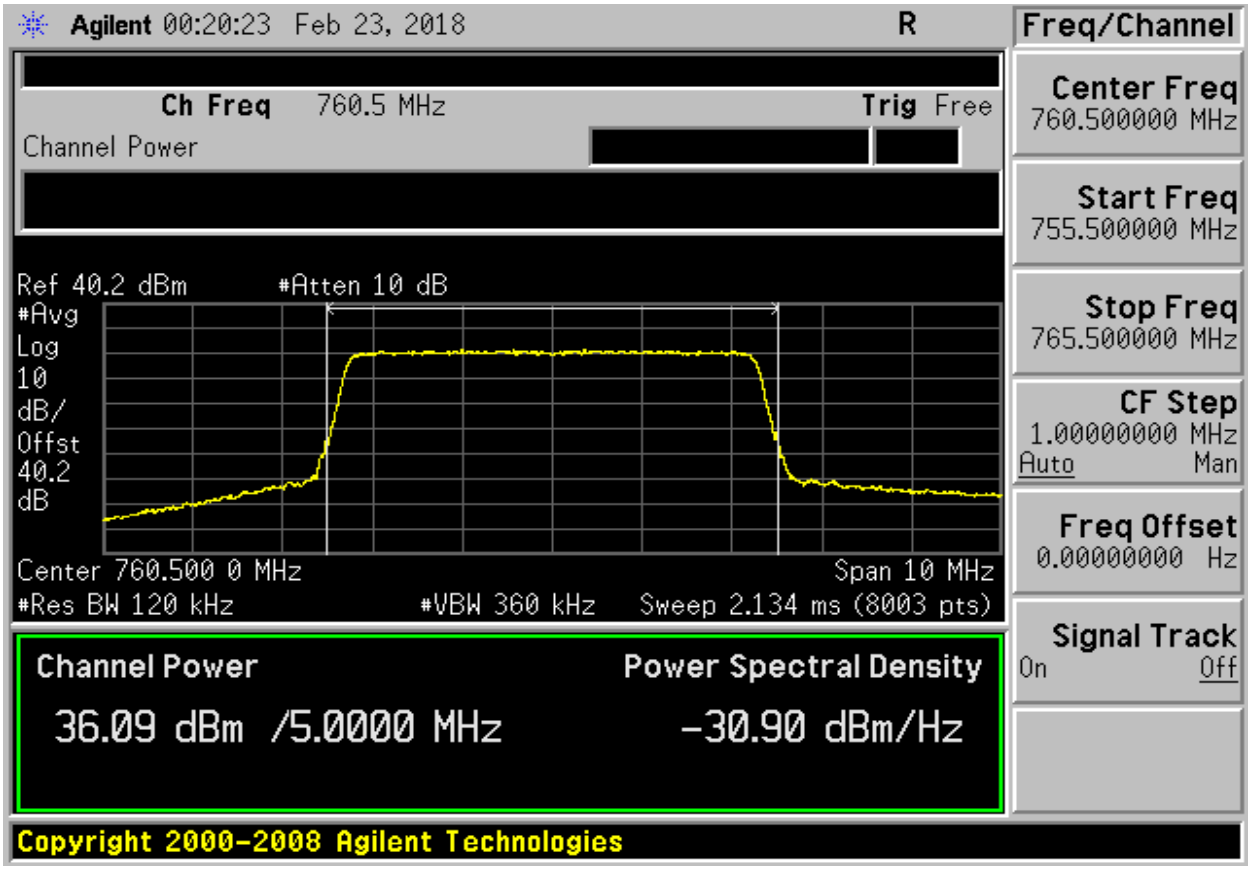
Low Channel (5 MHz)
1car_64QAM_5MHz_Low_chnl_port1_avg_pwr



Low Channel (5 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

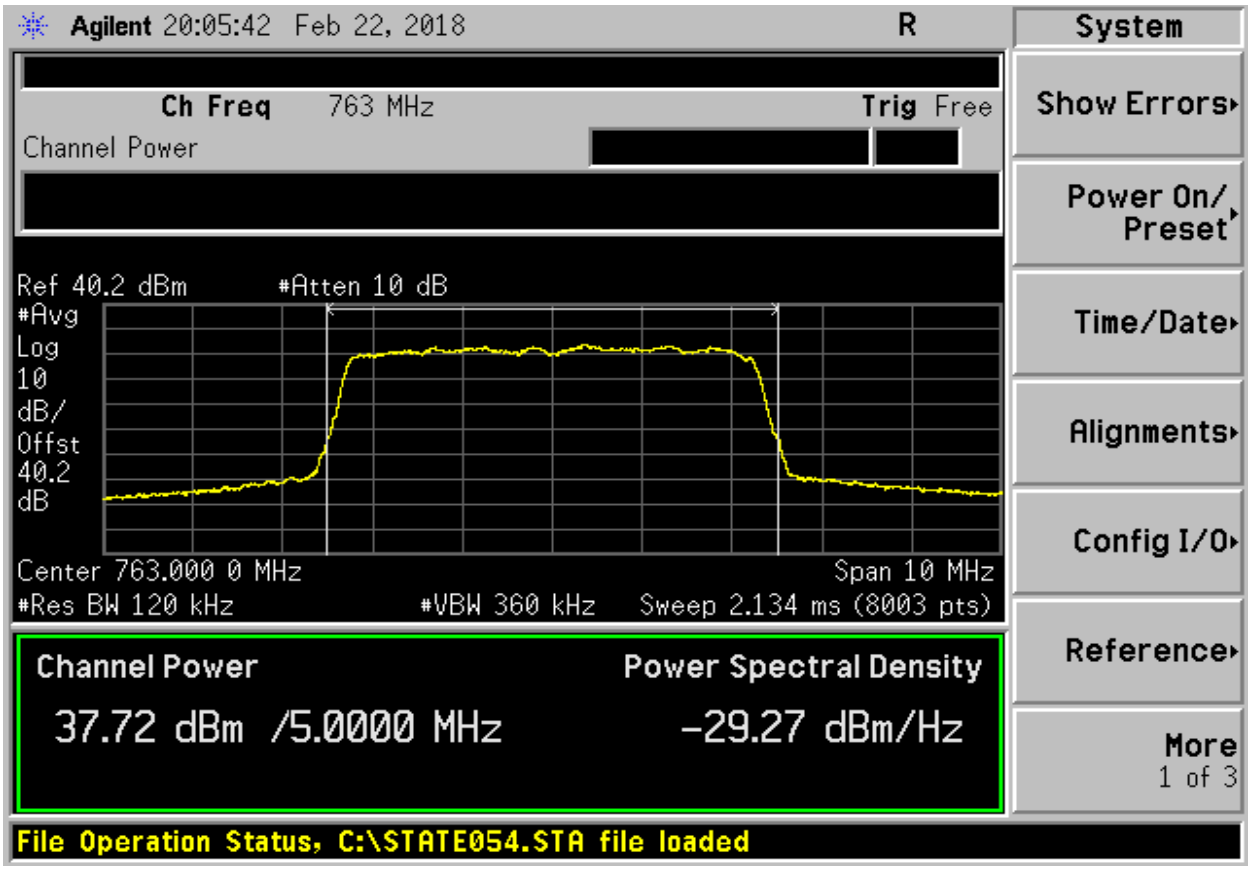
1car_256QAM_5MHz_Low_chnl_port1_avg_pwr



Middle Channel (5 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

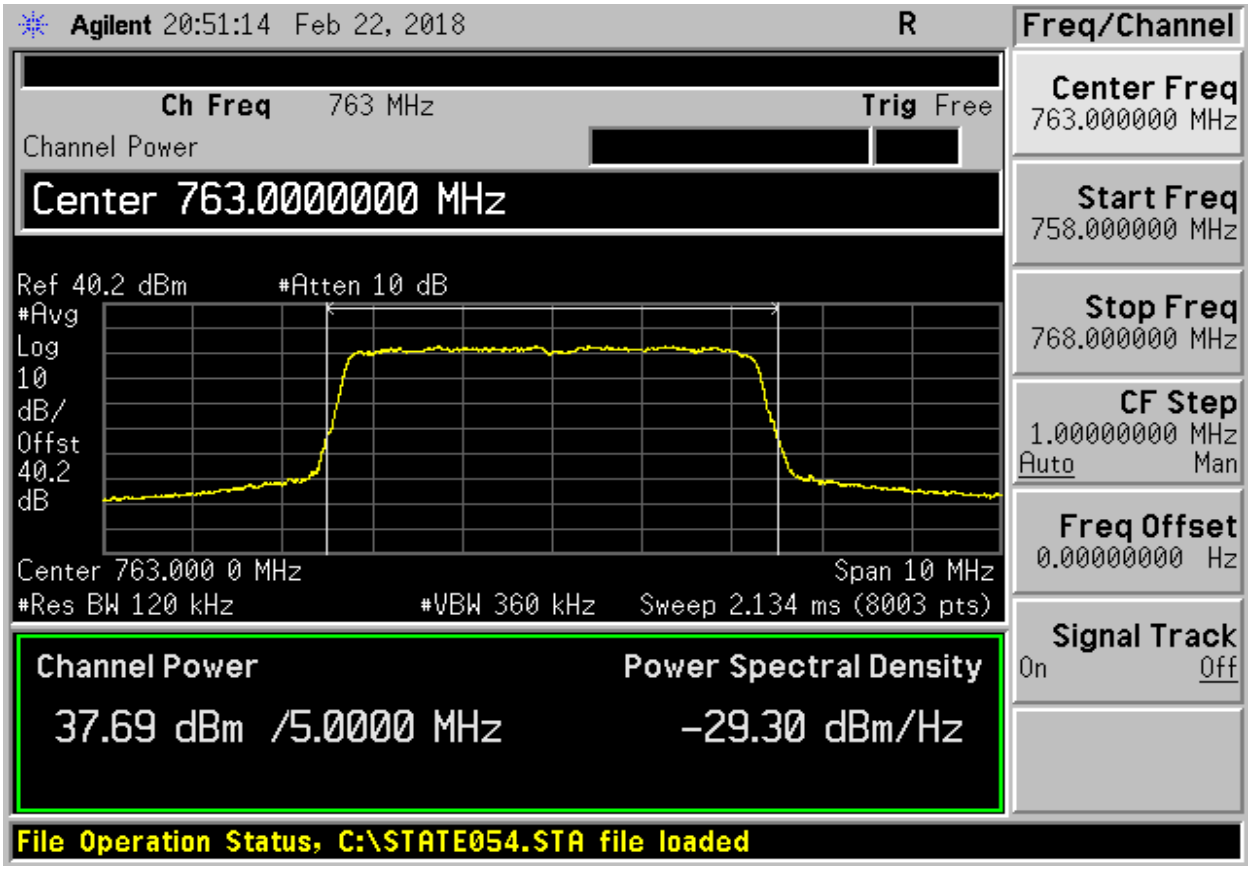
1car_QPSK_5MHz_Mid_chnl_port1_avg_pwr



Middle Channel (5 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

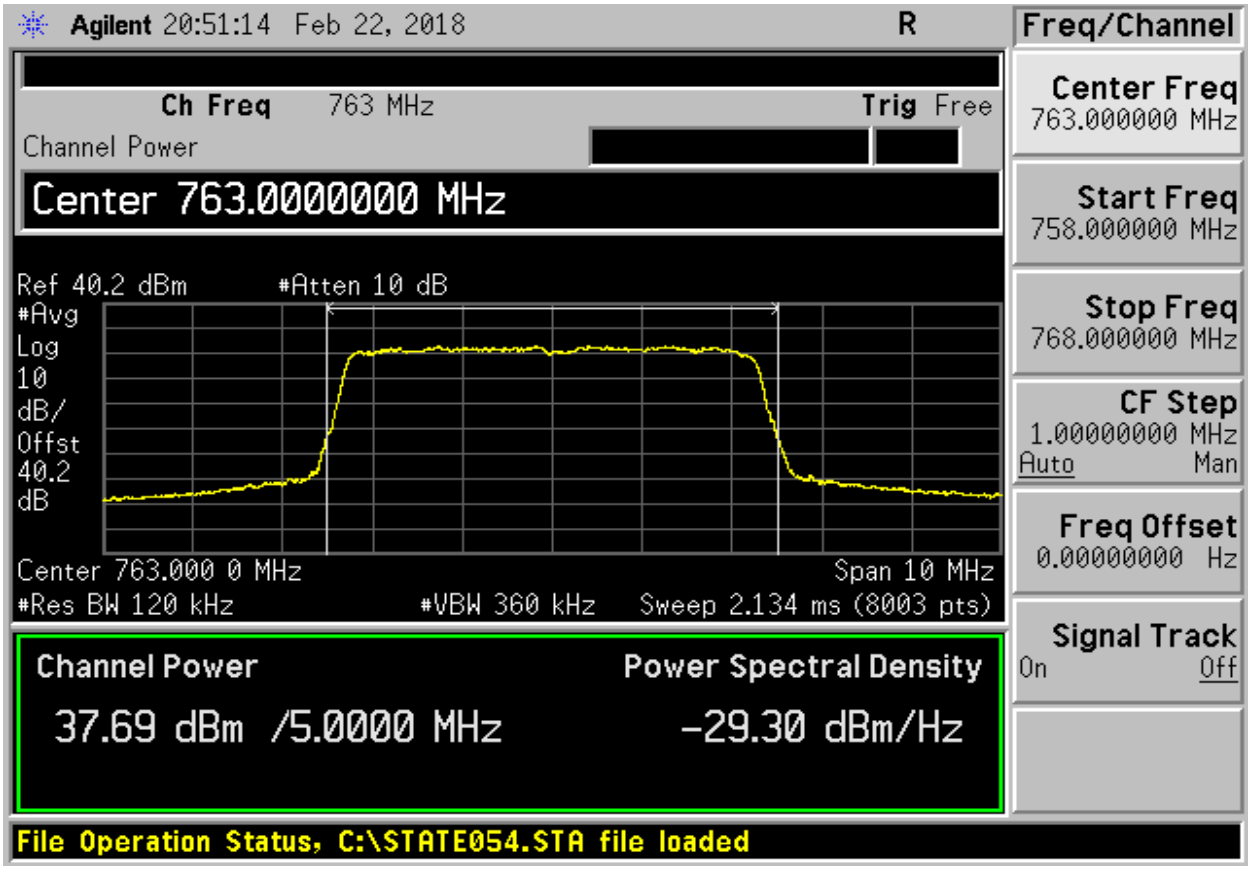
1car_16QAM_5MHz_Mid_chnl_port1_avg_pwr



Middle Channel (5 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

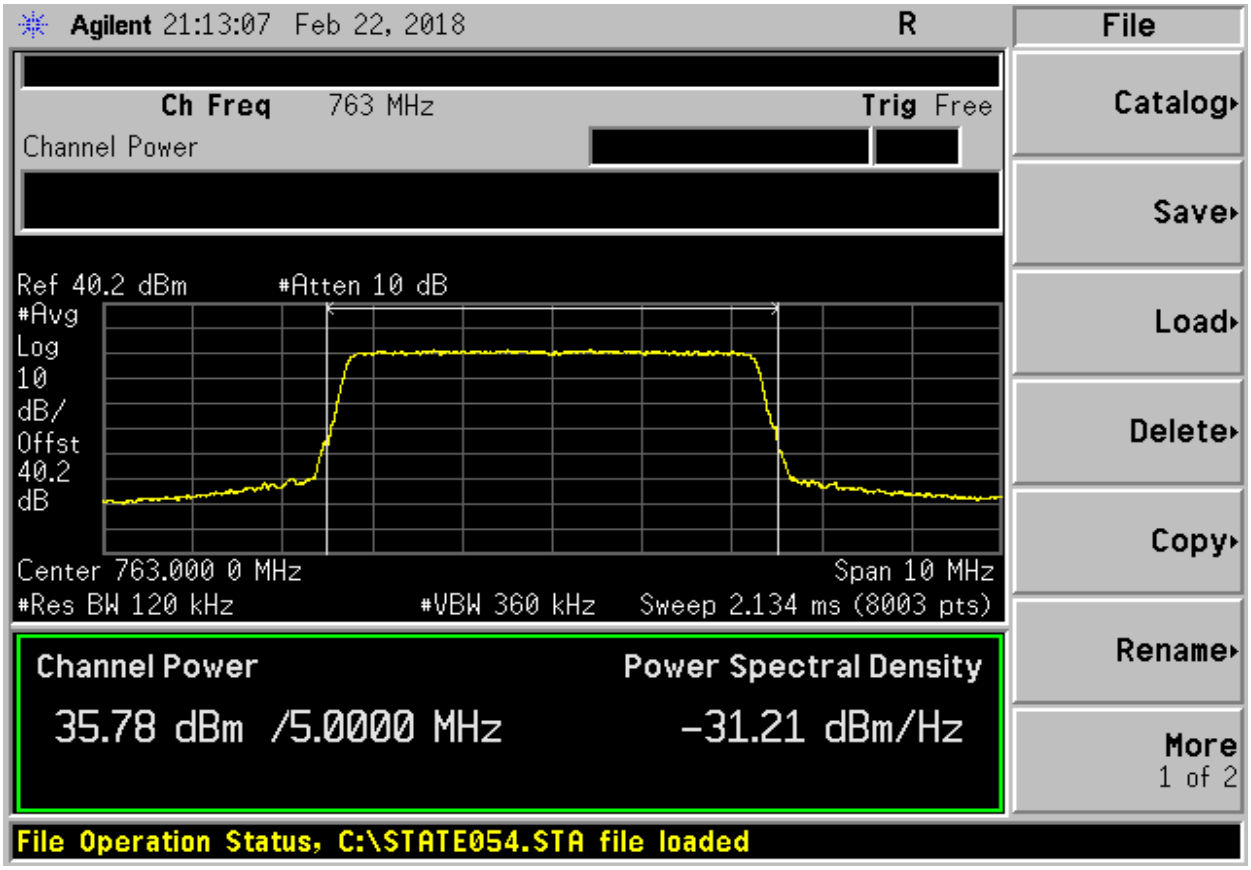
1car_64QAM_5MHz_Mid_chnl_port1_avg_pwr



Middle Channel (5 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

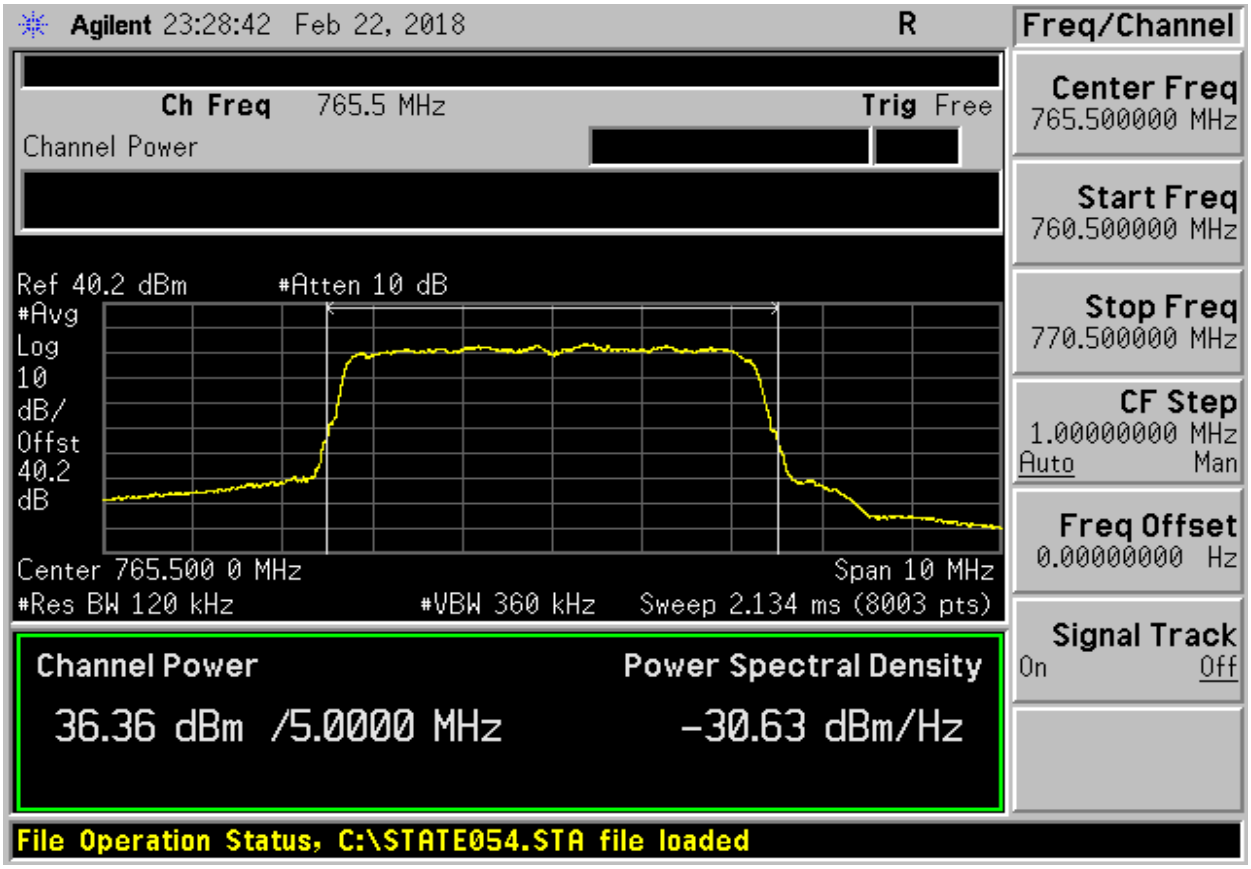
1car_256QAM_5MHz_Mid_chnl_port1_avg_pwr



High Channel (5 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

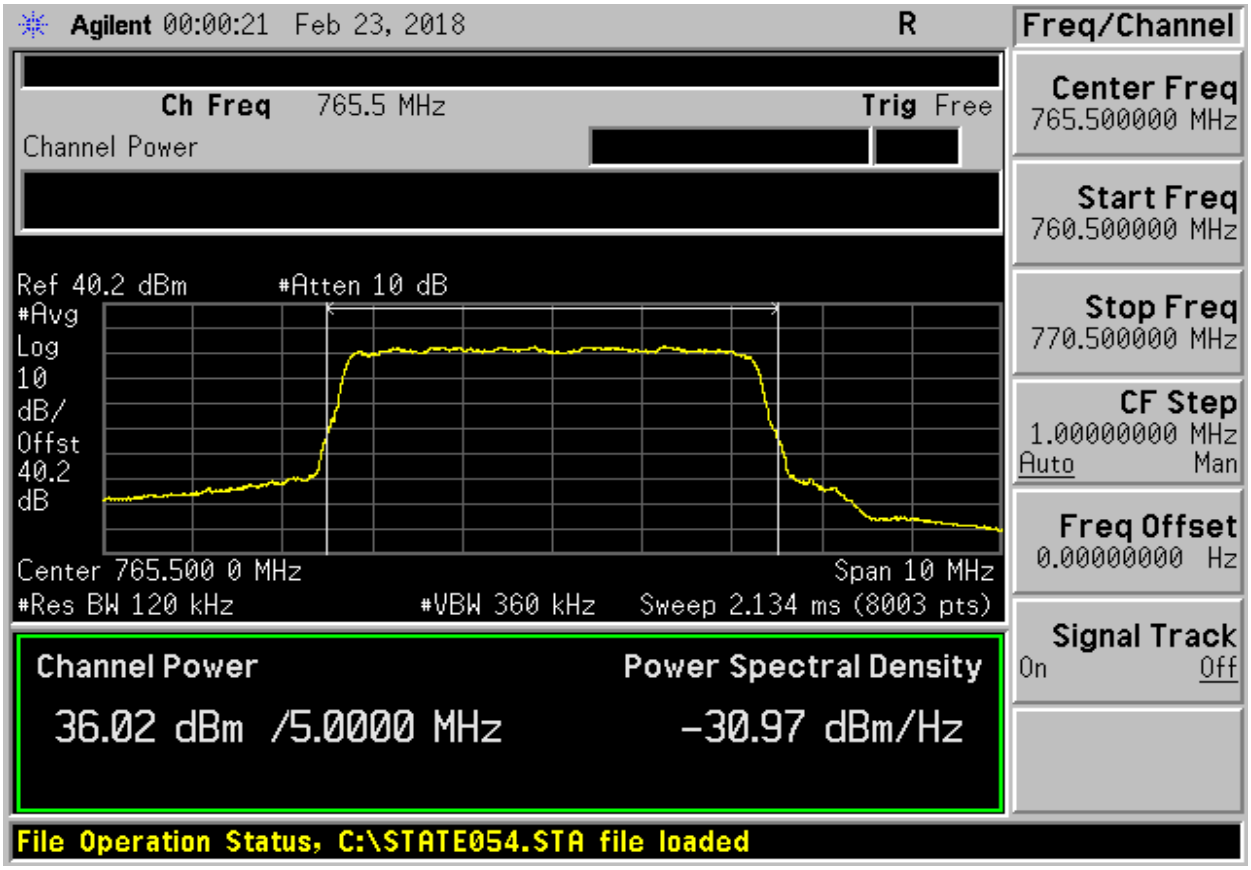
1car_QPSK_5MHz_High_chnl_port1_avg_pwr



High Channel (5 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

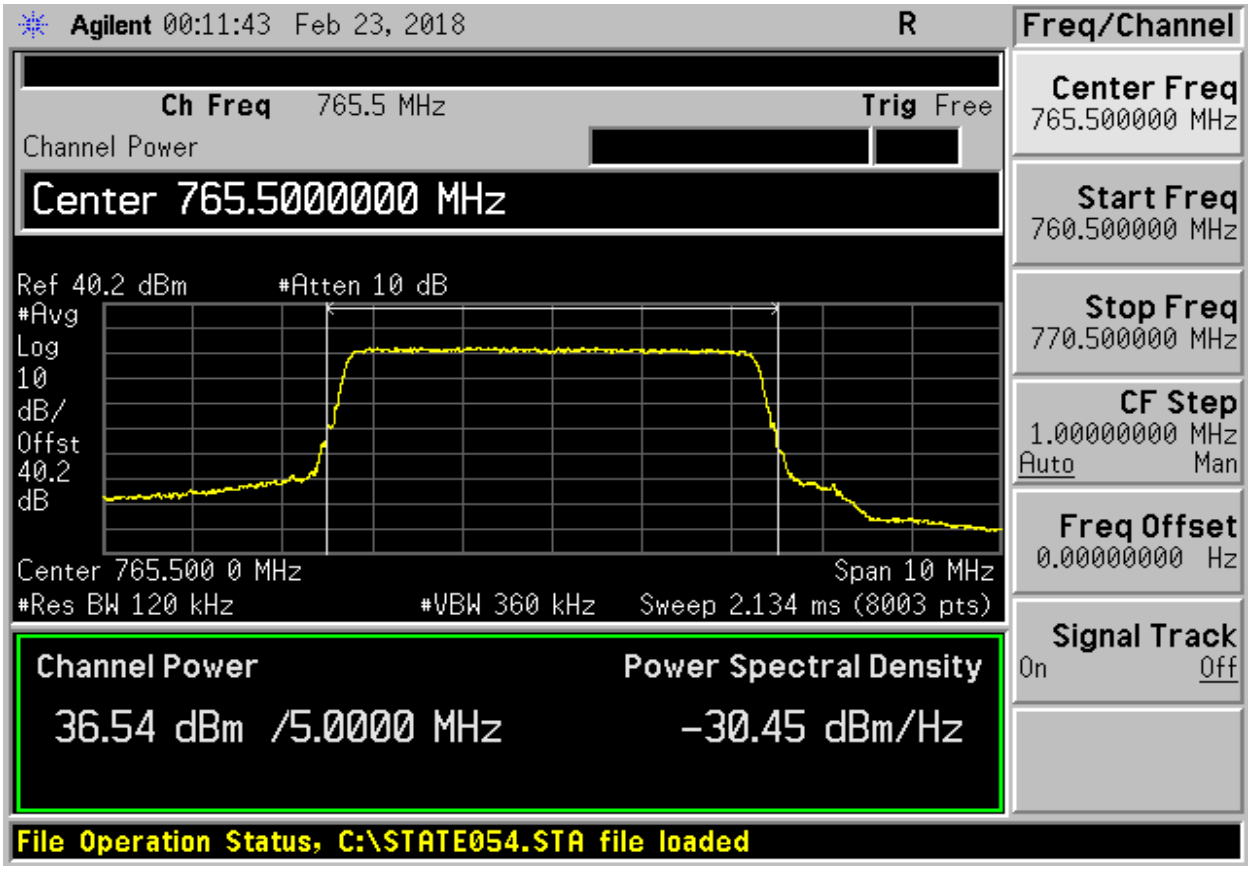
1car_16QAM_5MHz_High_chnl_port1_avg_pwr



High Channel (5 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

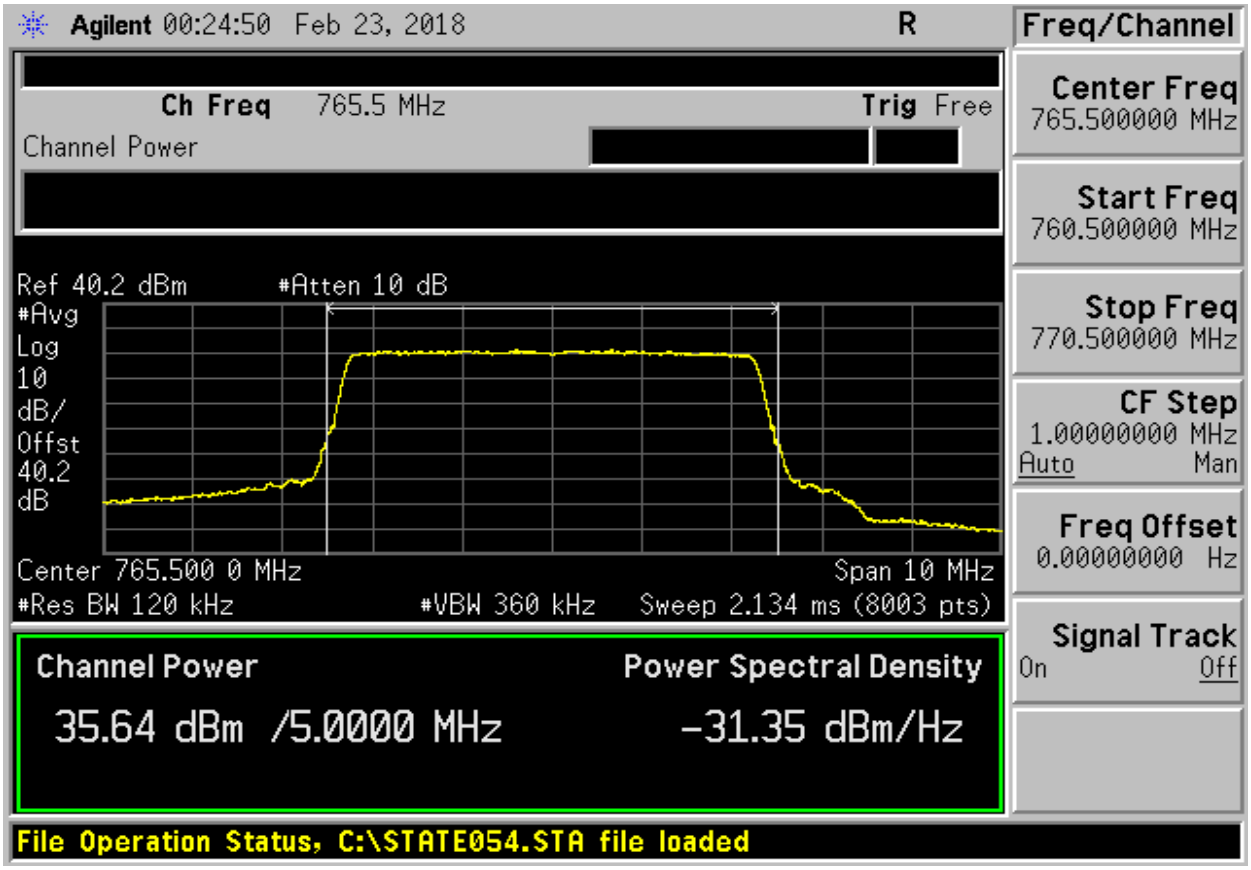
1car_64QAM_5MHz_High_chnl_port1_avg_pwr



High Channel (5 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

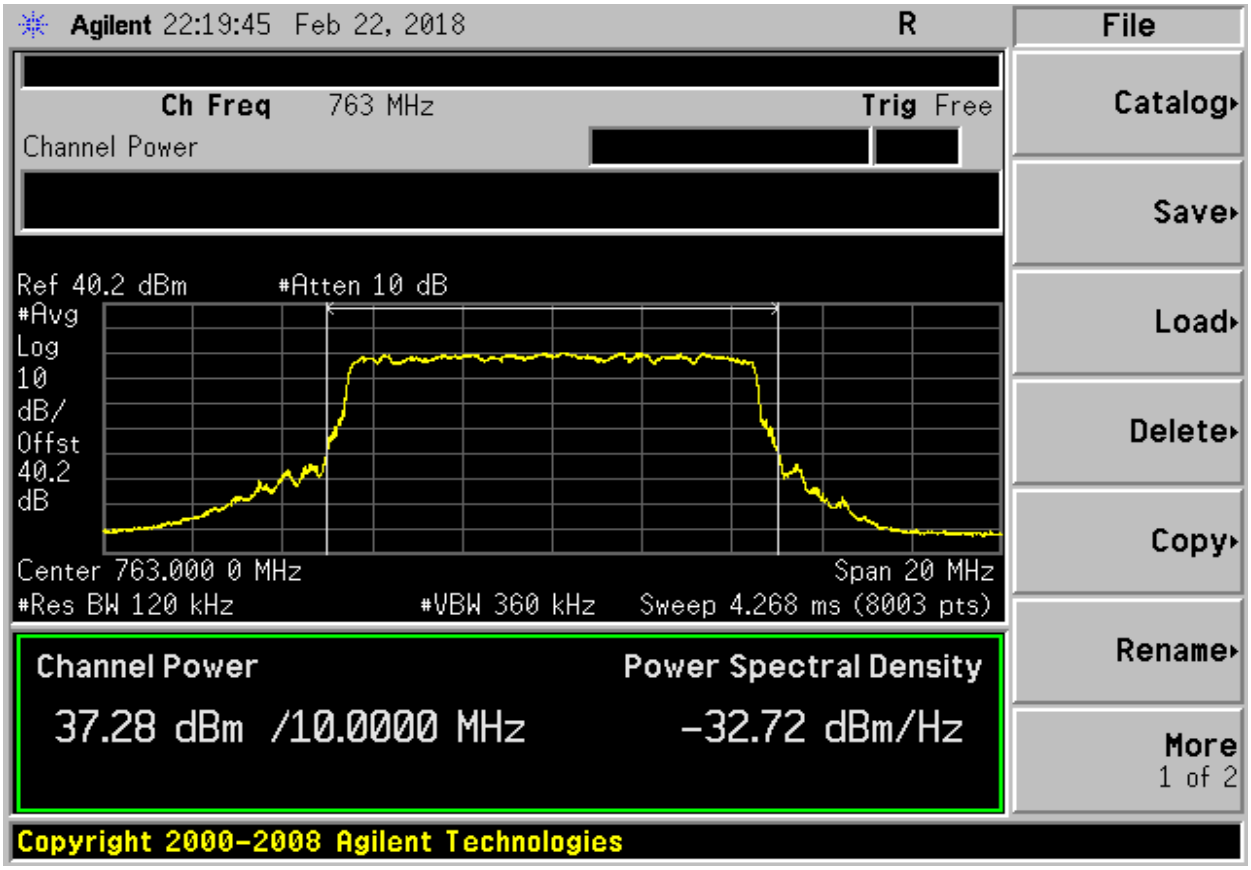
1car_256QAM_5MHz_High_chnl_port1_avg_pwr



Middle Channel (10 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

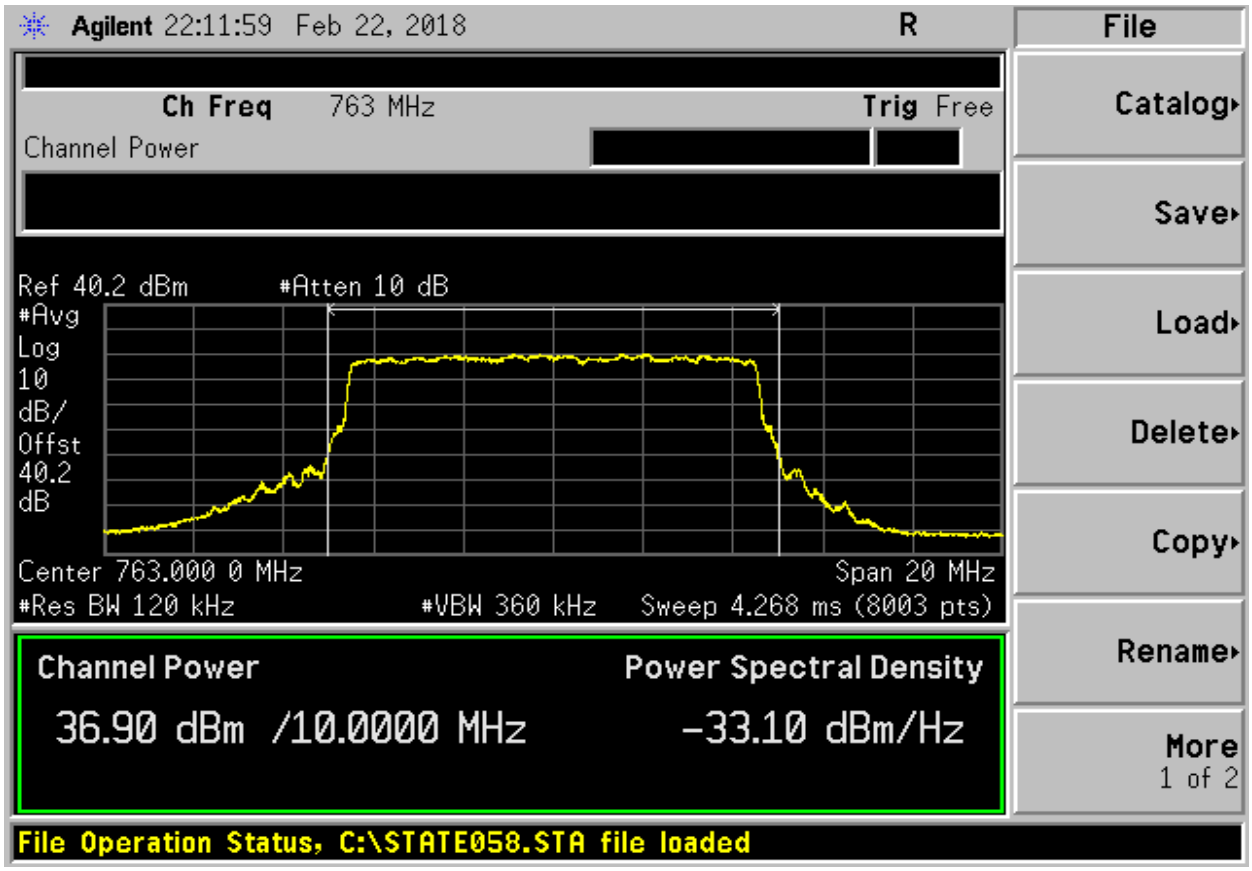
1car_QPSK_10MHz_Mid_chnl_port2_avg_pwr



Middle Channel (10 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

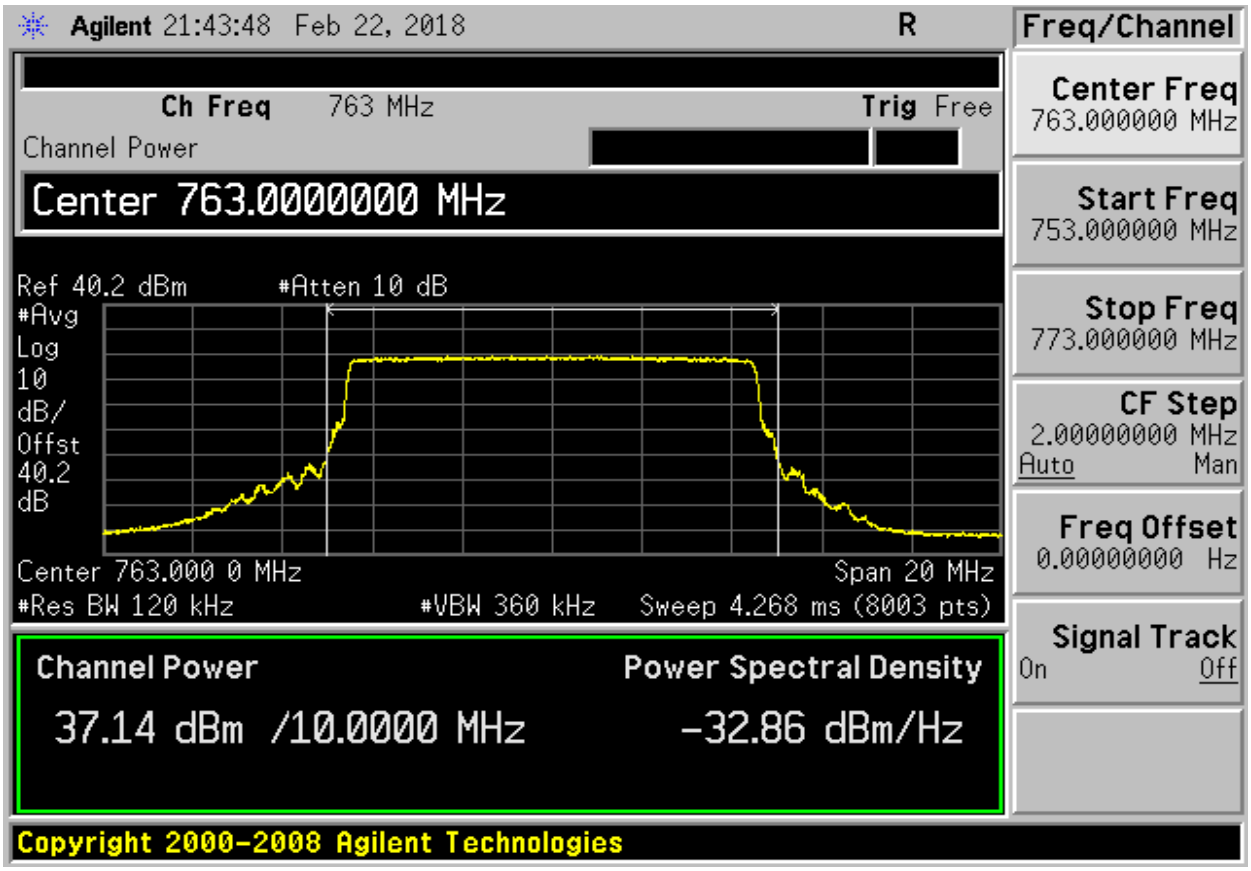
1car_16QAM_10MHz_Mid_chnl_port2_avg_pwr



Middle Channel (10 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

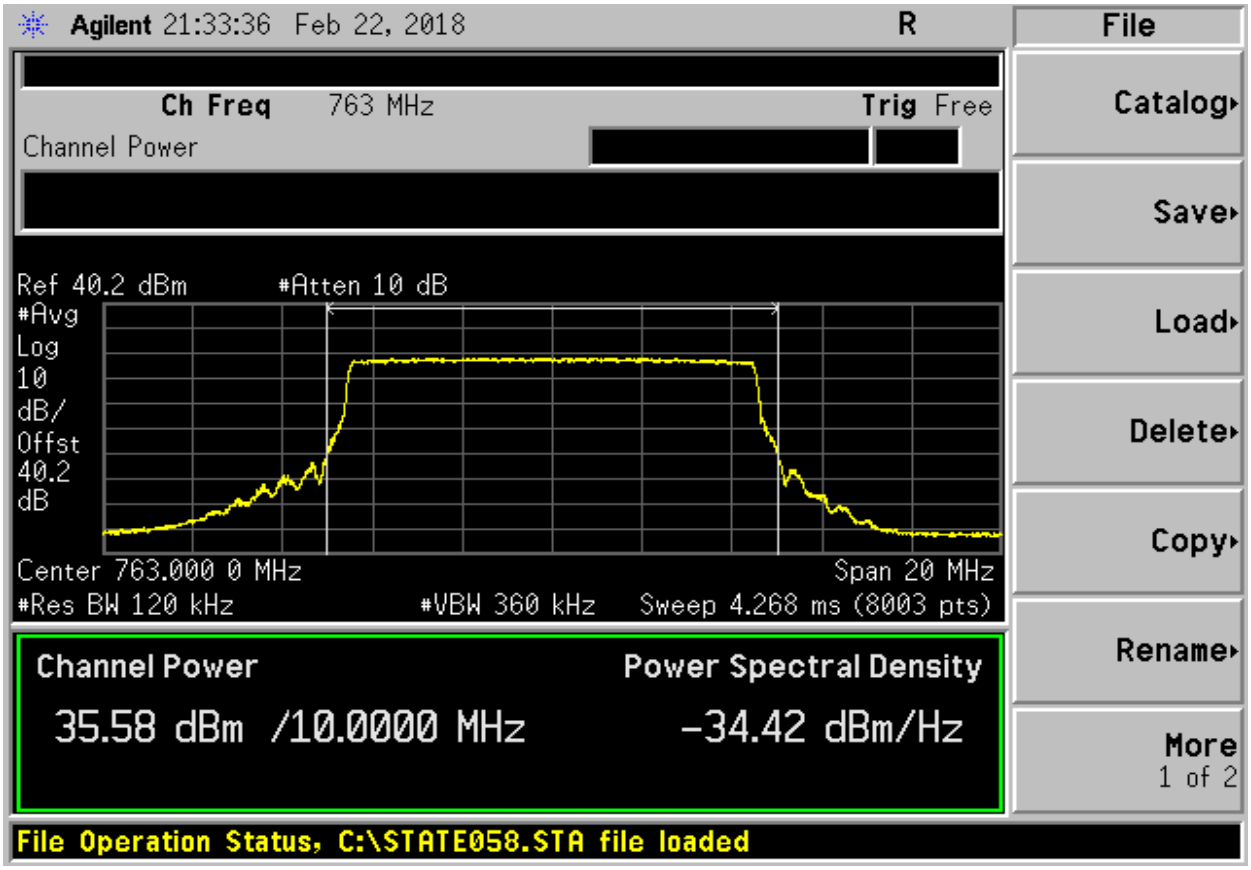
1car_64QAM_10MHz_Mid_chnl_port2_avg_pwr



Middle Channel (10 MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

1car_256QAM_10MHz_Mid_chnl_port2_avg_pwr

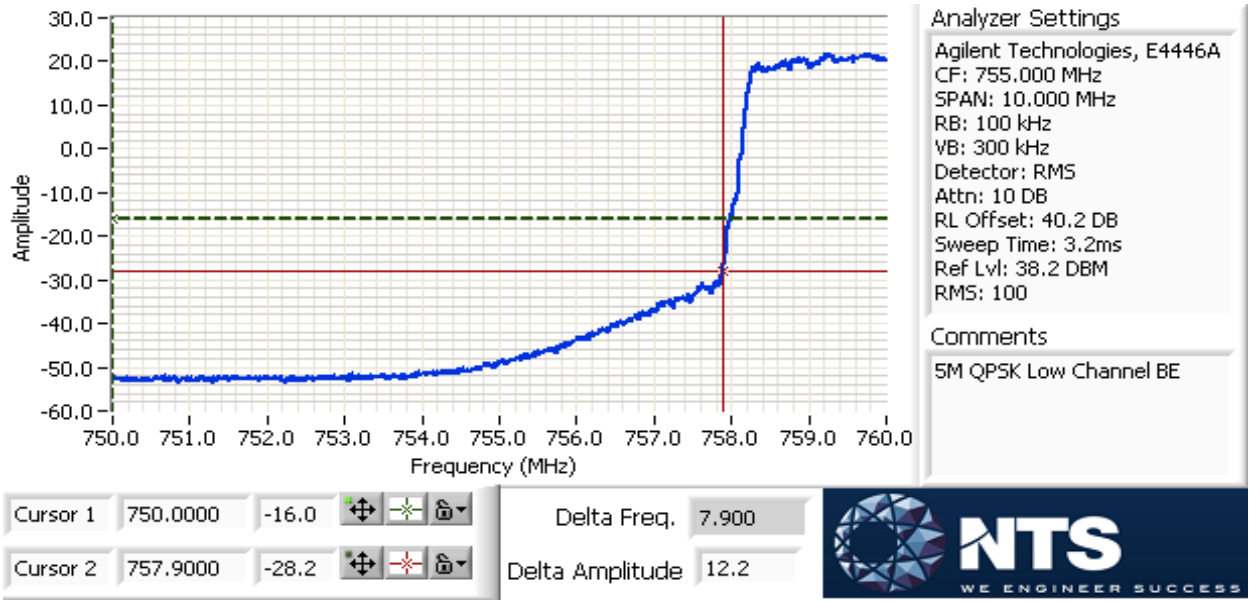


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Run #2: Band edge/Block edge

On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.
Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

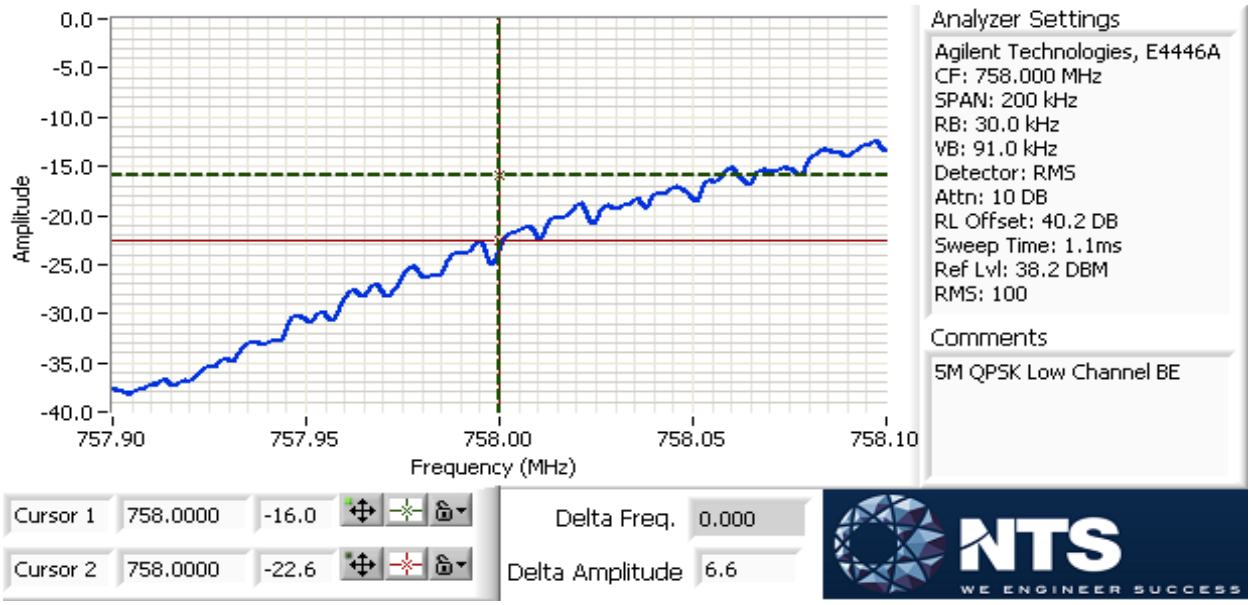
Low Channel Band edge/Block edge (5MHz)
5M QPSK Low Channel BE 750-760MHz



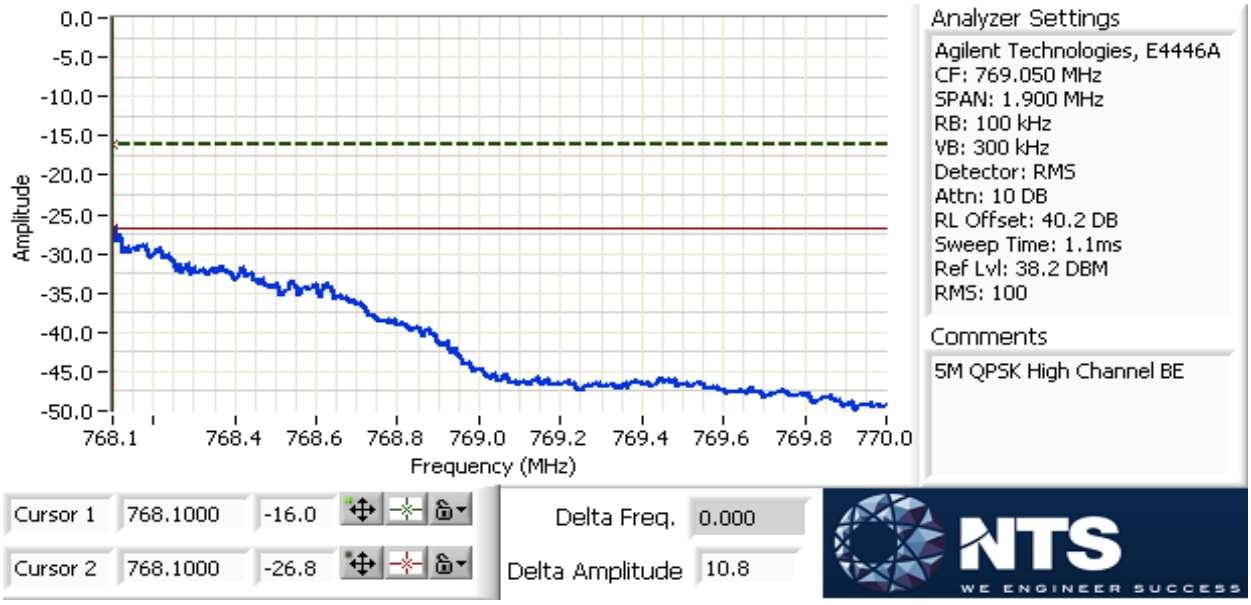
Low Channel Band edge/Block edge (5MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

5M QPSK Low Channel BE 757.9-758.1MHz

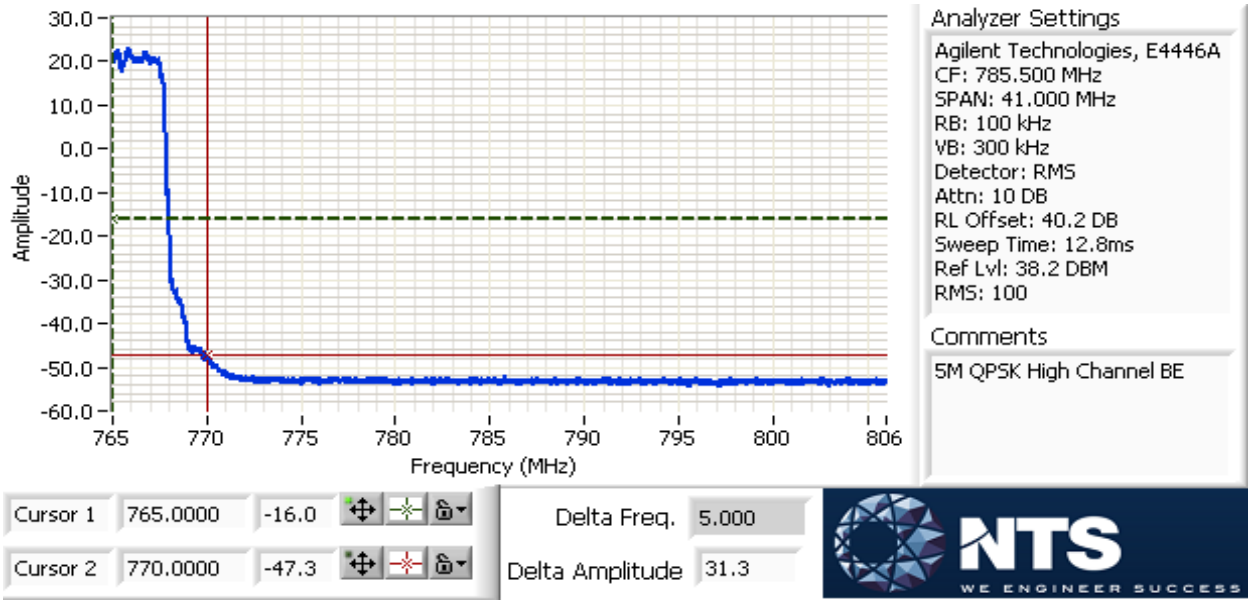


High Channel Band edge/Block edge (5MHz)
5M QPSK High Channel BE 768.1-770 MHz

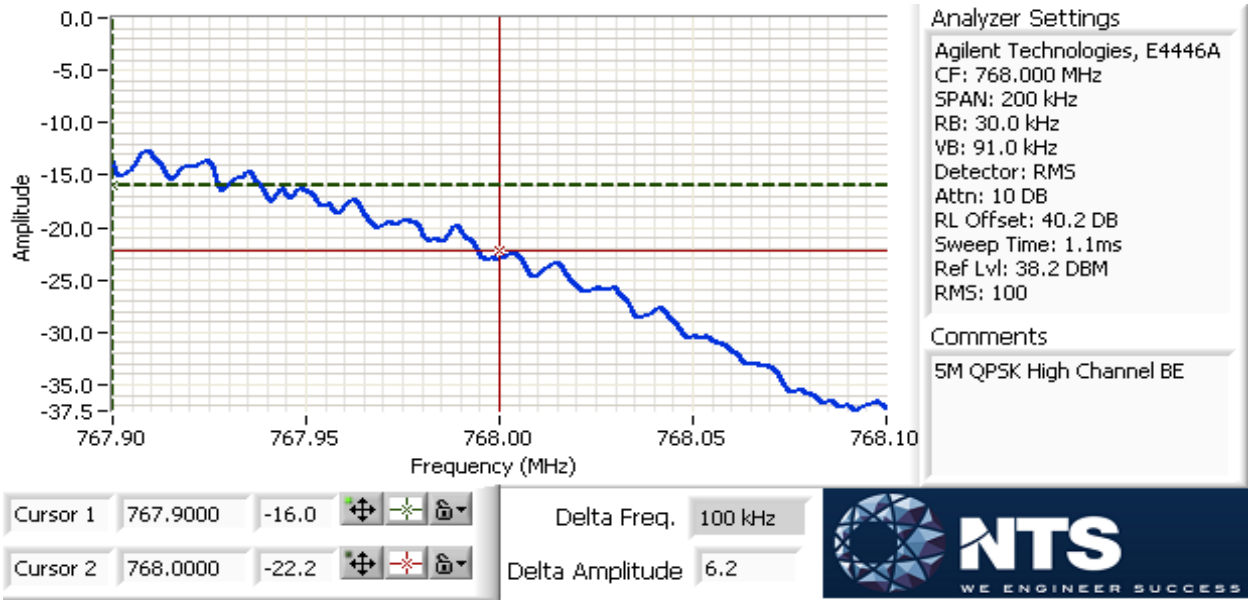


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

High Channel Band edge/Block edge (5MHz)
5M QPSK High Channel BE 765-806 MHz

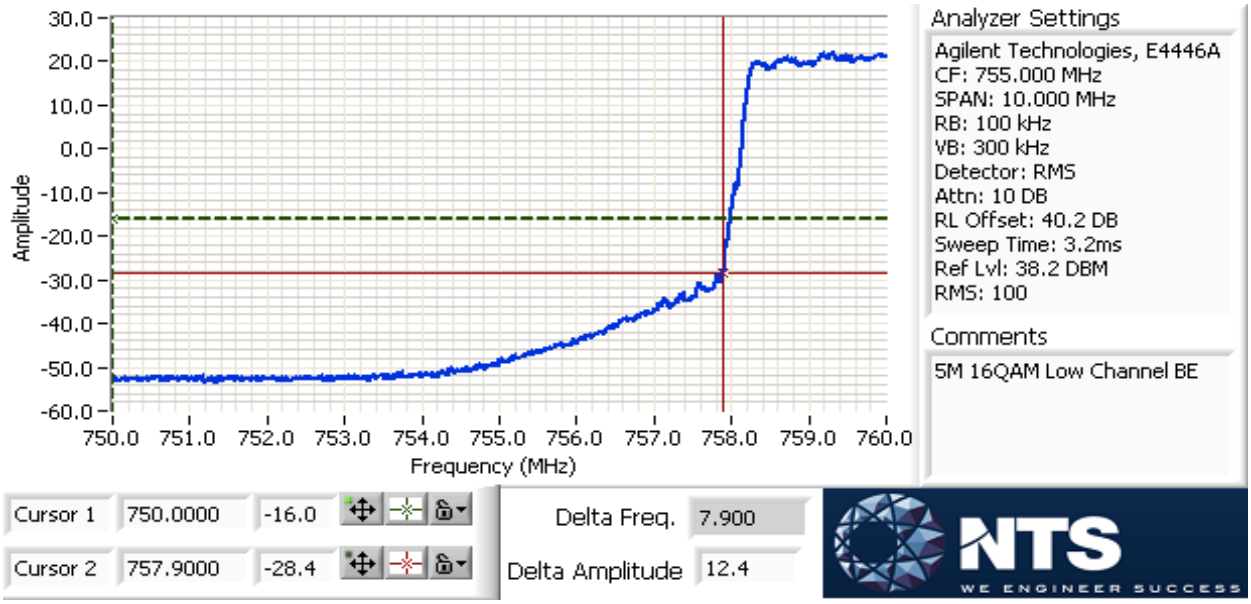


High Channel Band edge/Block edge (5MHz)
5M QPSK High Channel BE 767.9-768.1MHz

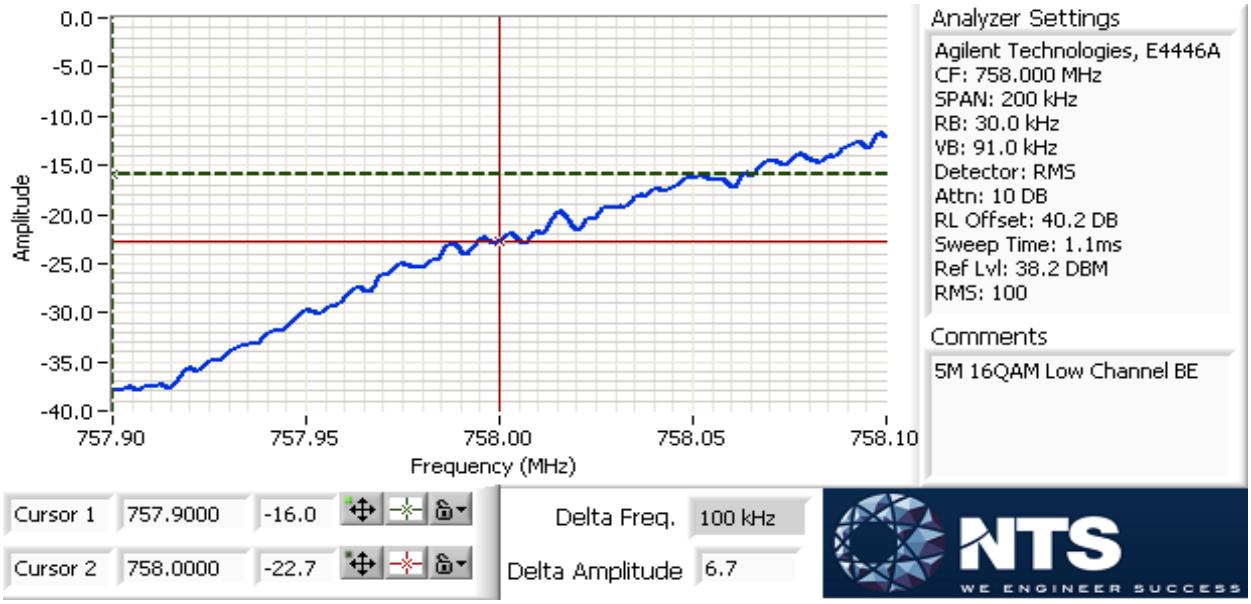


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Low Channel Band edge/Block edge (5MHz)
5M 16QAM Low Channel BE 750-760MHz

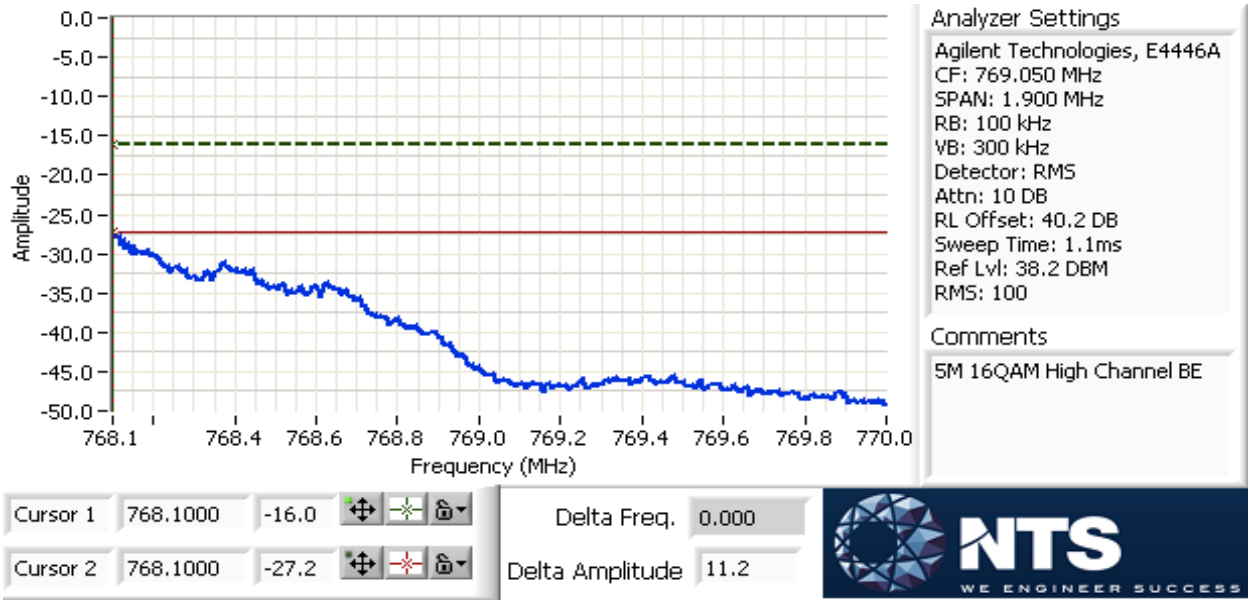


Low Channel Band edge/Block edge (5MHz)
5M 16QAM Low Channel BE 757.9-758.1MHz

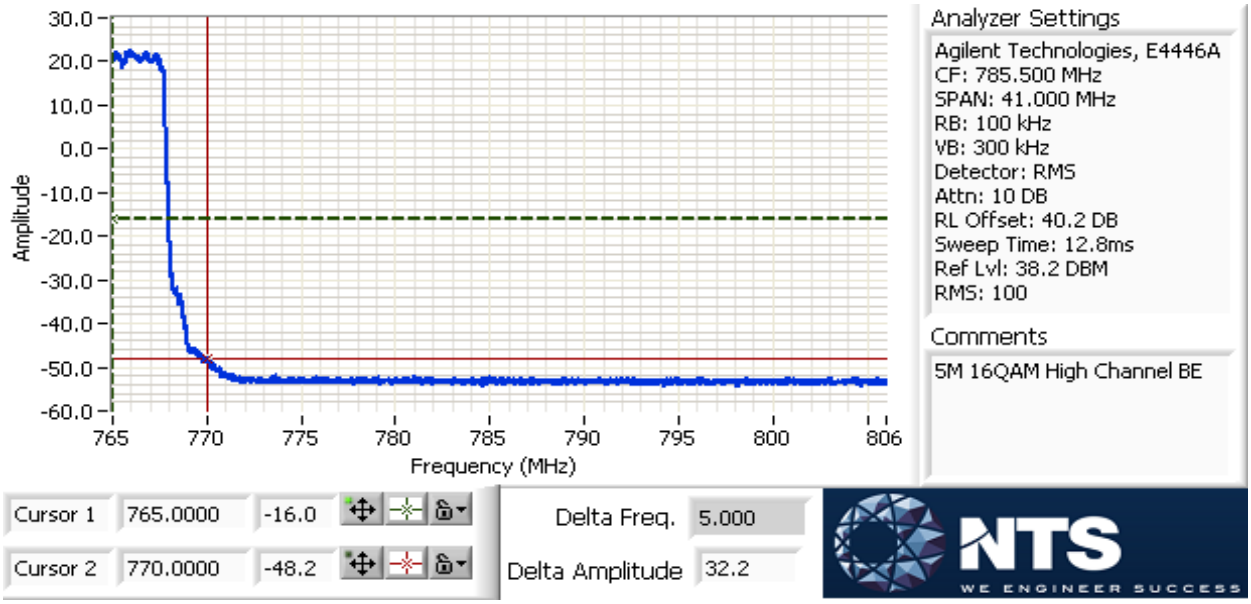


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

High Channel Band edge/Block edge (5MHz)
5M 16QAM High Channel BE 768.1-770 MHz

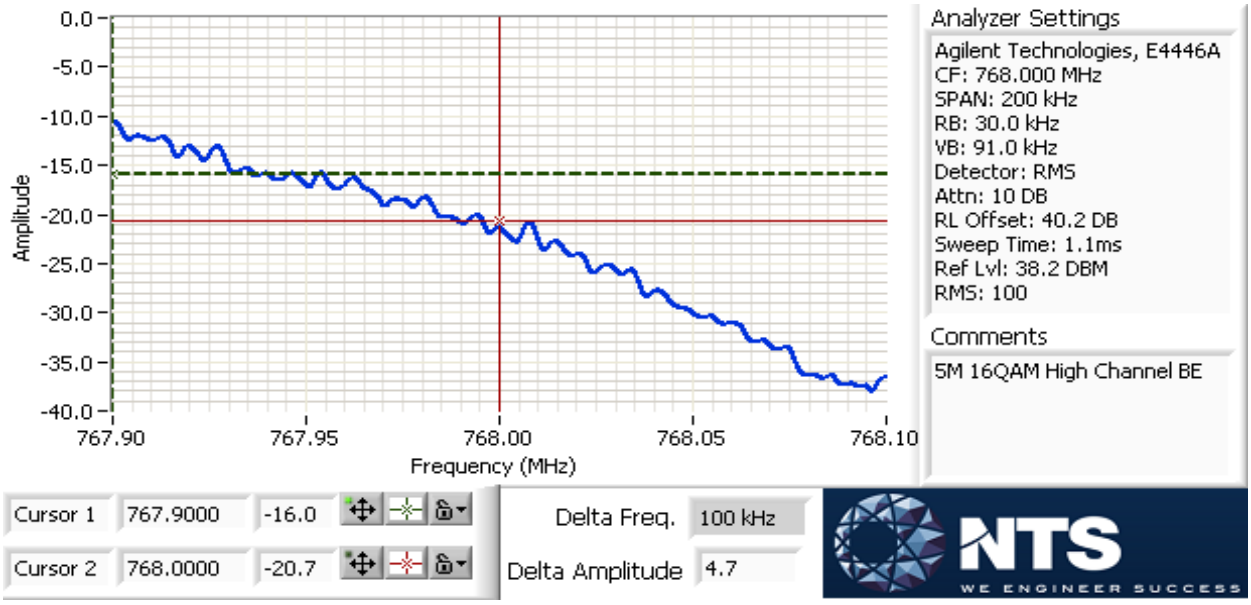


High Channel Band edge/Block edge (5MHz)
5M 16QAM High Channel BE 765-806 MHz

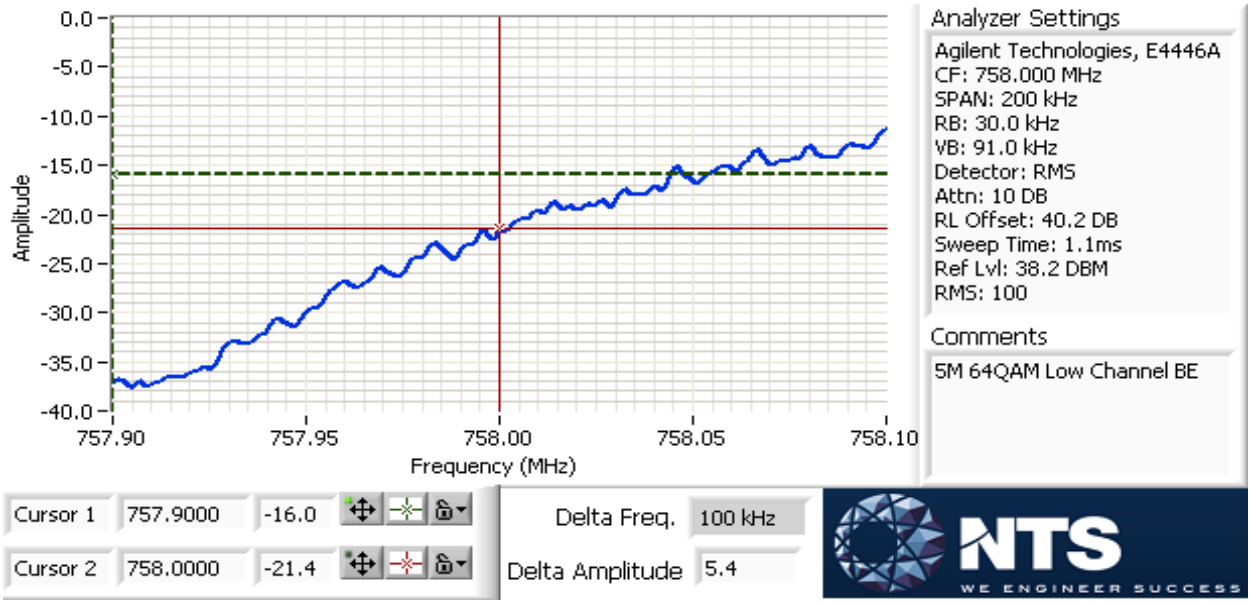


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

High Channel Band edge/Block edge (5MHz)
5M 16QAM High Channel BE 767.9-768.1 MHz

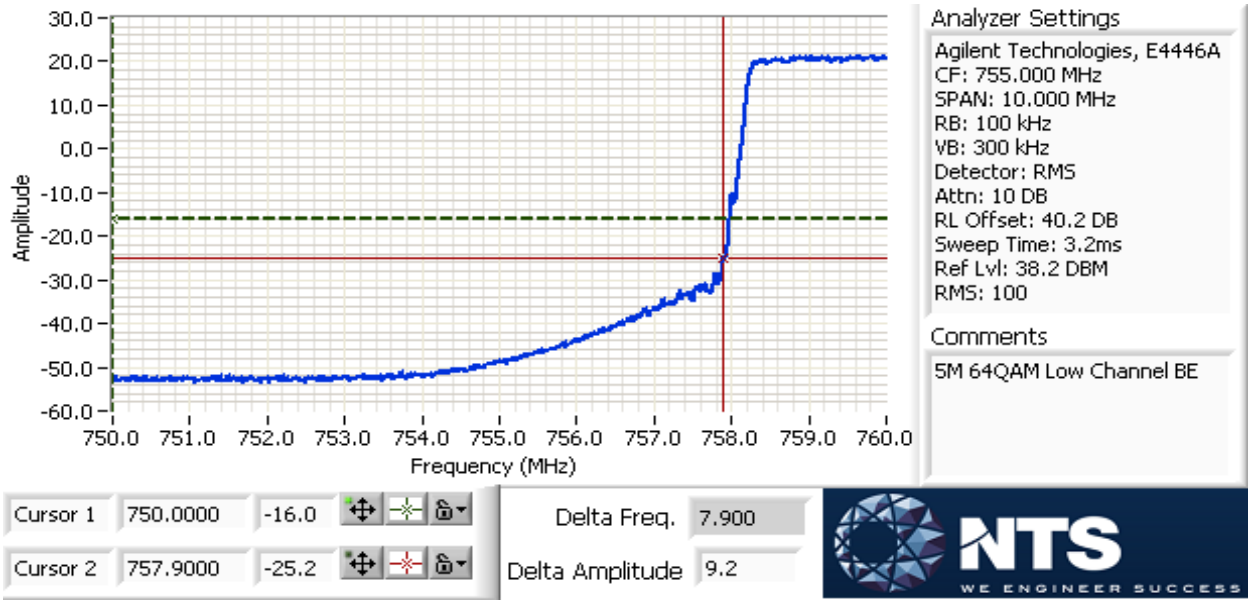


Low Channel Band edge/Block edge (5MHz)
5M 64QAM Low Channel BE 757.9-758.1MHz

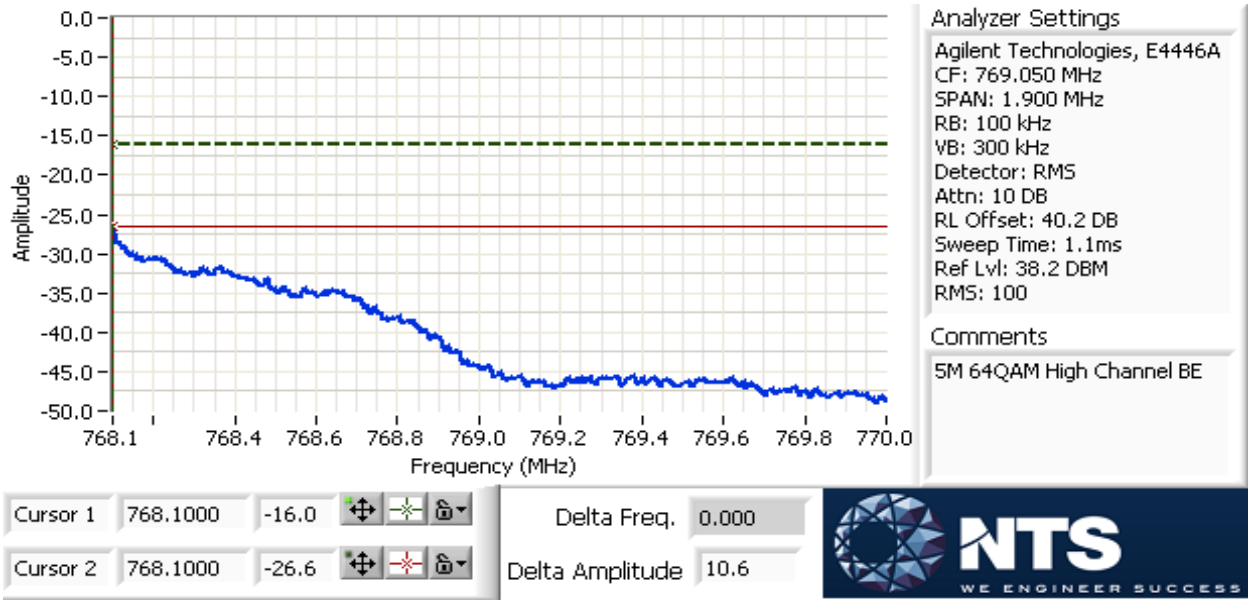


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Low Channel Band edge/Block edge (5MHz)
5M 64QAM Low Channel BE 750-760MHz



High Channel Band edge/Block edge (5MHz)
5M 64QAM High Channel BE 768.1-770 MHz



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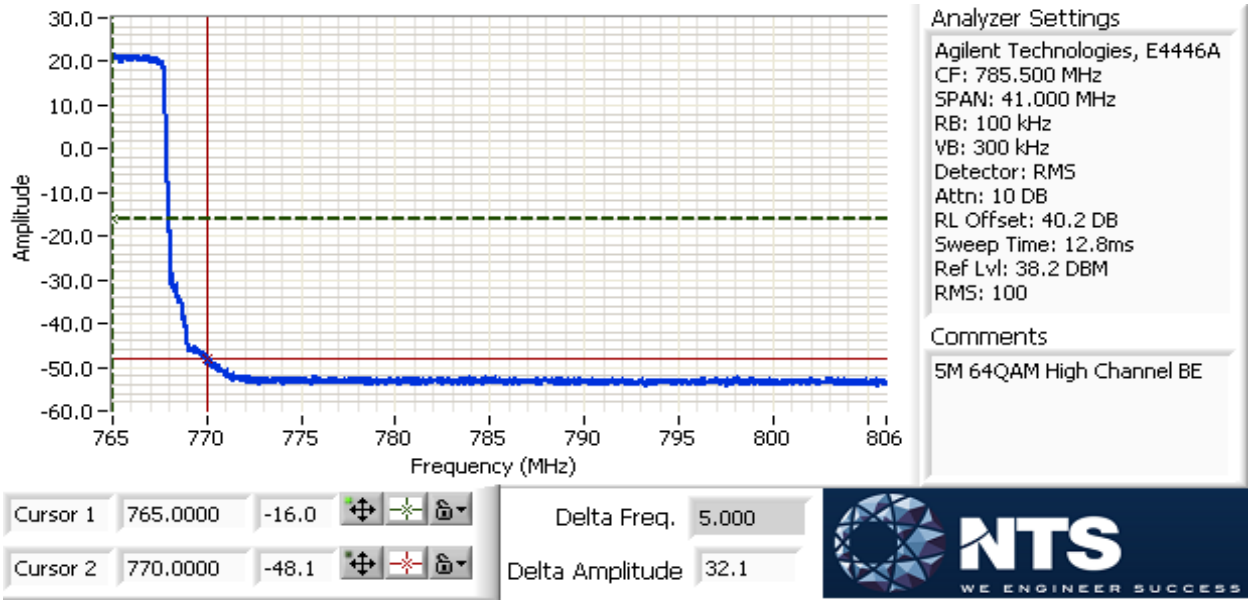
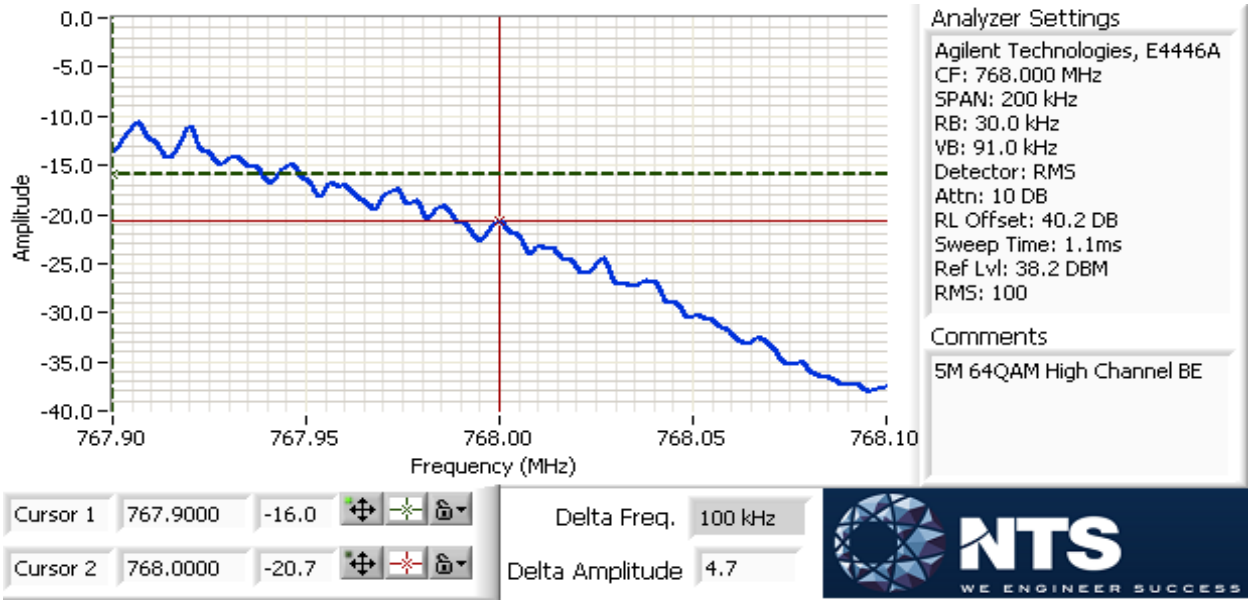
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

High Channel Band edge/Block edge (5MHz)
5M 64QAM High Channel BE 765-806 MHz

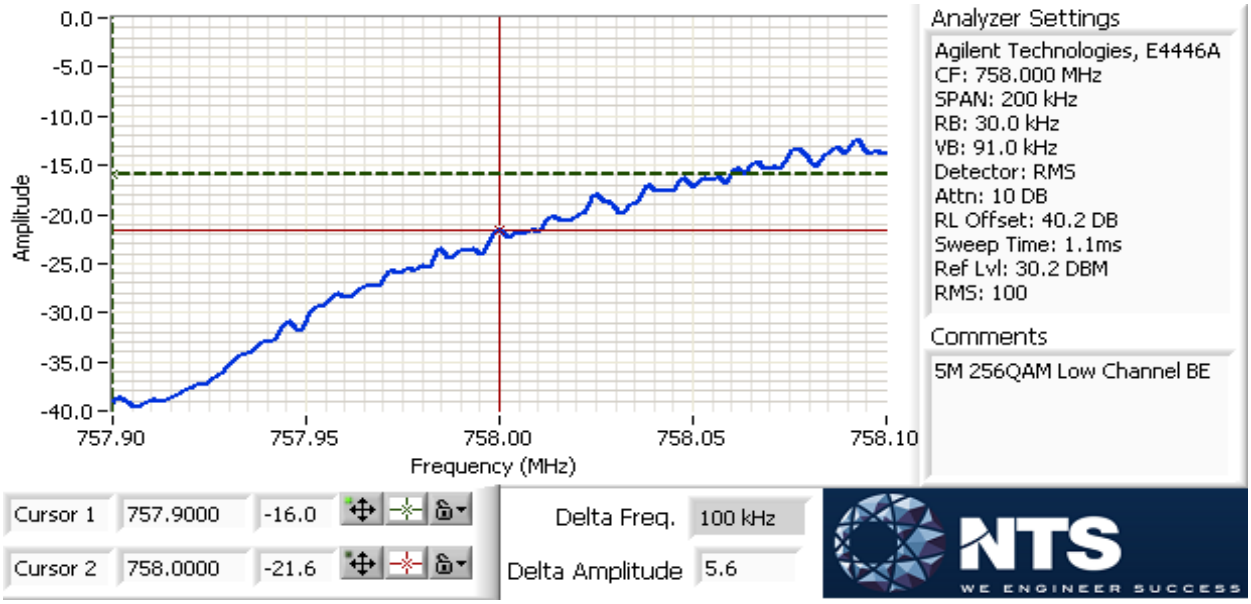


High Channel Band edge/Block edge (5MHz)
5M 64QAM High Channel BE 767.9-768.1 MHz

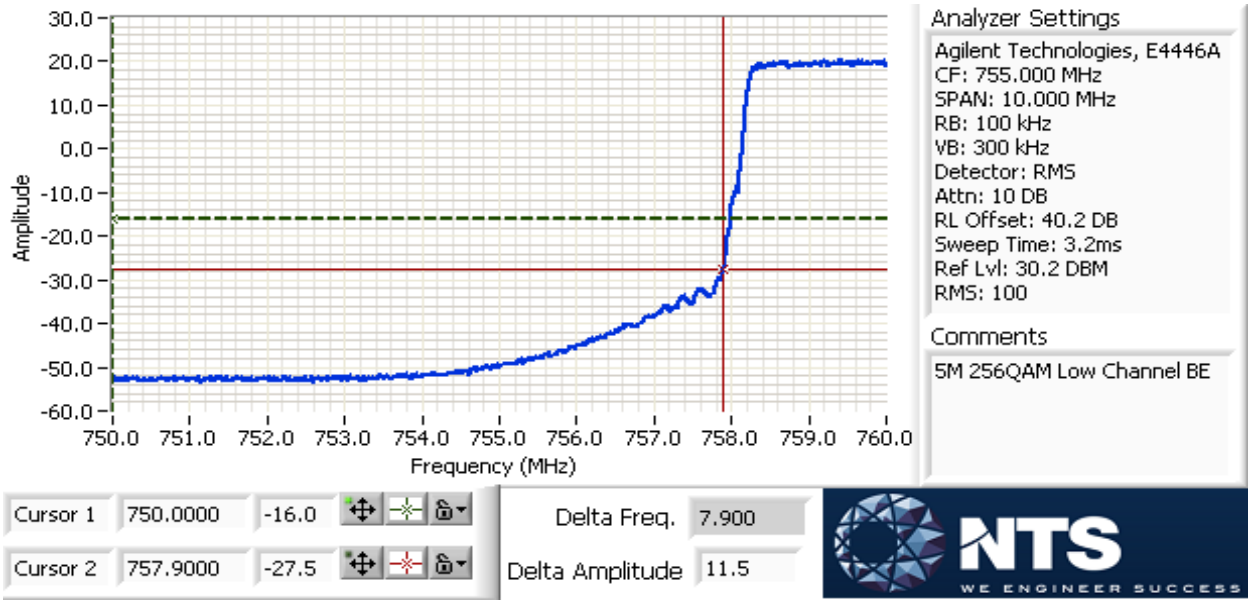


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Low Channel Band edge/Block edge (5MHz)
5M 256QAM Low Channel BE 757.9-758.1MHz

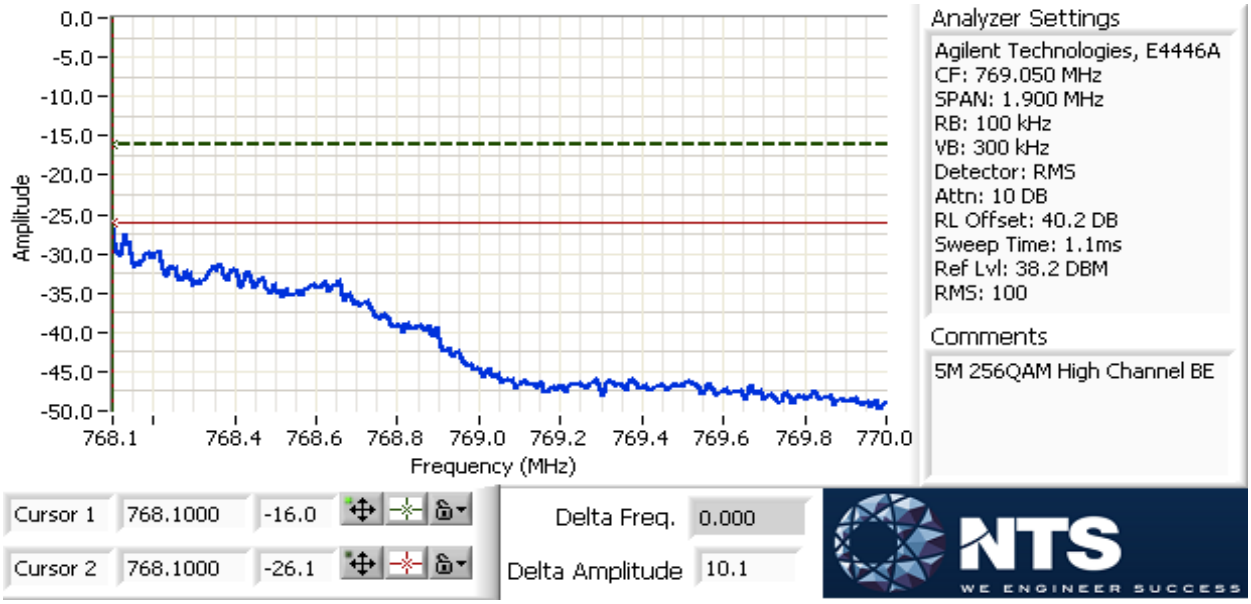


Low Channel Band edge/Block edge (5MHz)
5M 256QAM Low Channel BE 750-760MHz

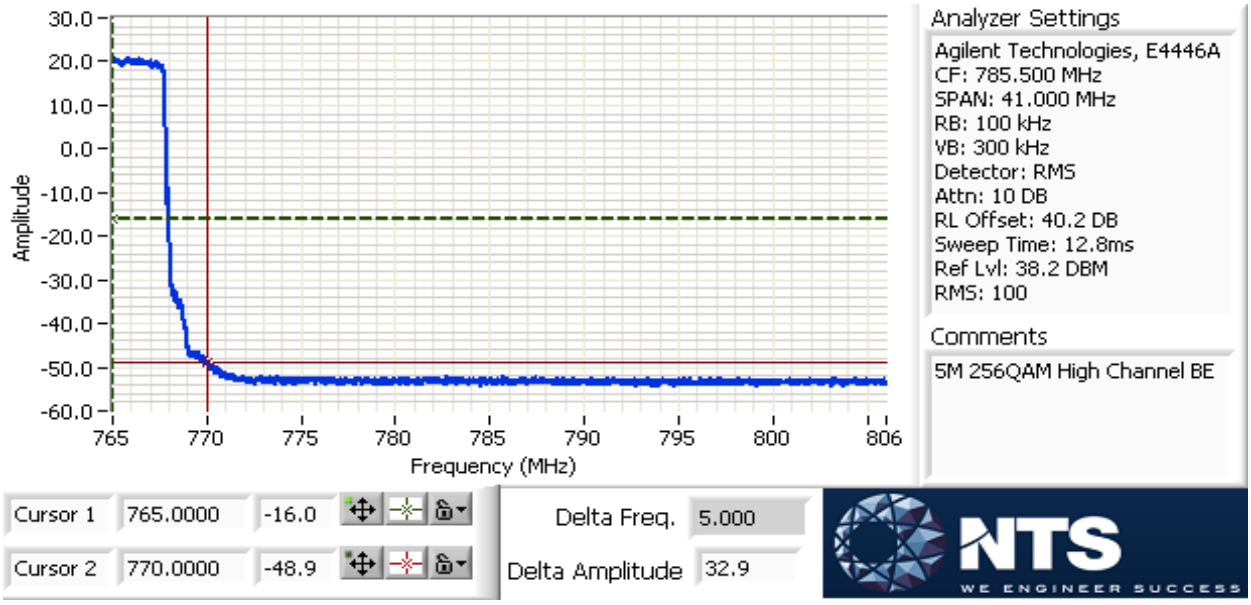


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

High Channel Band edge/Block edge (5MHz)
5M 256QAM High Channel BE 768.1-770 MHz

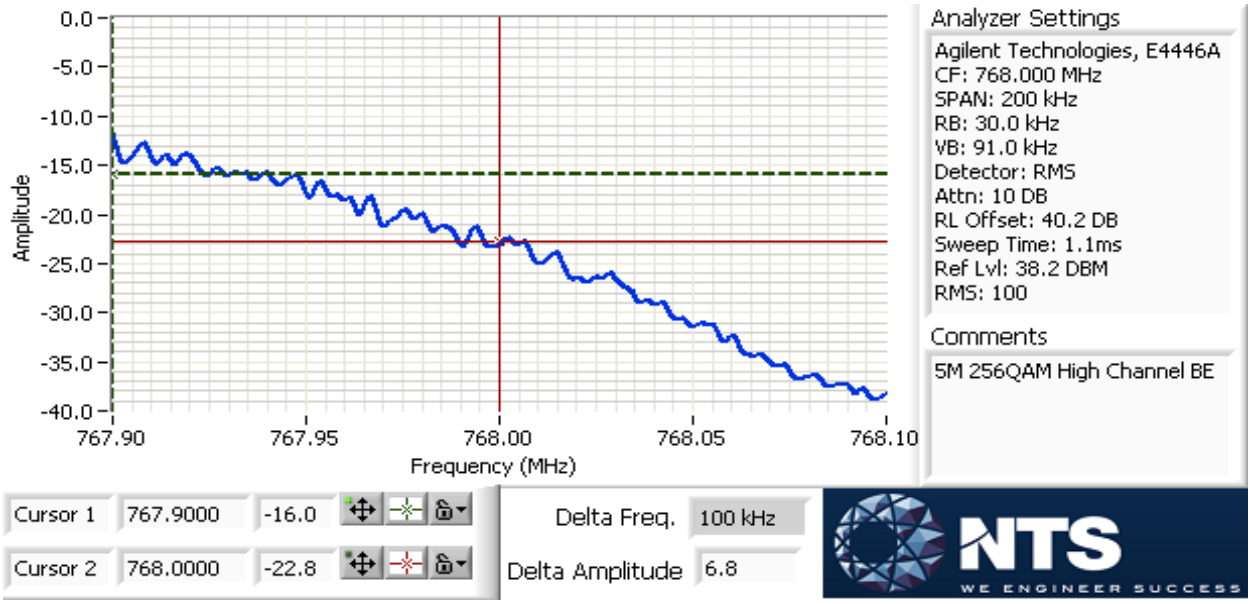


High Channel Band edge/Block edge (5MHz)
5M 256QAM High Channel BE 765-806 MHz

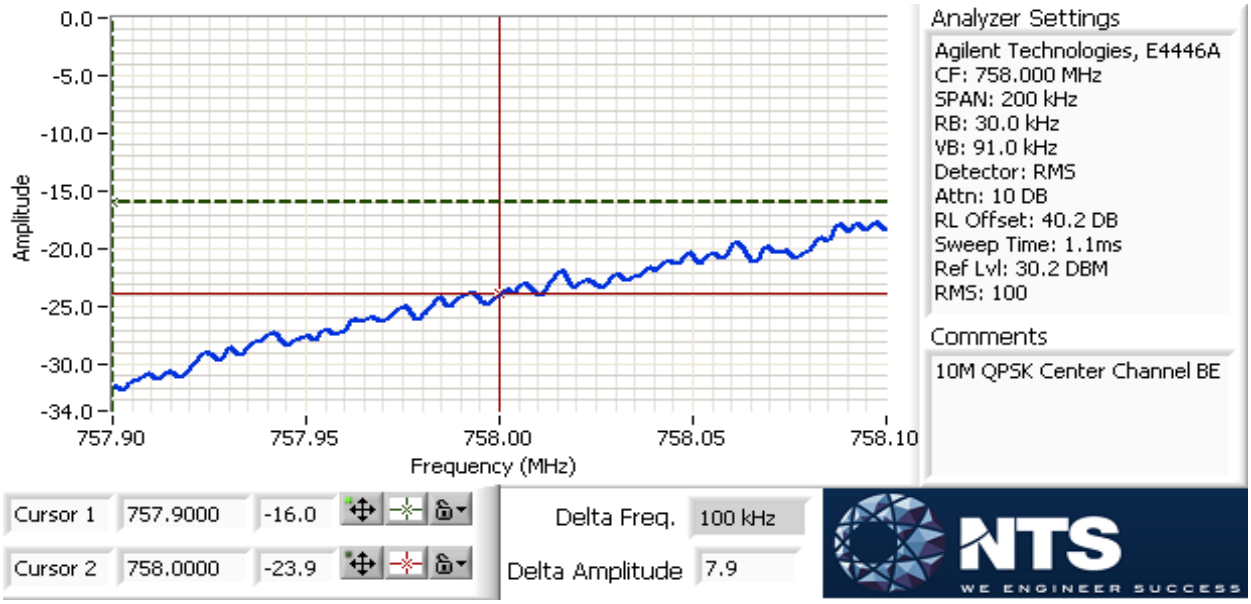


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

High Channel Band edge/Block edge (5MHz)
5M 256QAM High Channel BE 767.9-768.1 MHz

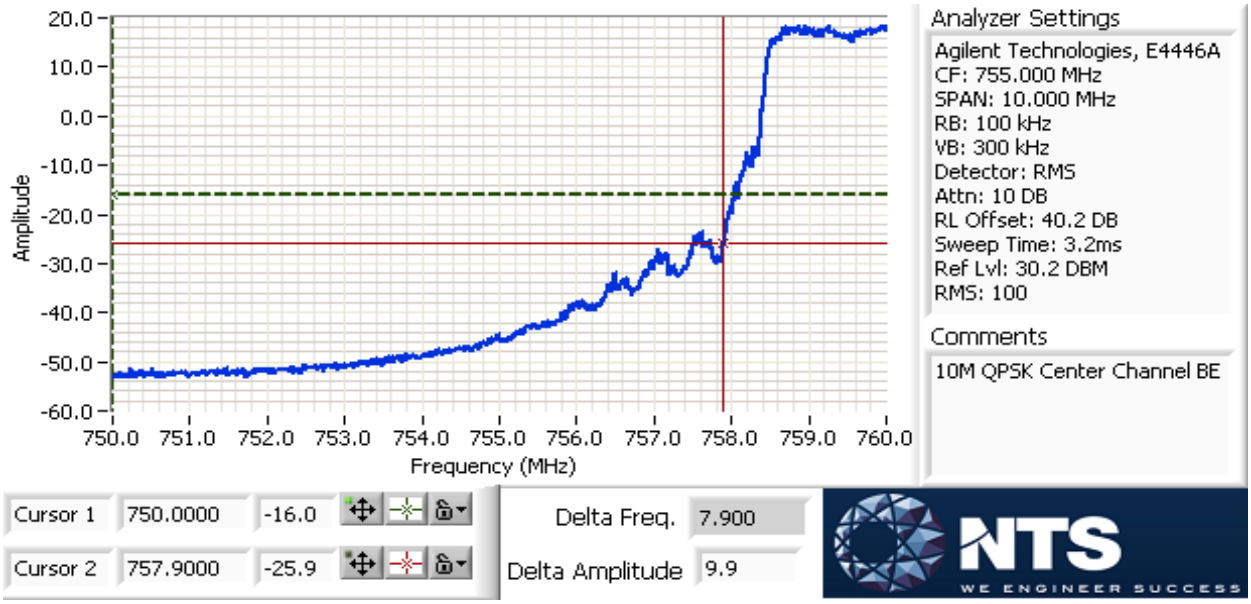


Center Channel Band edge/Block edge (10MHz)
10M QPSK Center Channel BE 757.9-758.1MHz

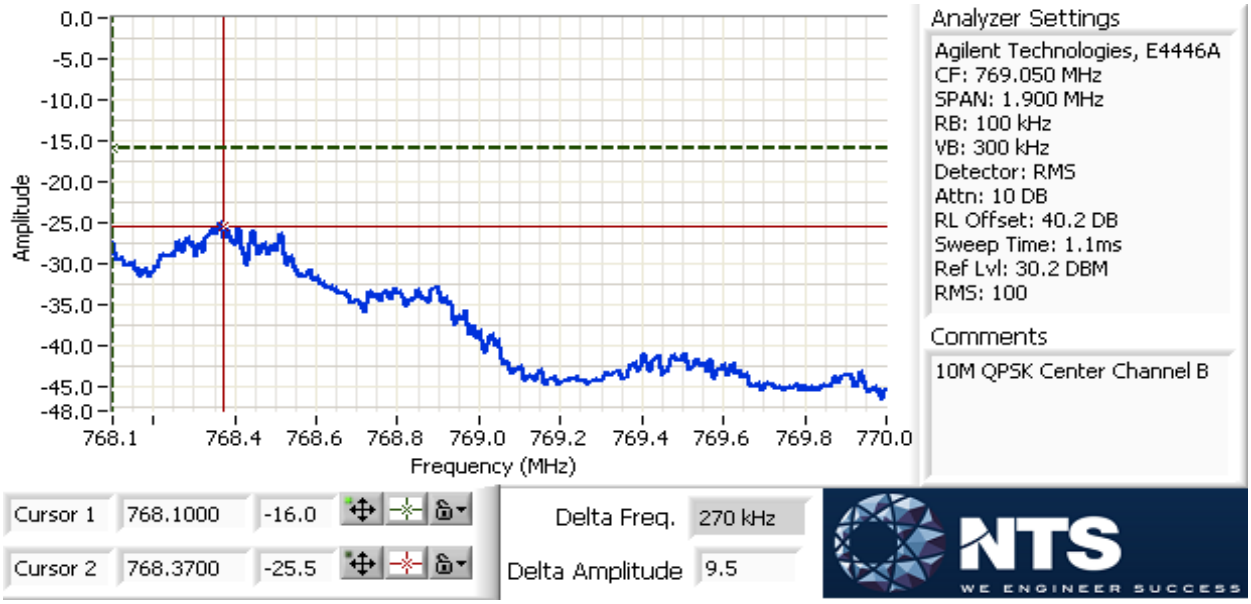


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Center Channel Band edge/Block edge (10MHz)
10M QPSK Center Channel BE 750-760MHz

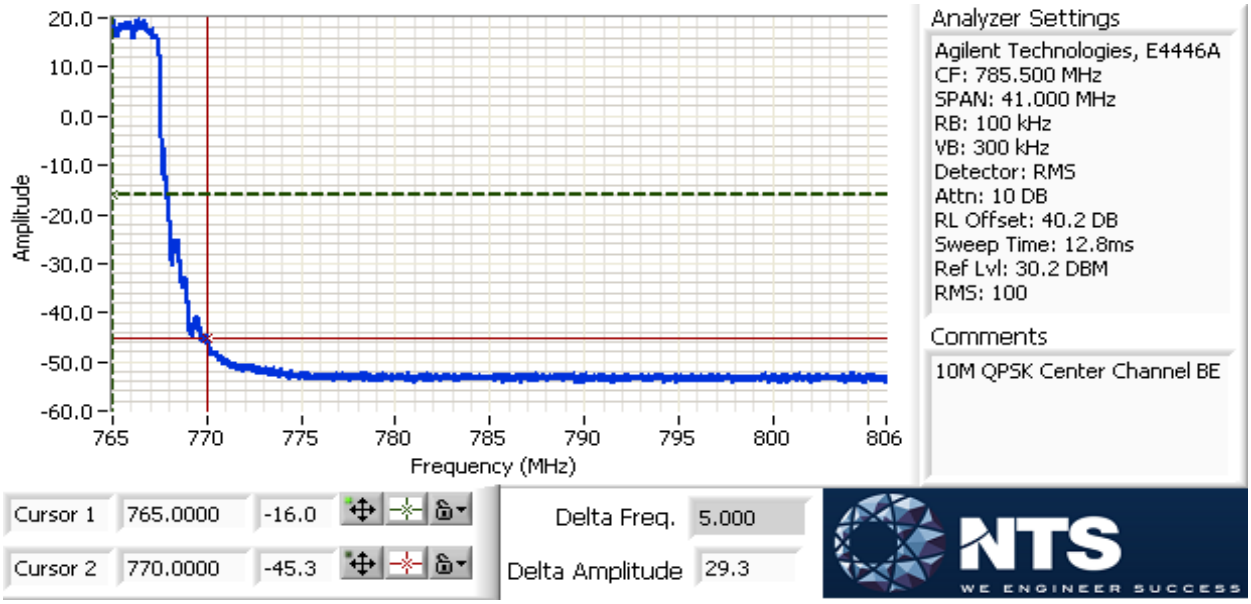


Center Channel Band edge/Block edge (10MHz)
10M QPSK Center Channel BE 768.1-770 MHz

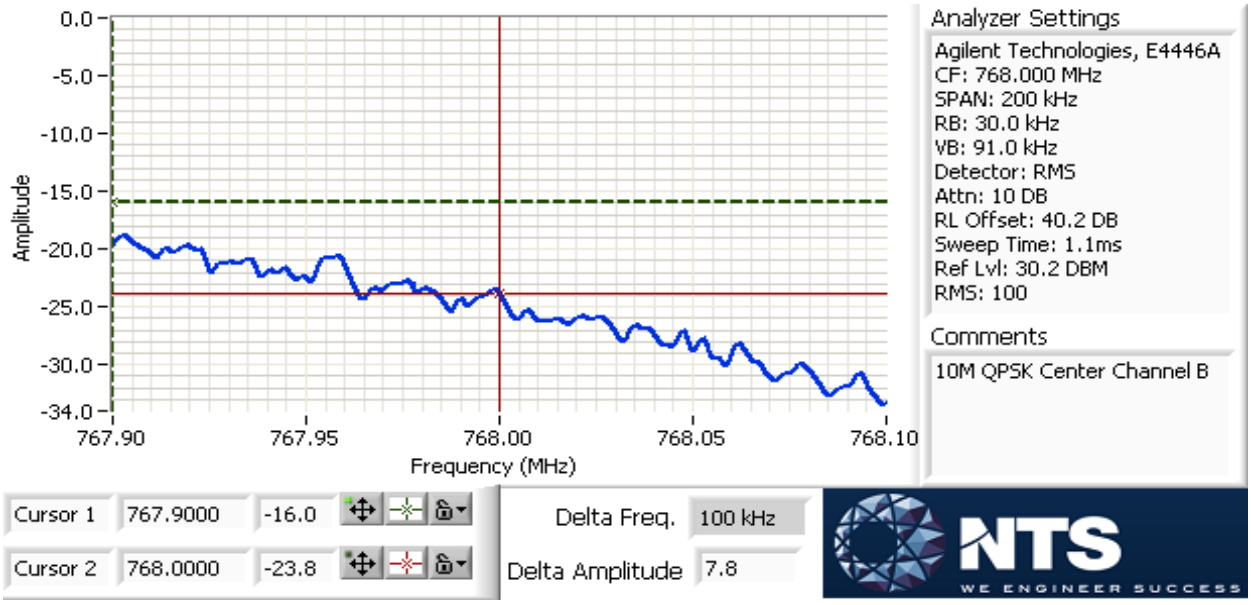


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Center Channel Band edge/Block edge (10MHz)
10M QPSK Center Channel BE 765-806 MHz

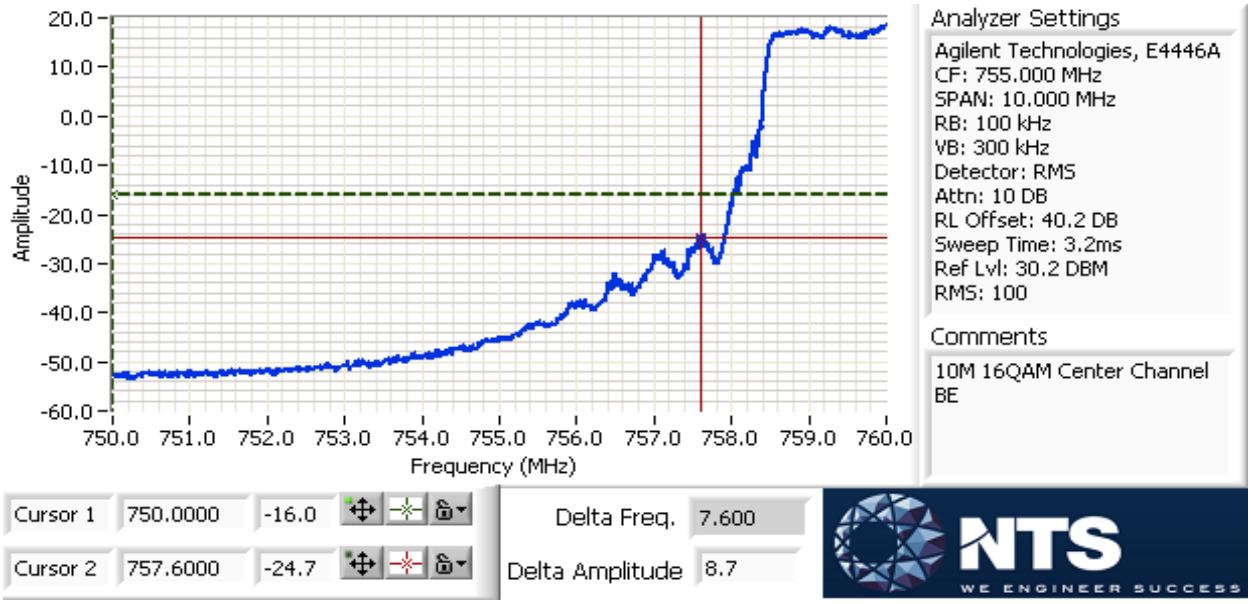


Center Channel Band edge/Block edge (10MHz)
10M QPSK Center Channel BE 767.9-768.1 MHz

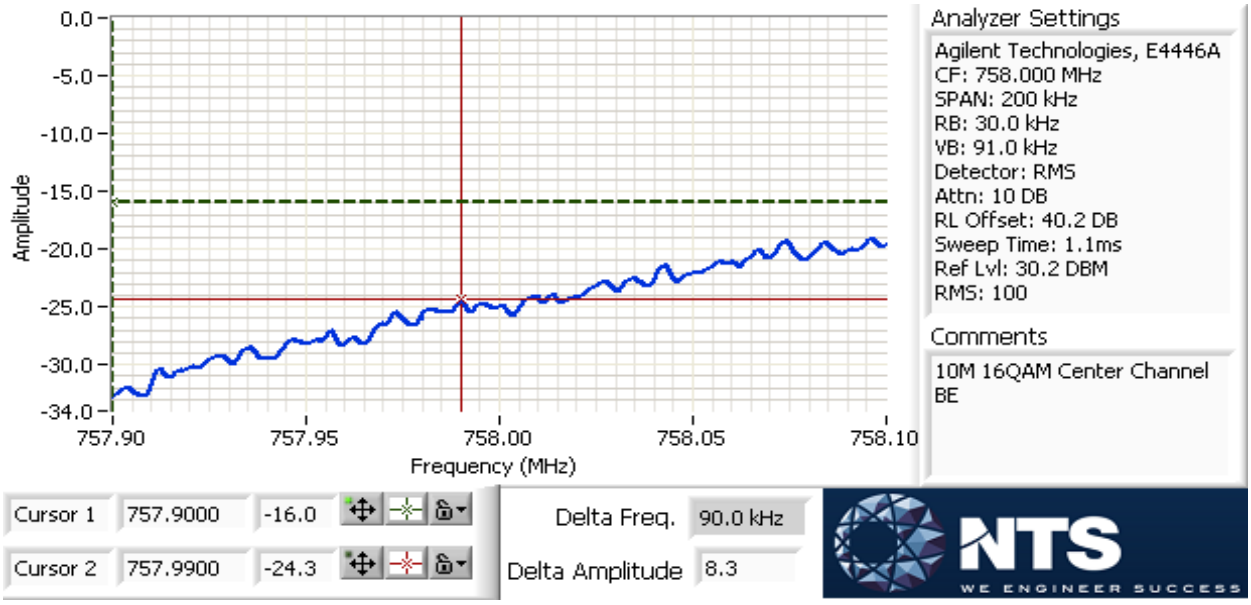


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Center Channel Band edge/Block edge (10MHz)
10M 16QAM Center Channel BE 750-760MHz

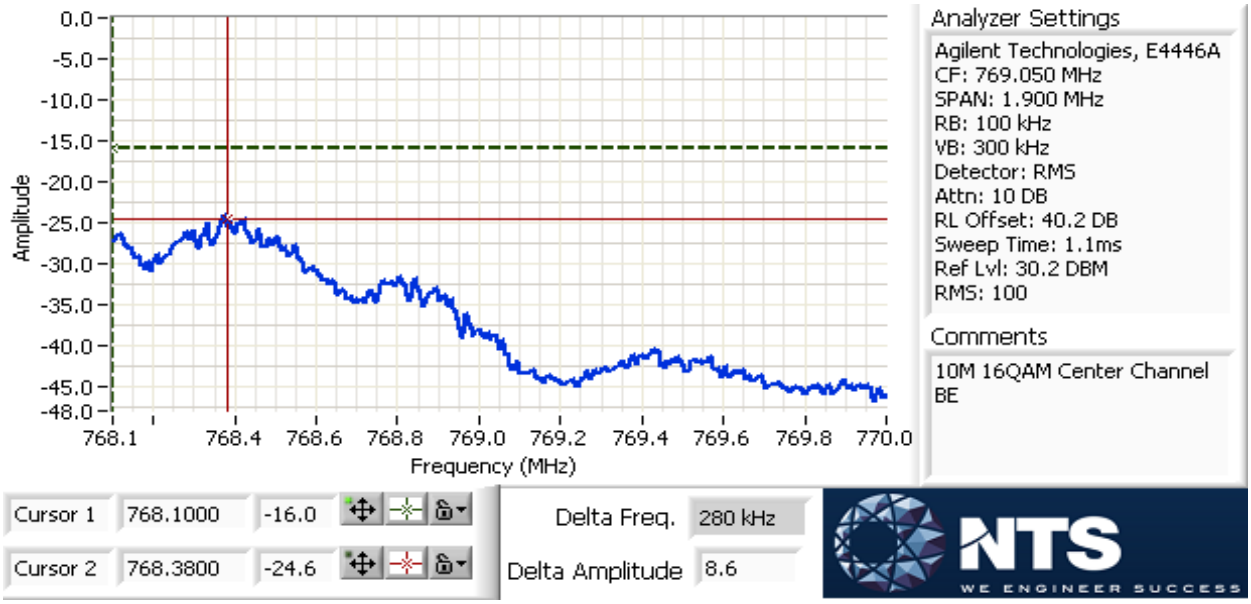


Center Channel Band edge/Block edge (10MHz)
10M 16QAM Center Channel BE 757.9-758.1MHz

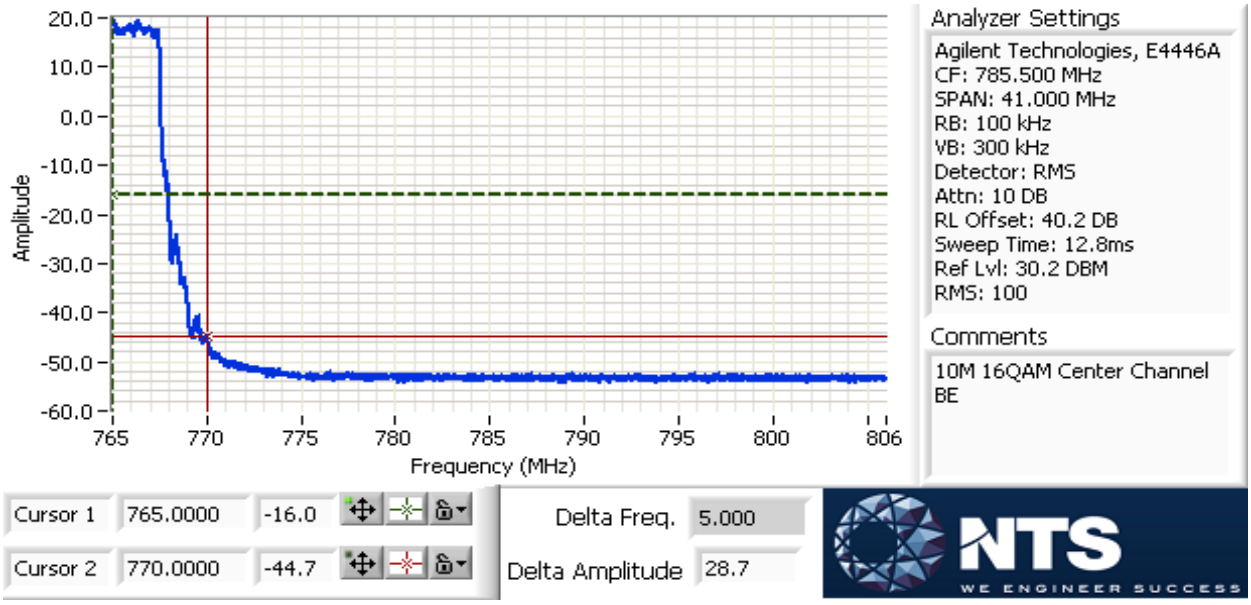


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Center Channel Band edge/Block edge (10MHz)
10M 16QAM Center Channel BE 768.1-770 MHz

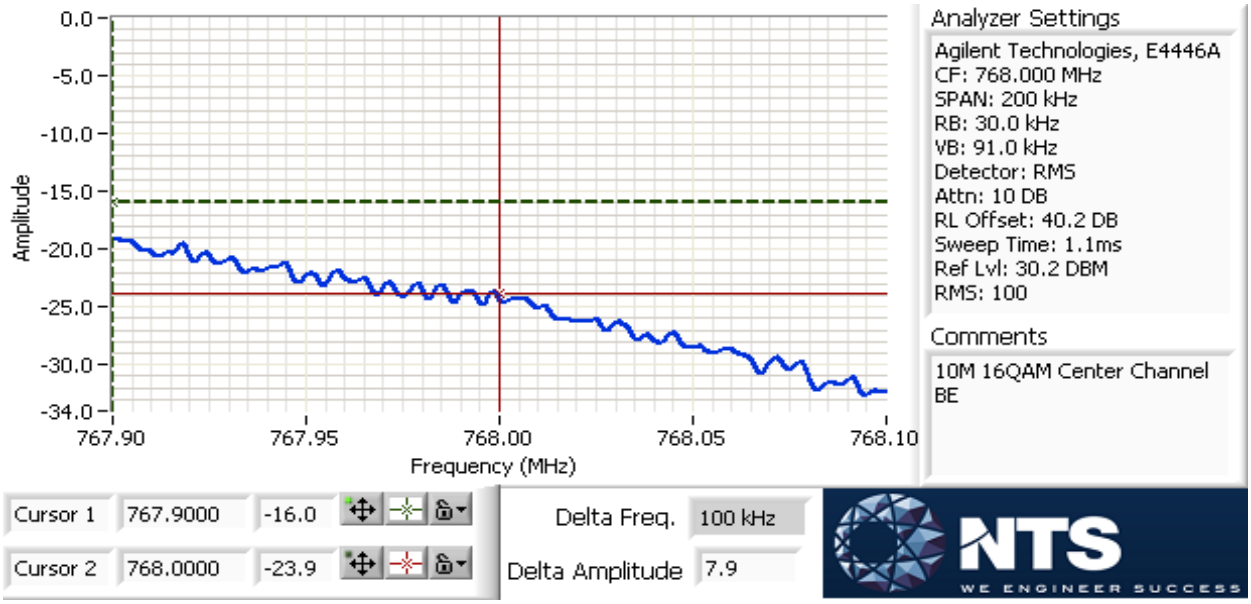


Center Channel Band edge/Block edge (10MHz)
10M 16QAM Center Channel BE 765-806 MHz

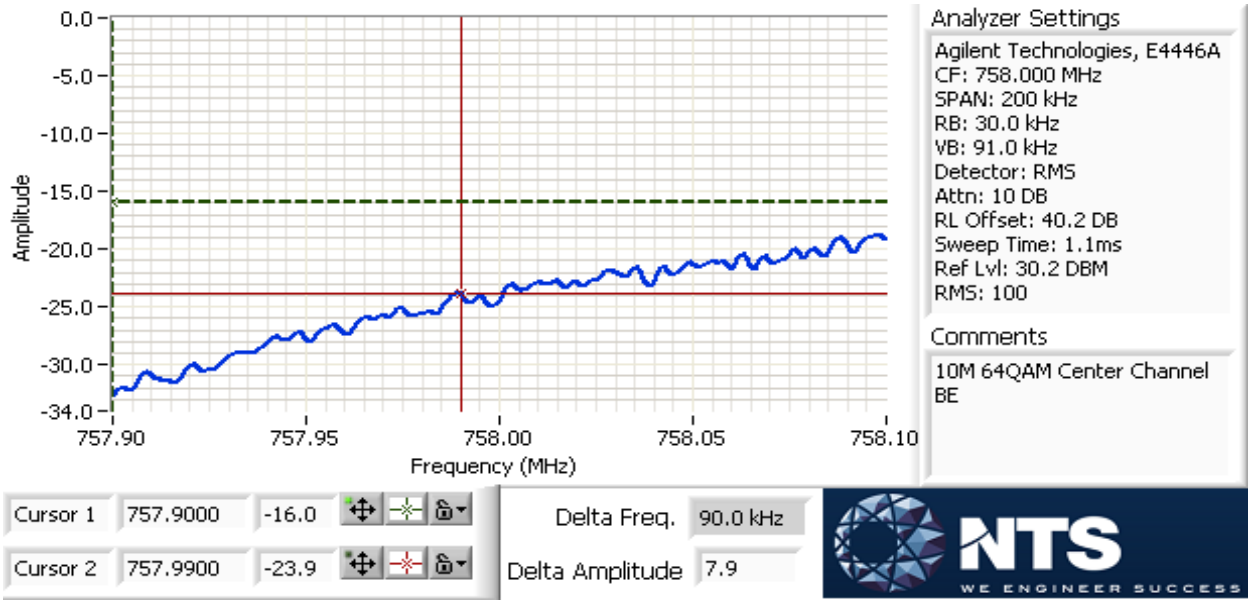


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Center Channel Band edge/Block edge (10MHz)
10M 16QAM Center Channel BE 767.9-768.1 MHz

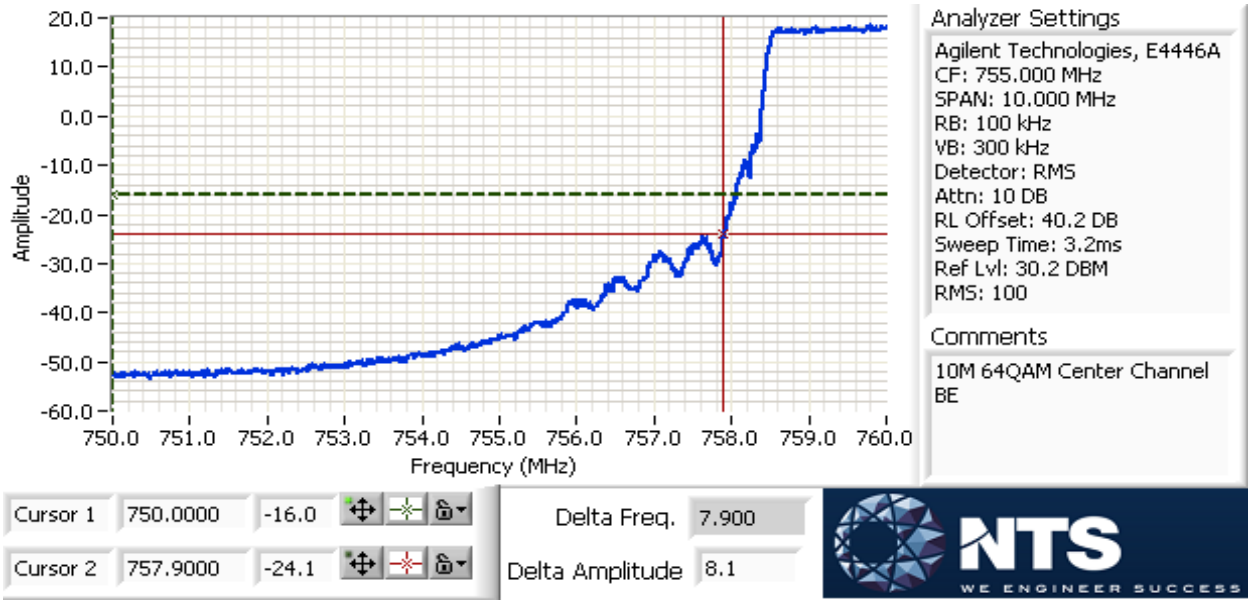


Center Channel Band edge/Block edge (10MHz)
10M 64QAM Center Channel BE 757.9-758.1MHz

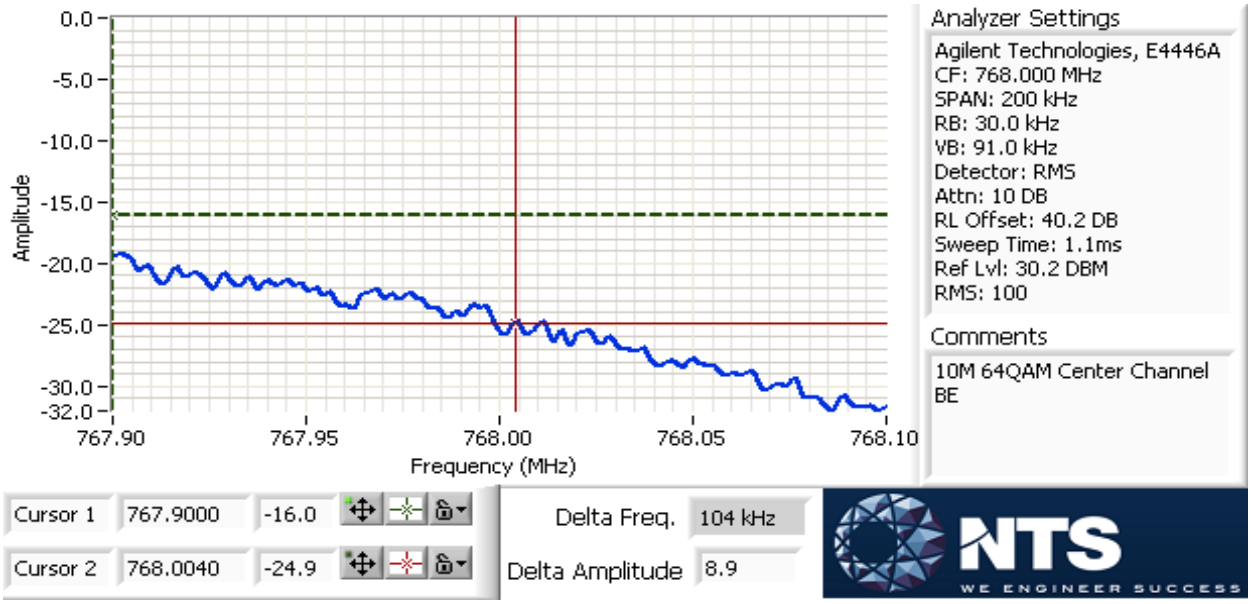


Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Center Channel Band edge/Block edge (10MHz)
10M 64QAM Center Channel BE 750-760MHz



Center Channel Band edge/Block edge (10MHz)
10M 64QAM Center Channel BE 767.9-768.1 MHz



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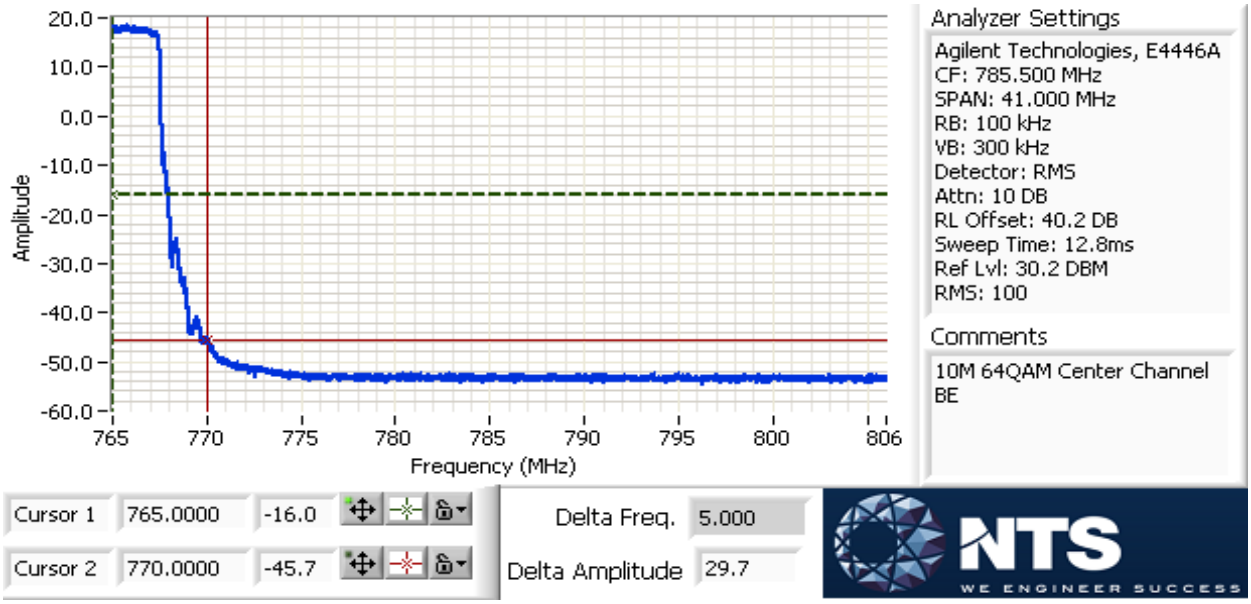
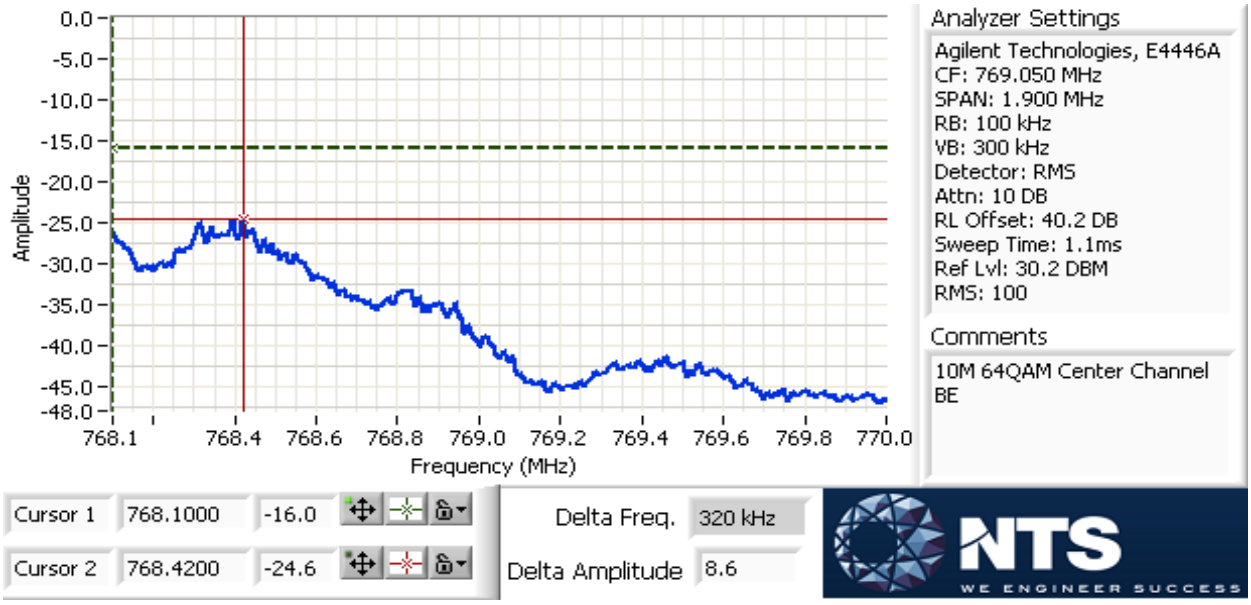
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Center Channel Band edge/Block edge (10MHz)
10M 64QAM Center Channel BE 765-806 MHz



Center Channel Band edge/Block edge (10MHz)
10M 64QAM Center Channel BE 768.1-770 MHz



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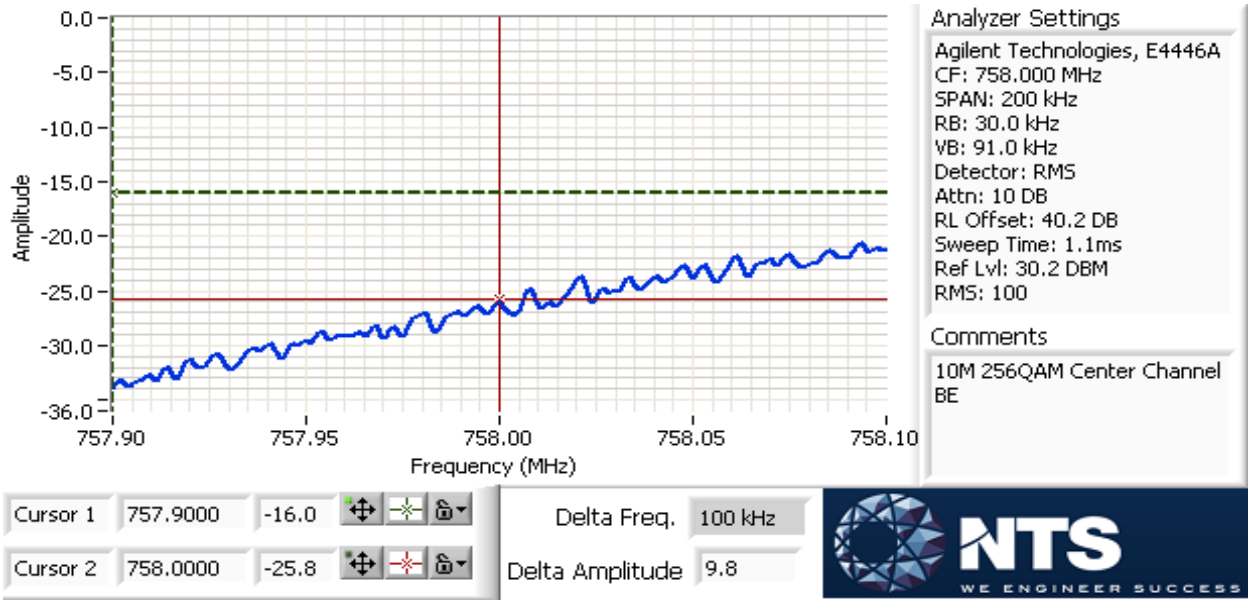
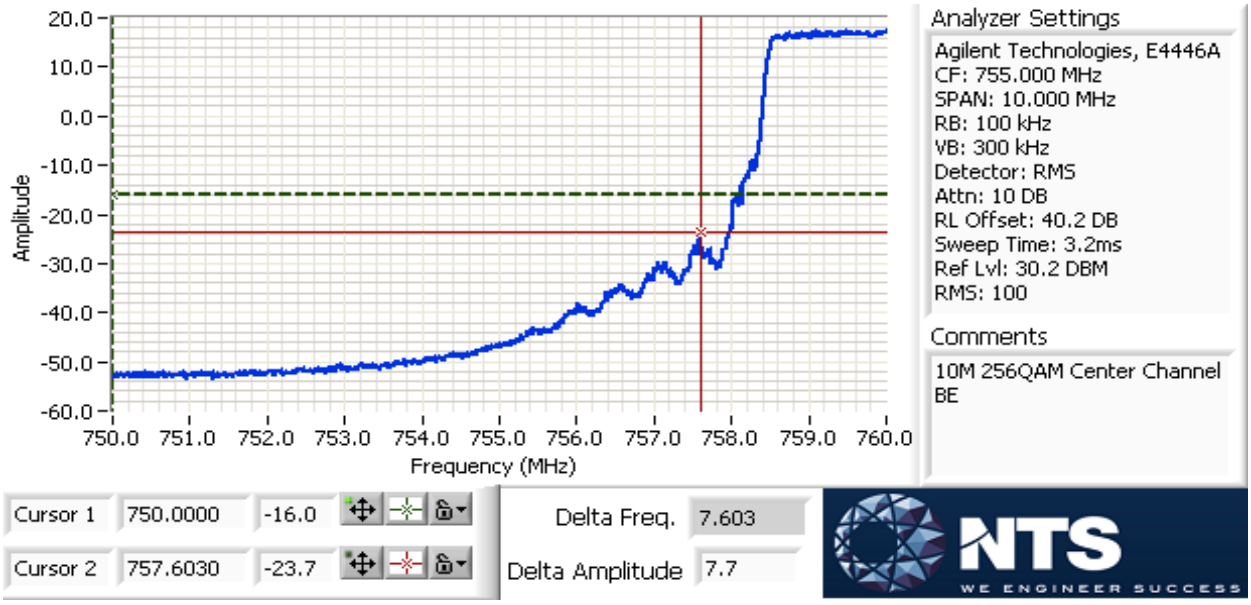
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Center Channel Band edge/Block edge (10MHz)
10M 256QAM Center Channel BE 757.9-758.1MHz



Center Channel Band edge/Block edge (10MHz)
10M 256QAM Center Channel BE 750-760MHz



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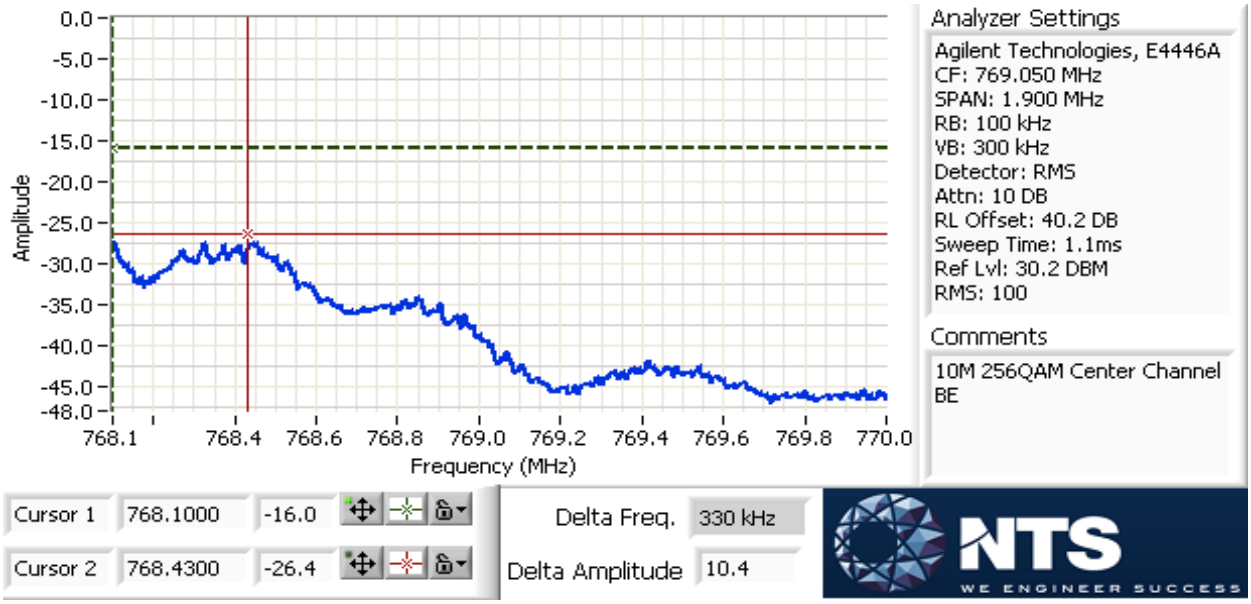
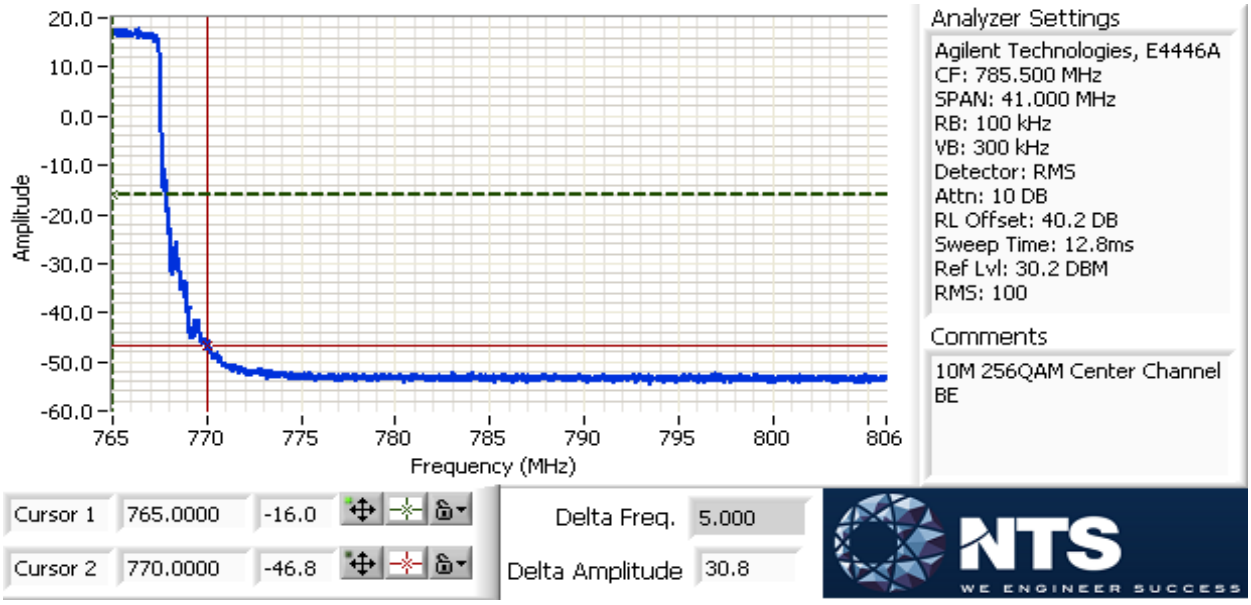
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Center Channel Band edge/Block edge (10MHz)
10M 256QAM Center Channel BE 768.1-770 MHz



Center Channel Band edge/Block edge (10MHz)
10M 256QAM Center Channel BE 765-806 MHz



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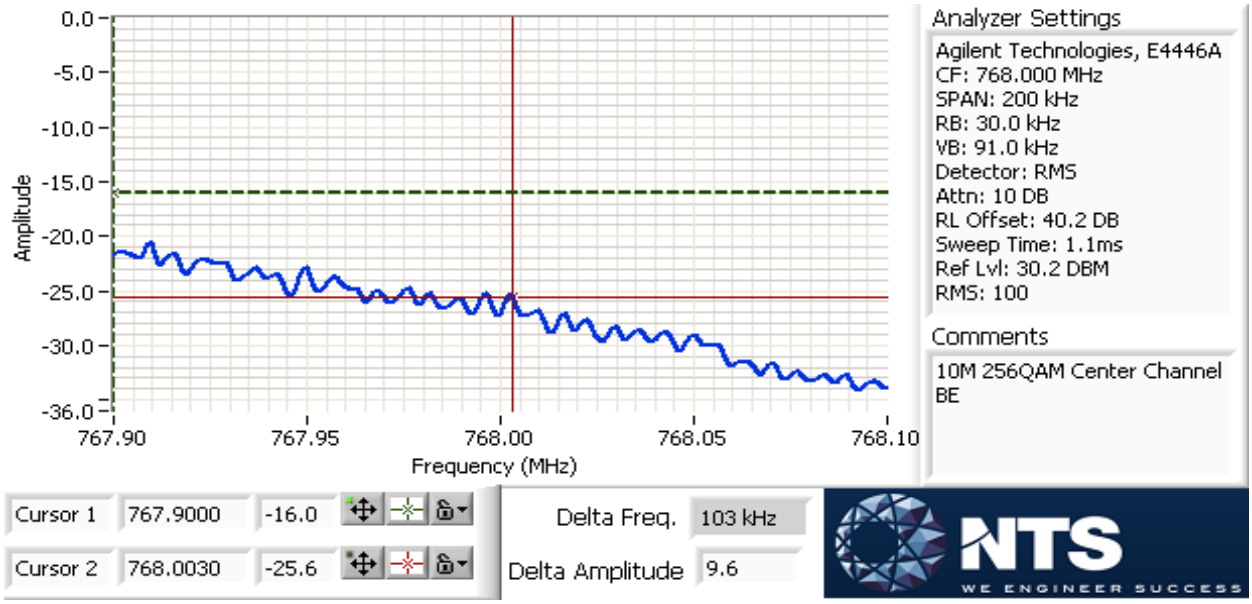
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Center Channel Band edge/Block edge (10MHz)
10M 256QAM Center Channel BE 767.9-768.1 MHz



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Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Run #3: Signal Bandwidth

Date of Test: 2/22/2018 Config. Used: 1
Test Engineer: Rafael Varelas Config Change: None
Test Location: FT Chamber #4 EUT Voltage: 120V/60Hz

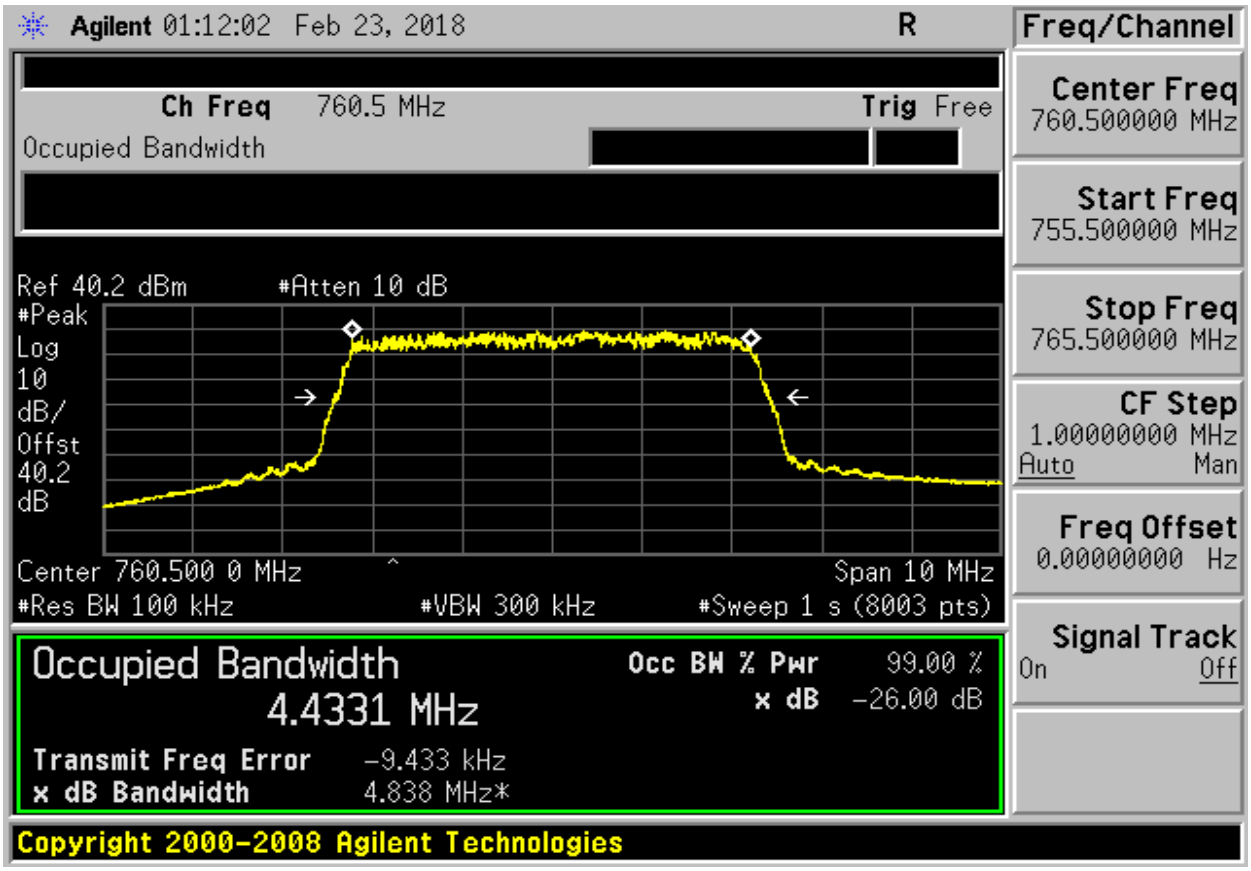
Power Setting	Frequency (MHz)	Resolution Bandwidth	Bandwidth (MHz) 26dB	99%
5MHz				
QPSK	760.5	100kHz	4.838	4.433
16QAM	760.5	100kHz	4.865	4.459
64QAM	760.5	100kHz	4.905	4.473
256QAM	760.5	100kHz	4.91	4.481
QPSK	763.0			
16QAM	763.0			
64QAM	763.0			
256QAM	763.0			
QPSK	765.5	100kHz	4.838	4.432
16QAM	765.5	100kHz	4.863	4.455
64QAM	765.5	100kHz	4.902	4.475
256QAM	765.5	100kHz	4.888	4.478
10MHz				
QPSK	763.0	200kHz	9.715	8.903
16QAM	763.0	200kHz	9.753	8.917
64QAM	763.0	200kHz	9.808	8.940
256QAM	763.0	200kHz	9.815	8.913

Note 1:	99% bandwidth measured in accordance with ANSI C63.10, with RB between 1% and 5% of the measured bandwidth and VB ≥ 3*RB and Span ≥ 1.5% and ≤ 5% of measured bandwidth.

Low Channel Signal Bandwidth (5MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

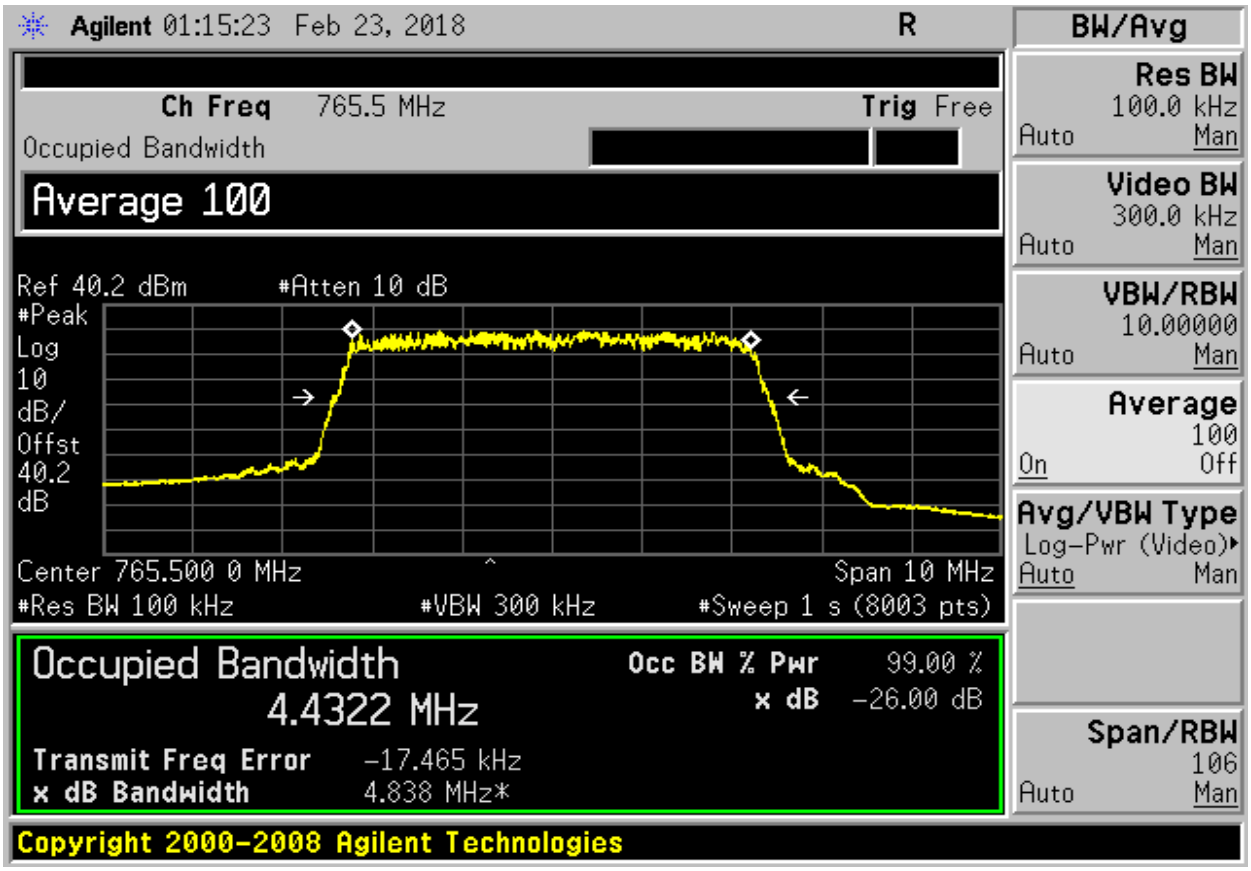
1car_QPSK_5MHz_Low_chnl_port1_OBW



High Channel Signal Bandwidth (5MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

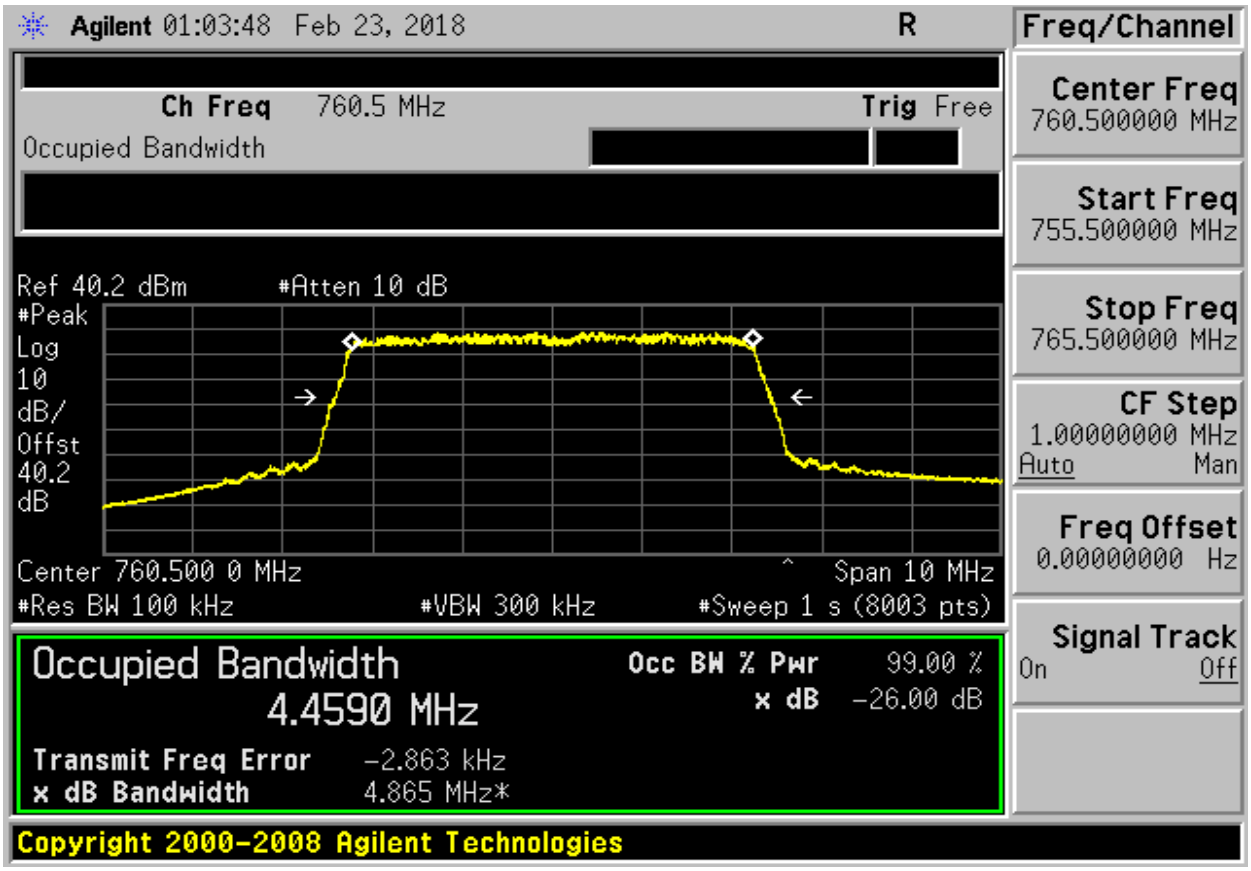
1car_QPSK_5MHz_Low_chnl_port1_OBW



Low Channel Signal Bandwidth (5MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

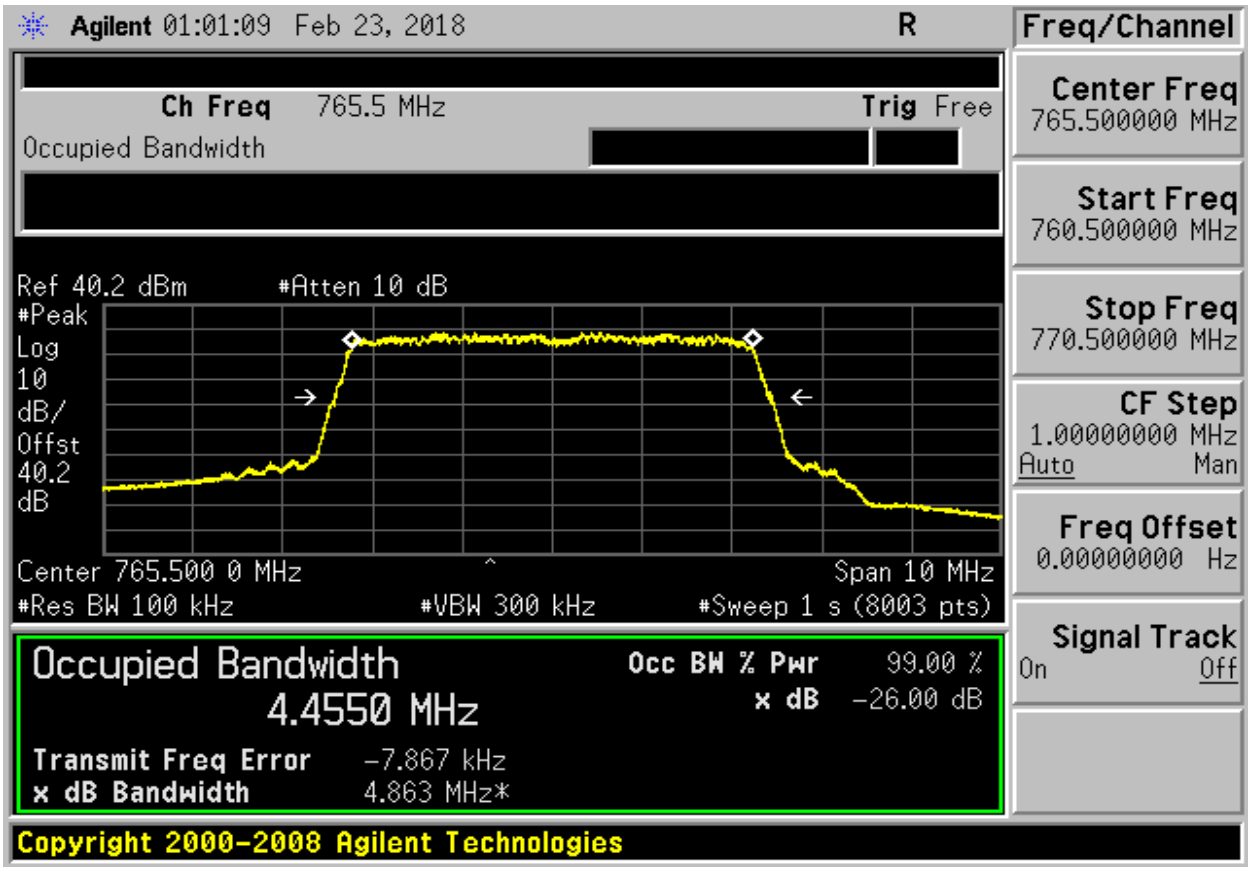
1car_16QAM_5MHz_Low_chnl_port1_OBW



High Channel Signal Bandwidth (5MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

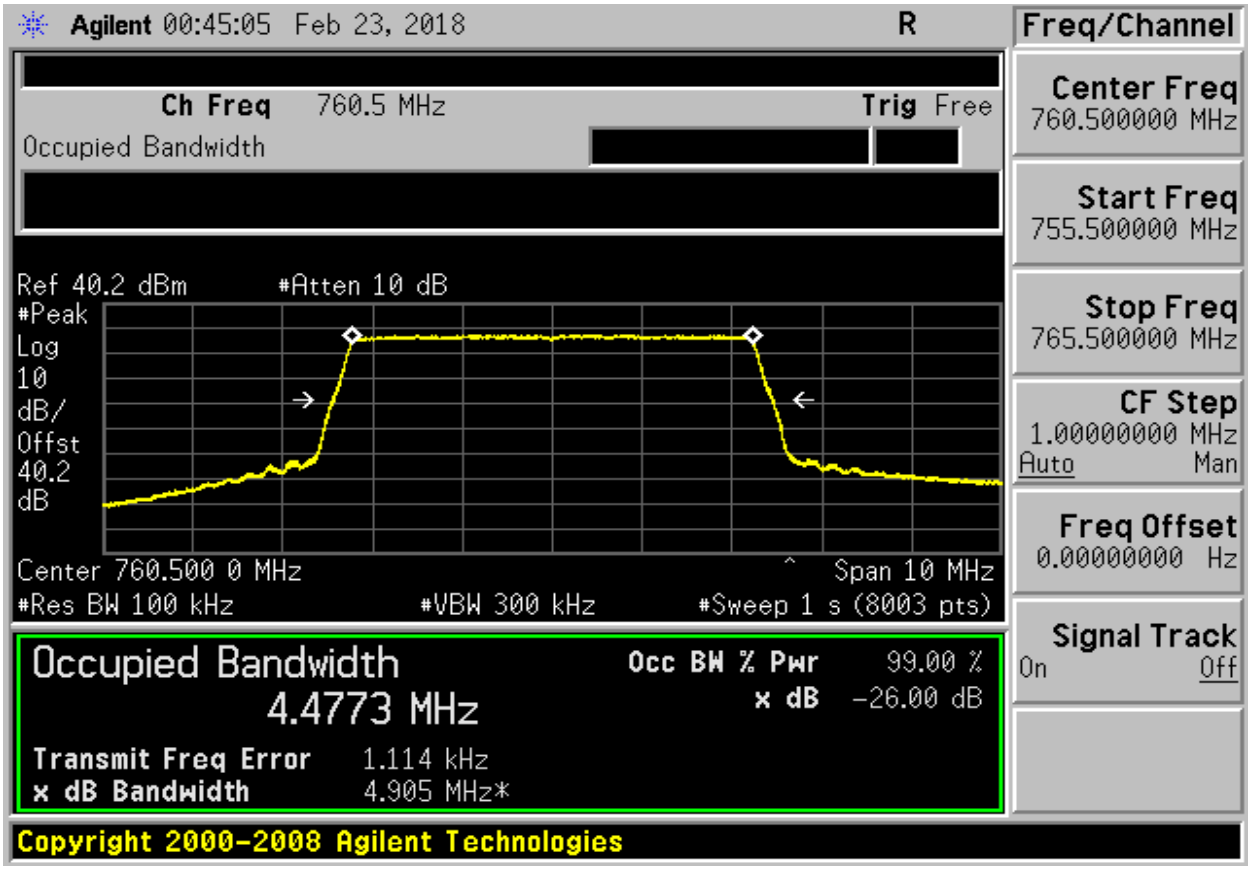
1car_16QAM_5MHz_High_chnl_port1_OBW



Low Channel Signal Bandwidth (5MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

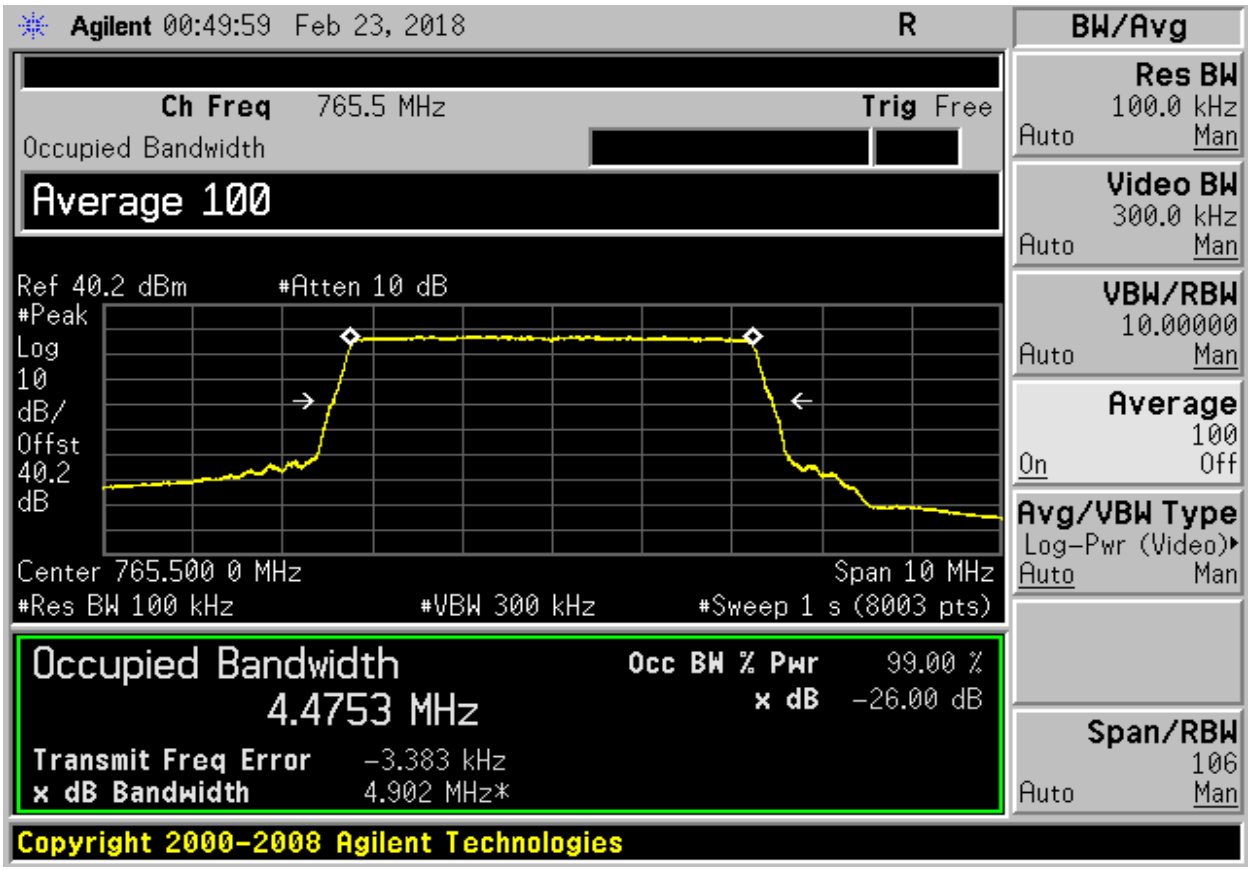
1car_64QAM_5MHz_Low_chnl_port1_OBW



High Channel Signal Bandwidth (5MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

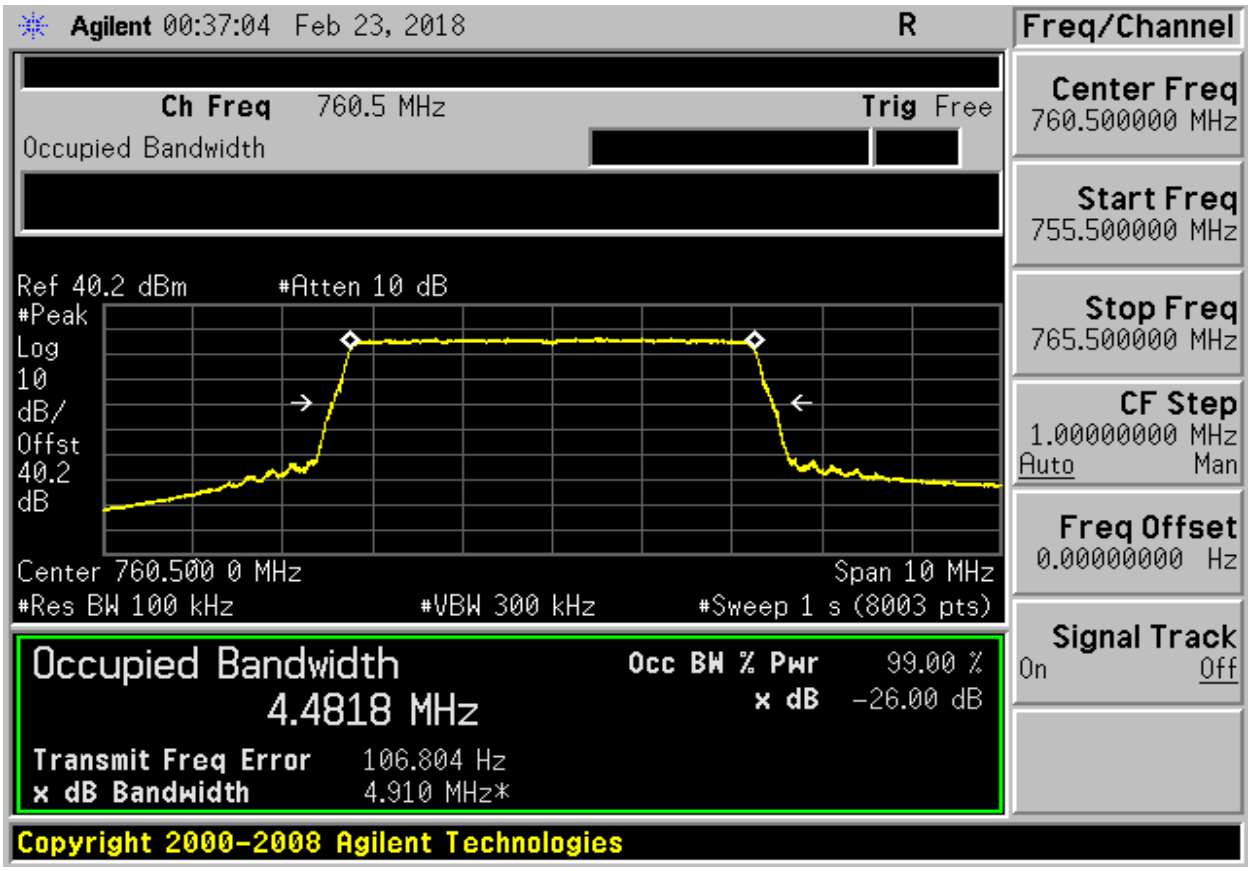
1car_64QAM_5MHz_High_chnl_port1_OBW



Low Channel Signal Bandwidth (5MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

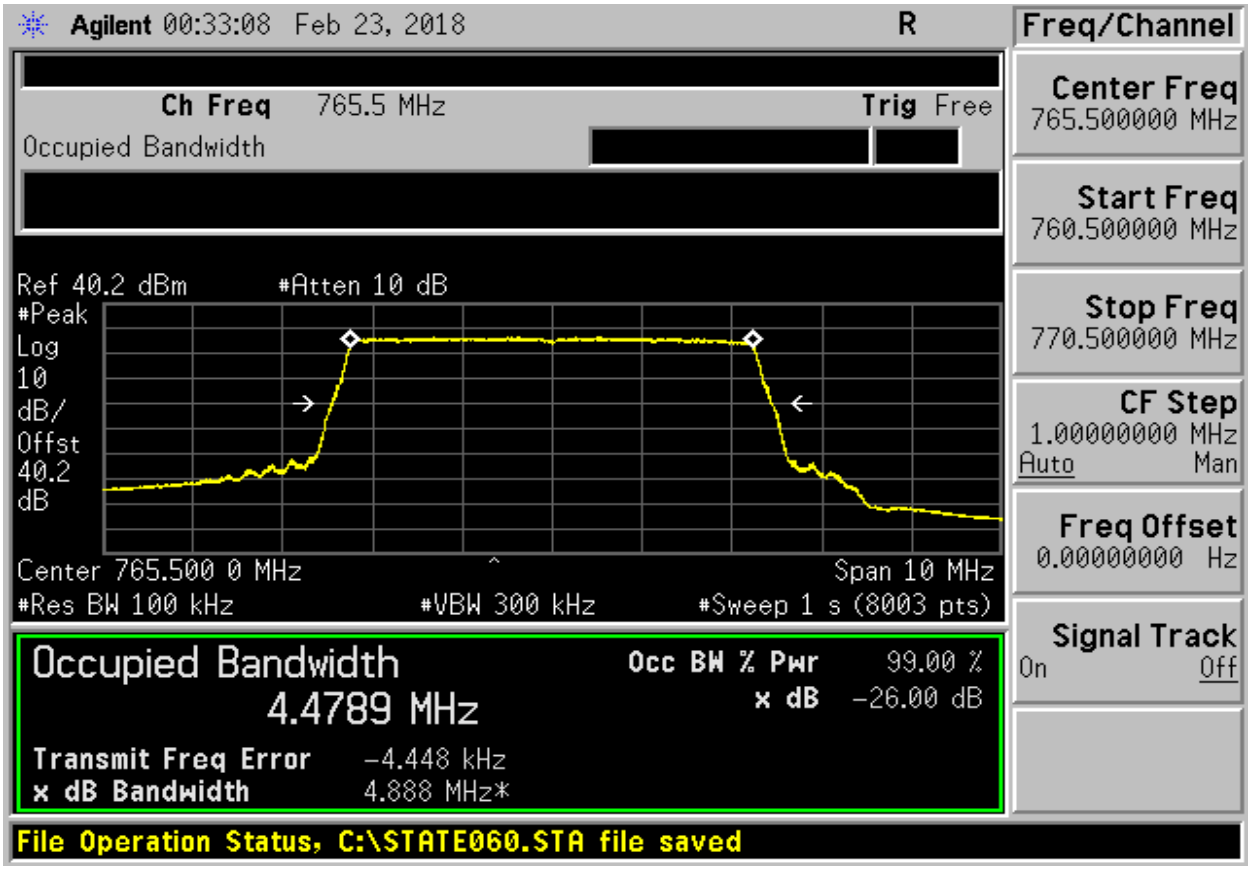
1car_256QAM_5MHz_Low_chnl_port1_OBW



High Channel Signal Bandwidth (5MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

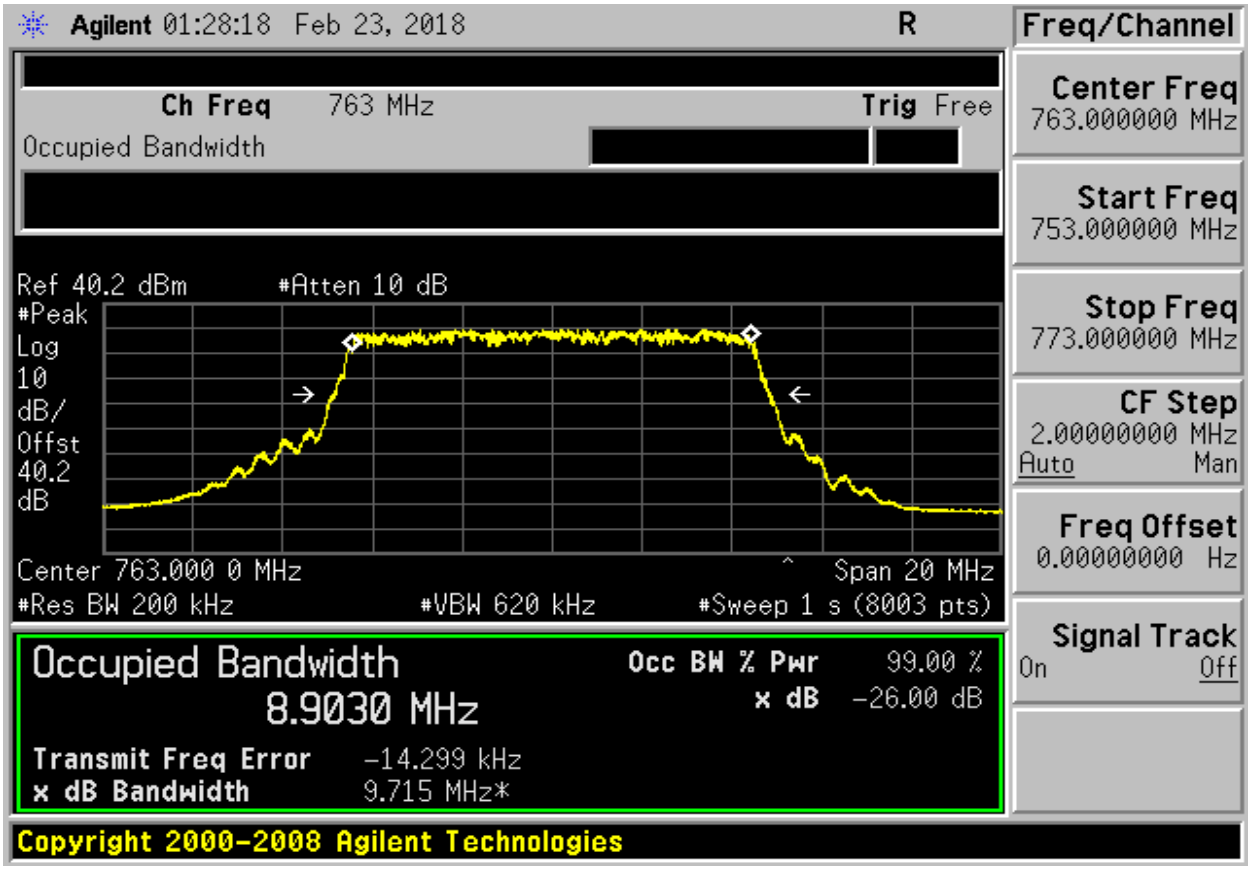
1car_256QAM_5MHz_High_chnl_port1_OBW



Center Channel Signal Bandwidth (10MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

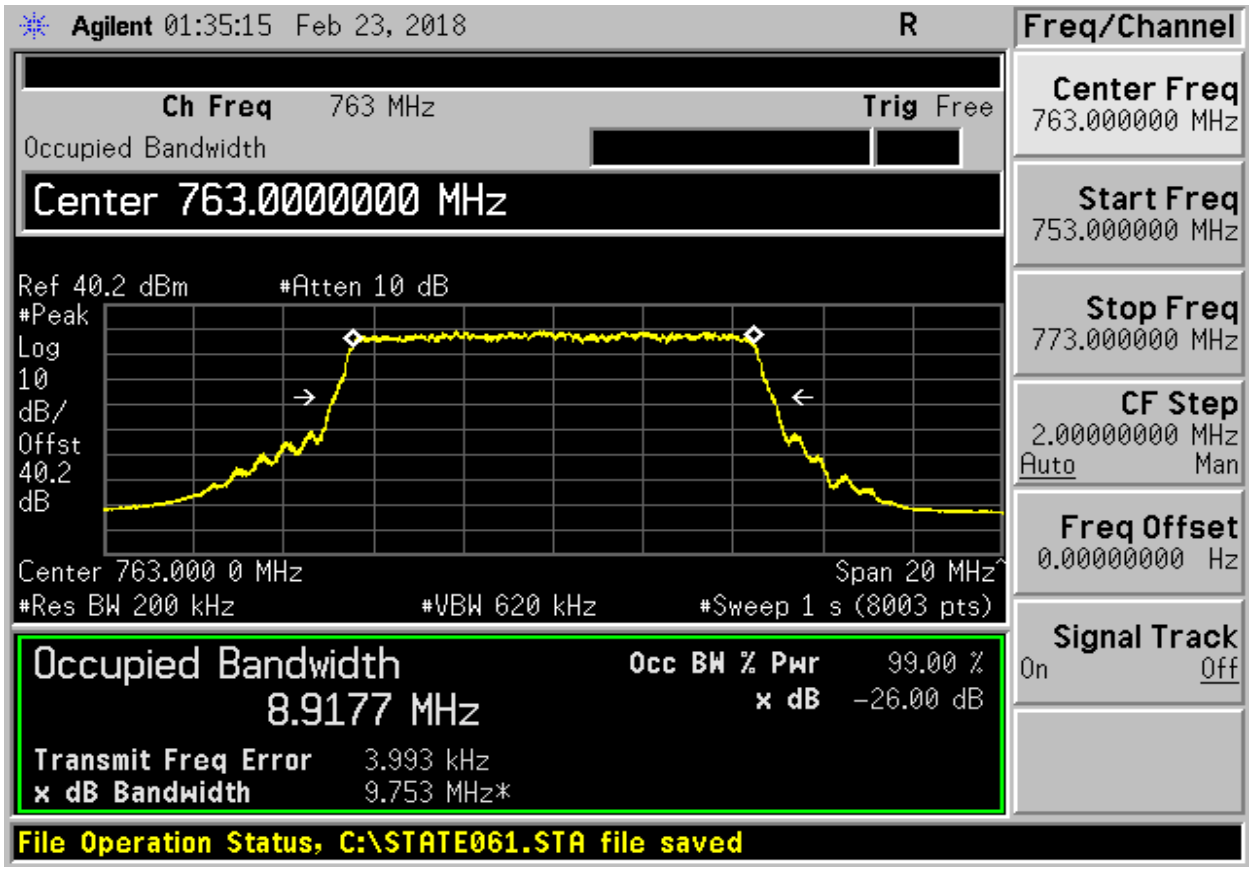
1car_QPSK_10MHz_Mid_chnl_port1_OBW



Center Channel Signal Bandwidth (10MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

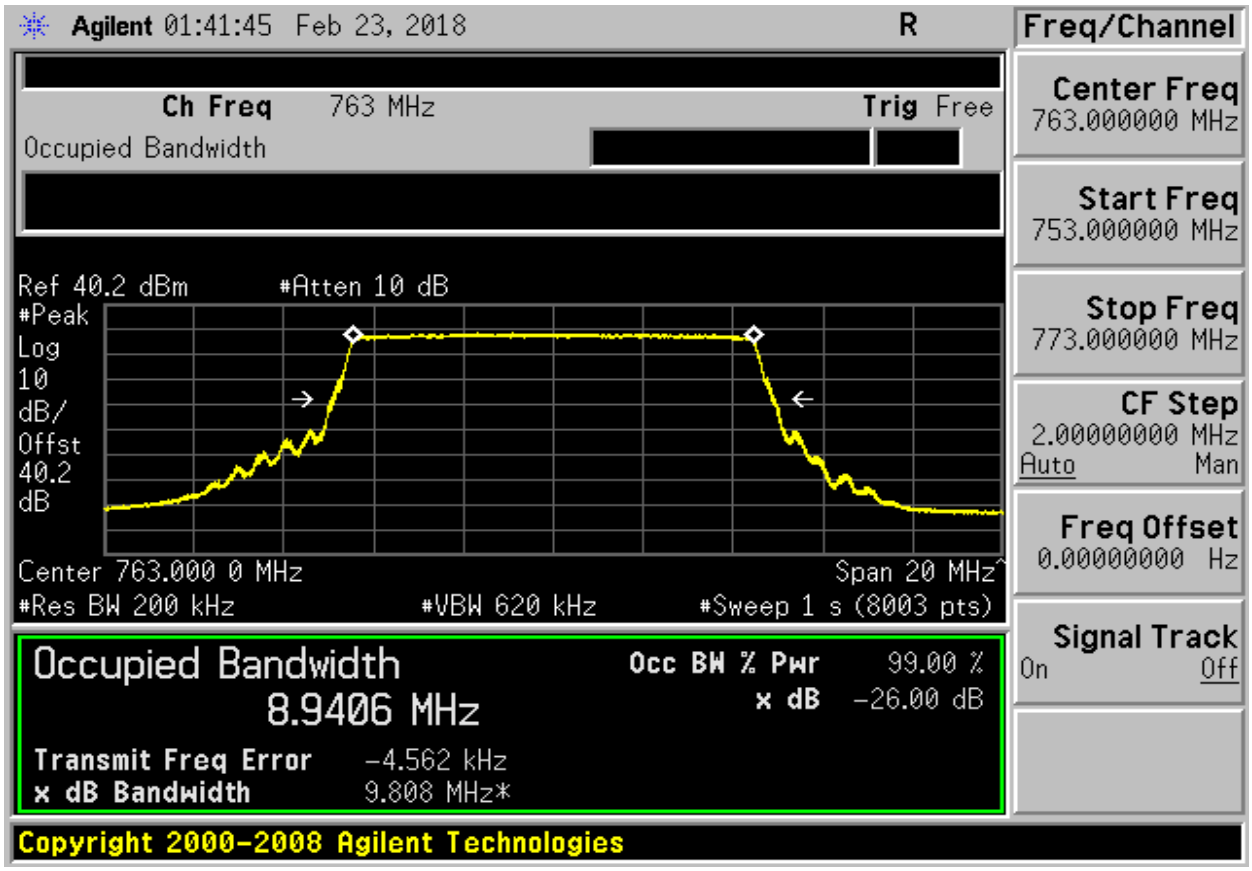
1car_16QAM_10MHz_Mid_chnl_port1_OBW



Center Channel Signal Bandwidth (10MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

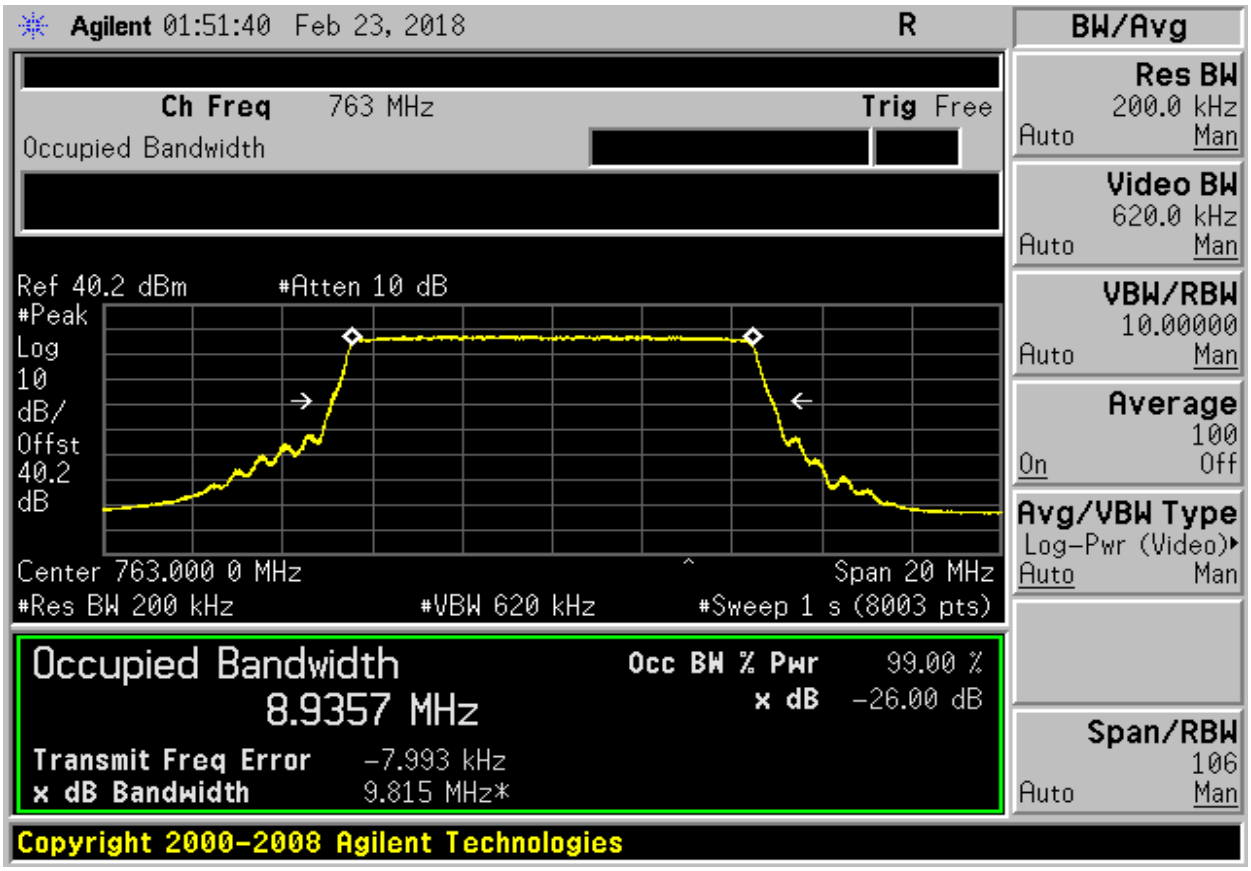
1car_64QAM_10MHz_Mid_chnl_port1_OBW



Center Channel Signal Bandwidth (10MHz)

Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

1car_256QAM_10MHz_Mid_chnl_port1_OBW



Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Run #4: Out of Band Spurious Emissions, Conducted

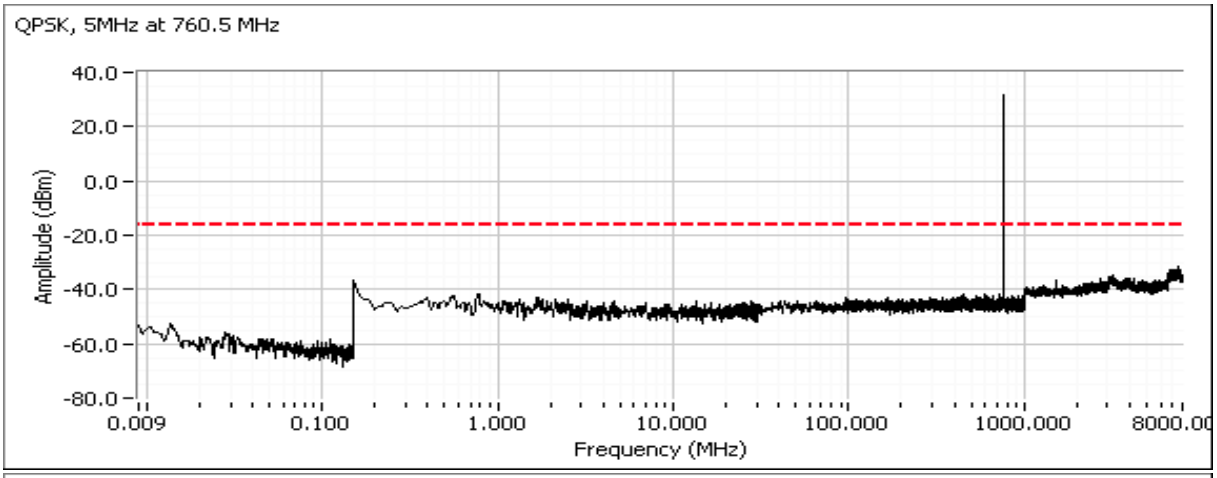
Date of Test: 02/22/18 Config. Used: 1

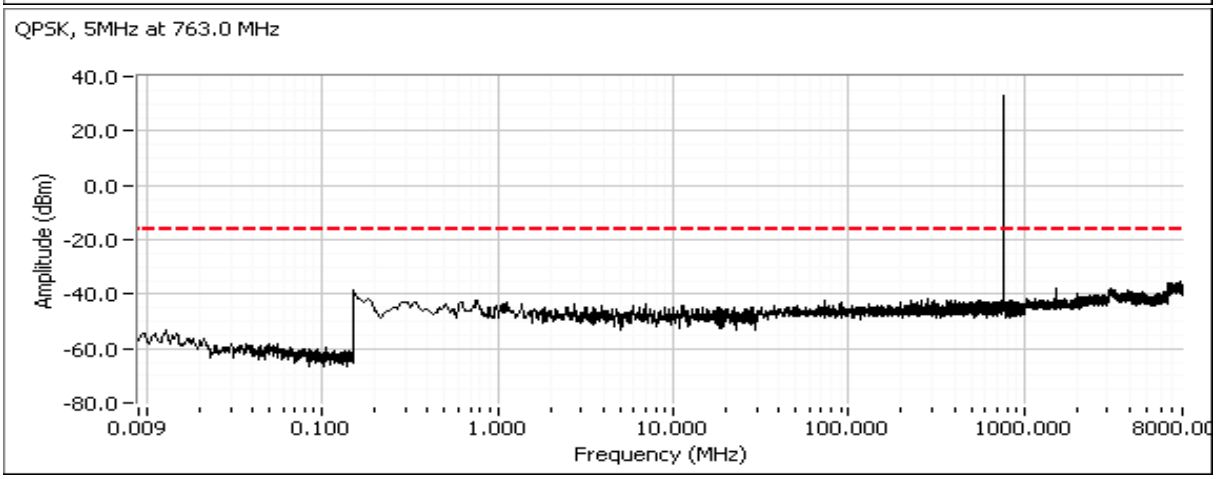
Test Engineer: Mehran Birgani Config Change: -

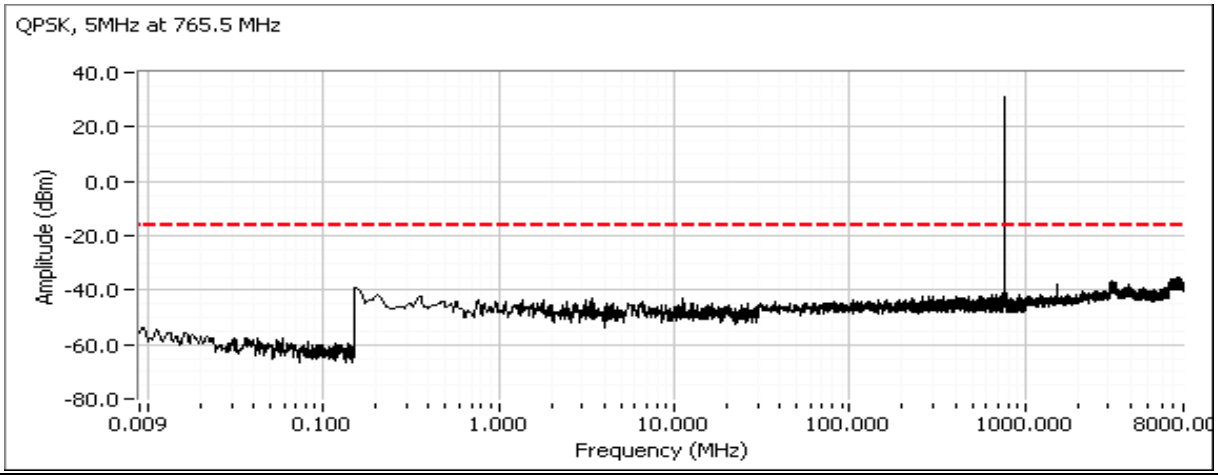
Test Location: Lab 4A EUT Voltage: 120V/ 60Hz

Frequency (MHz)	Modulation/ BW	Limit	Result
760.5	QPSK/ 5MHz	-16	Pass
763.0	QPSK/ 5MHz	-16	Pass
765.3	QPSK/ 5MHz	-16	Pass
760.5	16QAM/ 5MHz	-16	Pass
763.0	16QAM/ 5MHz	-16	Pass
765.3	16QAM/ 5MHz	-16	Pass
760.5	64QAM/ 5MHz	-16	Pass
763.0	64QAM/ 5MHz	-16	Pass
765.3	64QAM/ 5MHz	-16	Pass
760.5	256QAM/ 5MHz	-16	Pass
763.0	256QAM/ 5MHz	-16	Pass
765.3	256QAM/ 5MHz	-16	Pass
760.5	QPSK/ 10MHz	-16	Pass
763.0	QPSK/ 10MHz	-16	Pass
765.3	QPSK/ 10MHz	-16	Pass
760.5	16QAM/ 10MHz	-16	Pass
763.0	16QAM/ 10MHz	-16	Pass
765.3	16QAM/ 10MHz	-16	Pass
760.5	64QAM/ 10MHz	-16	Pass
763.0	64QAM/ 10MHz	-16	Pass
765.3	64QAM/ 10MHz	-16	Pass
760.5	256QAM/ 10MHz	-16	Pass
763.0	256QAM/ 10MHz	-16	Pass
765.3	256QAM/ 10MHz	-16	Pass

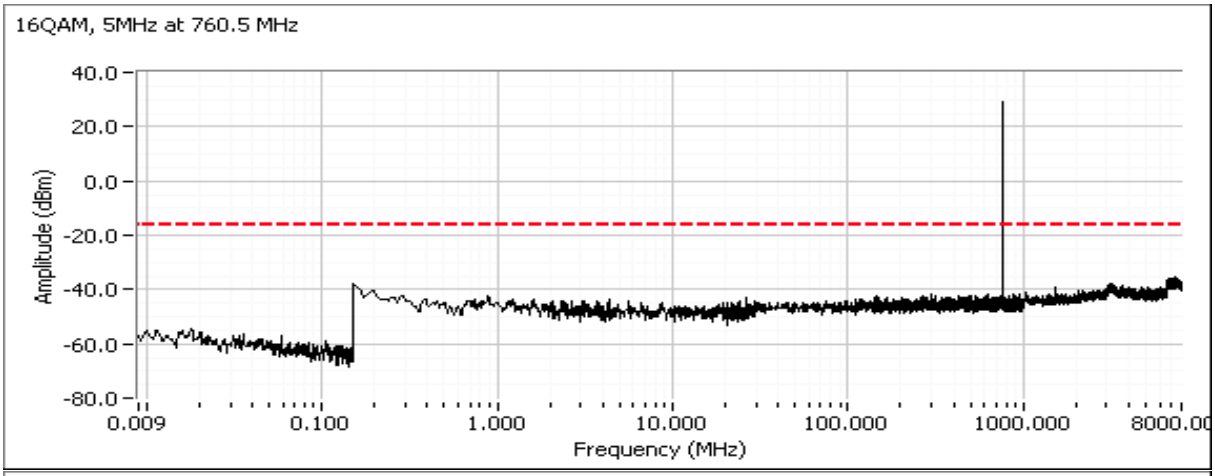
Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

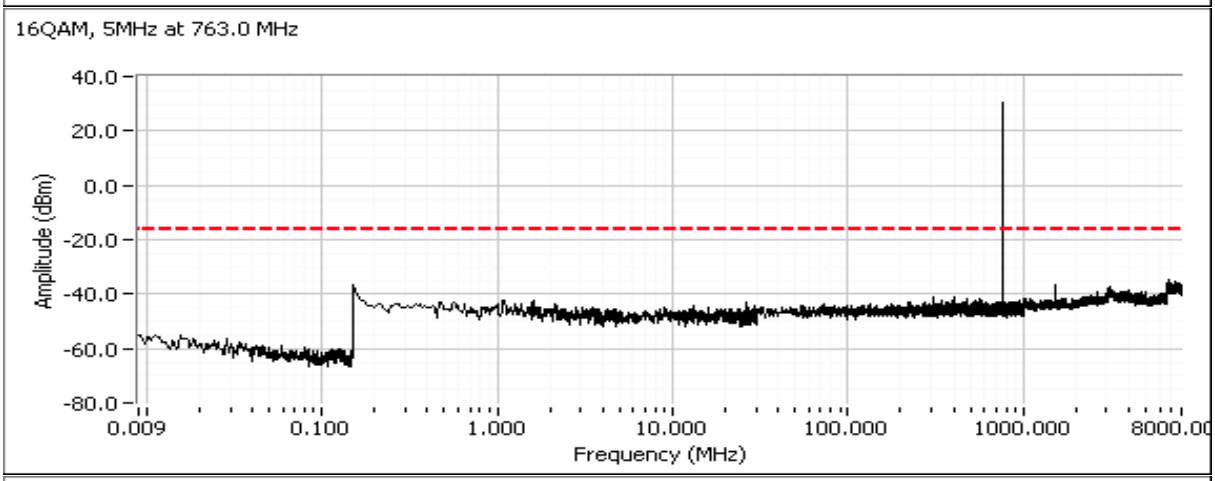


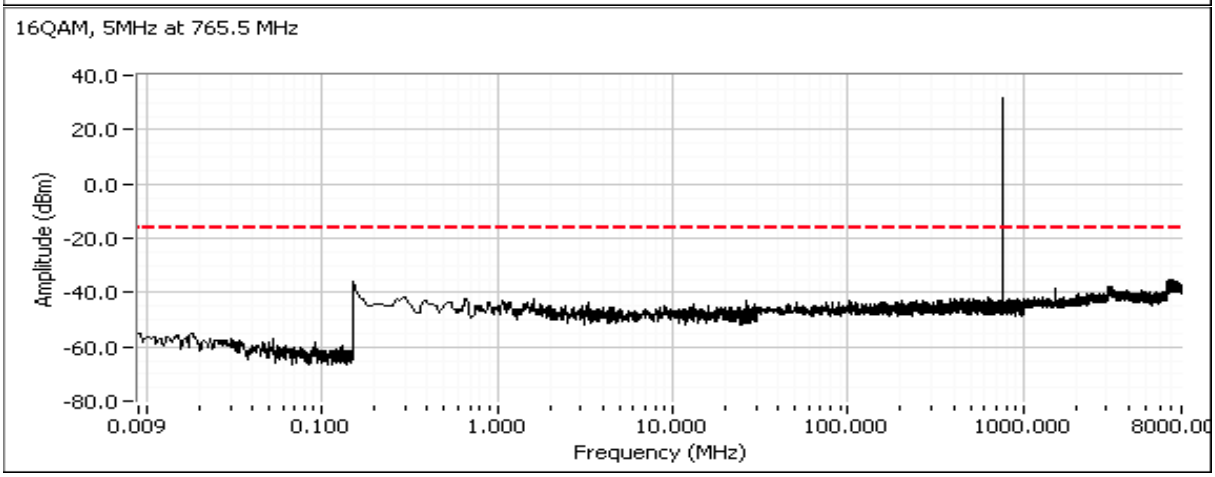




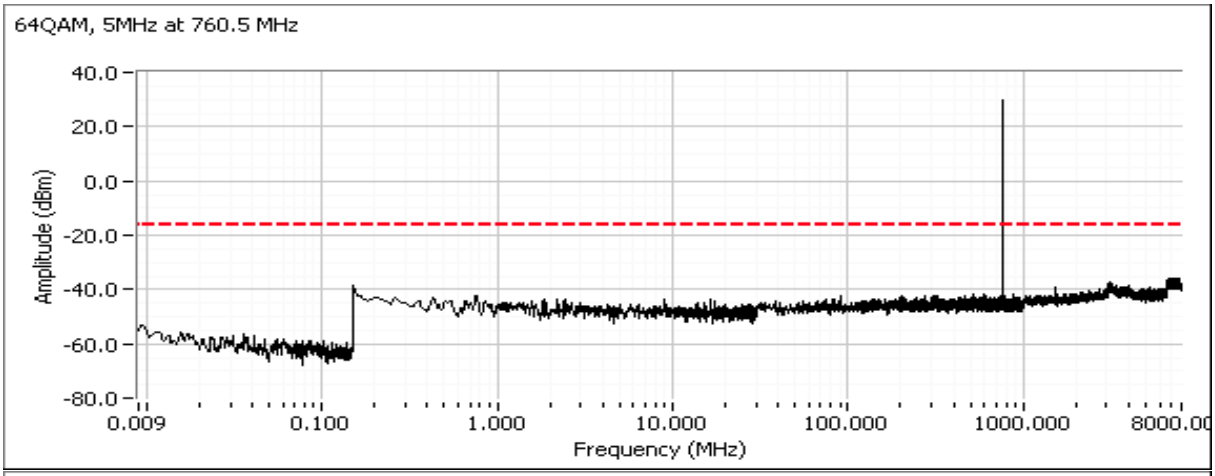
Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

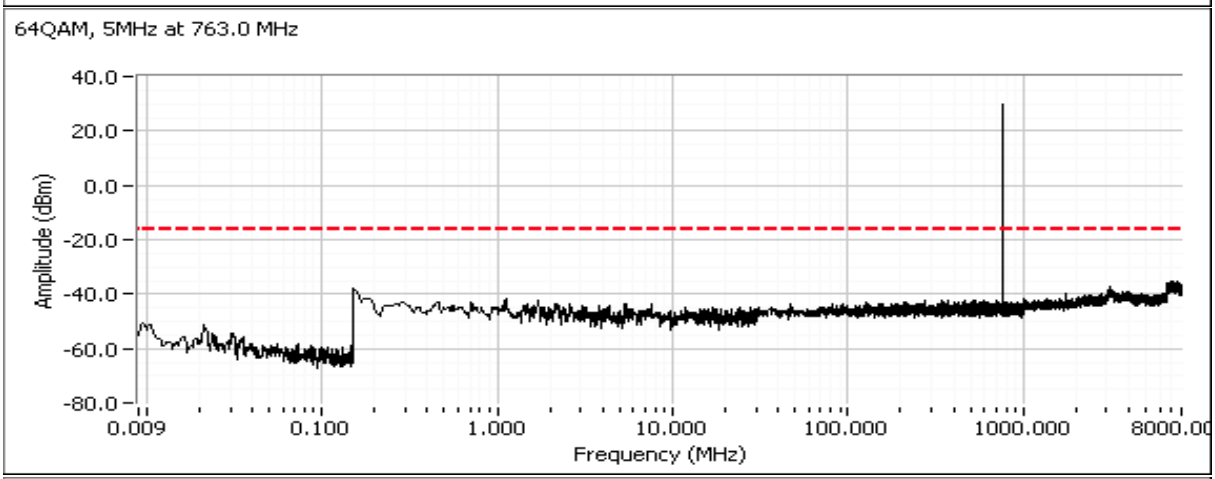


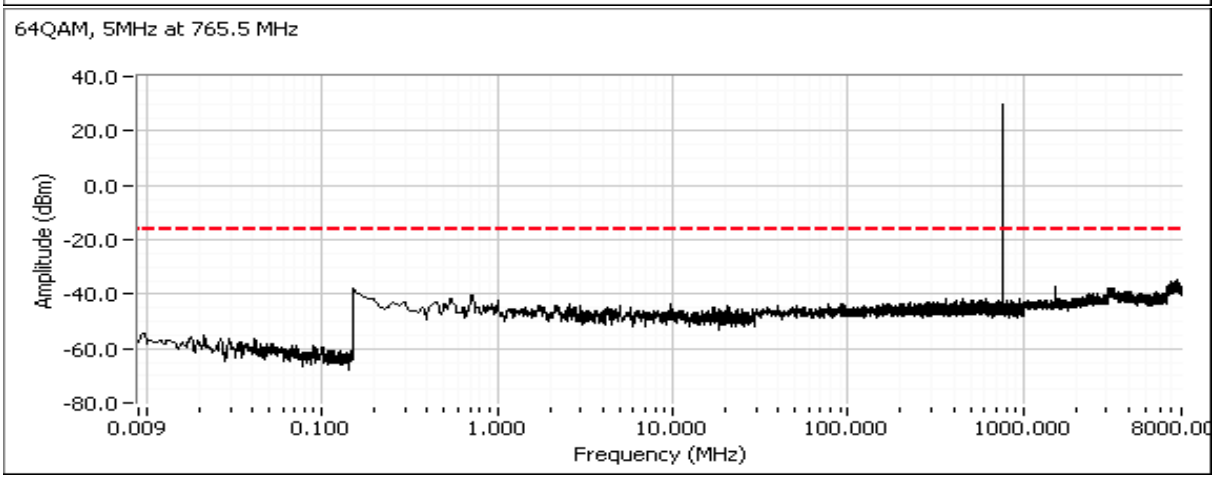




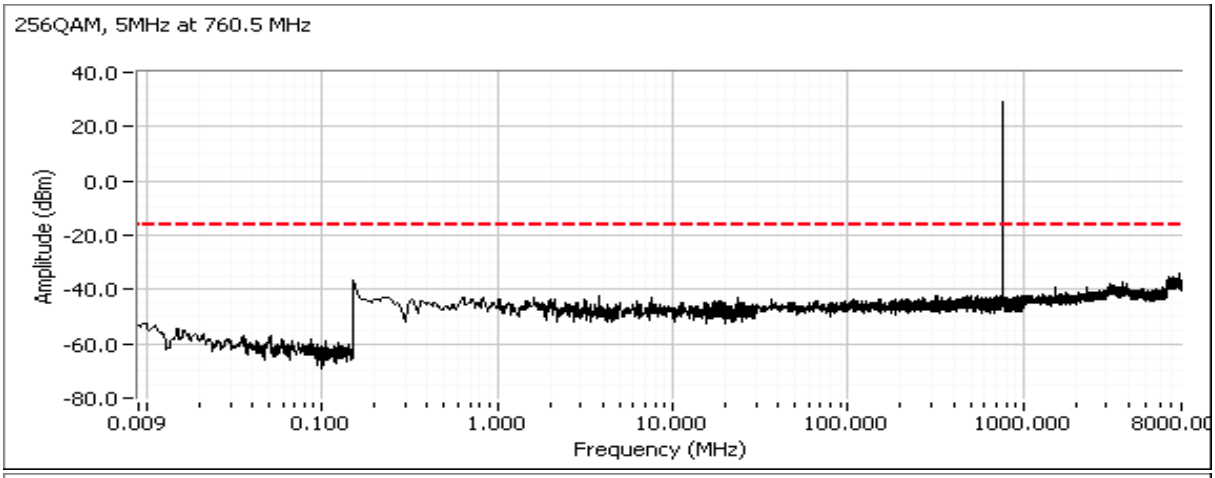
Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

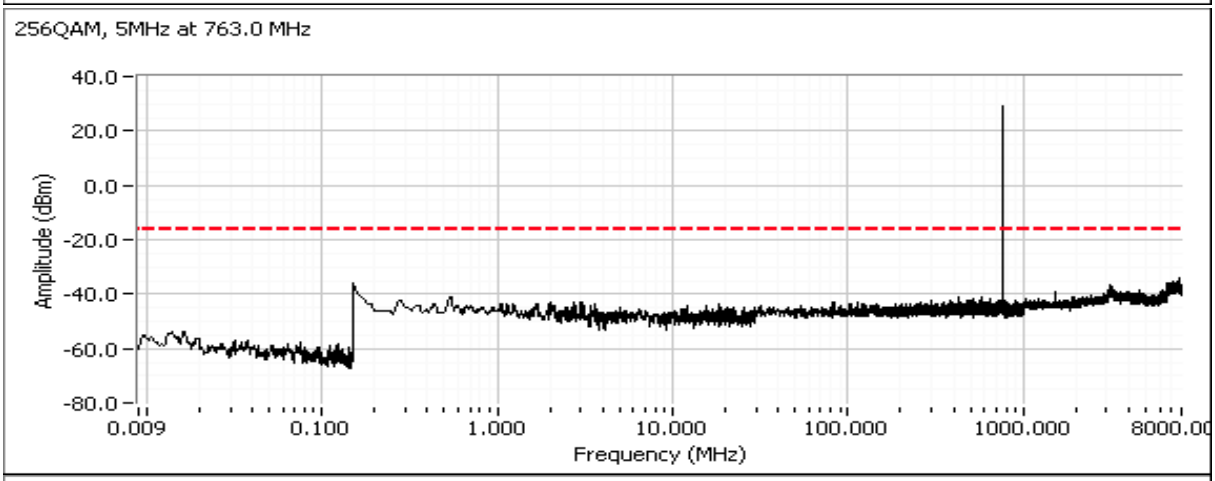


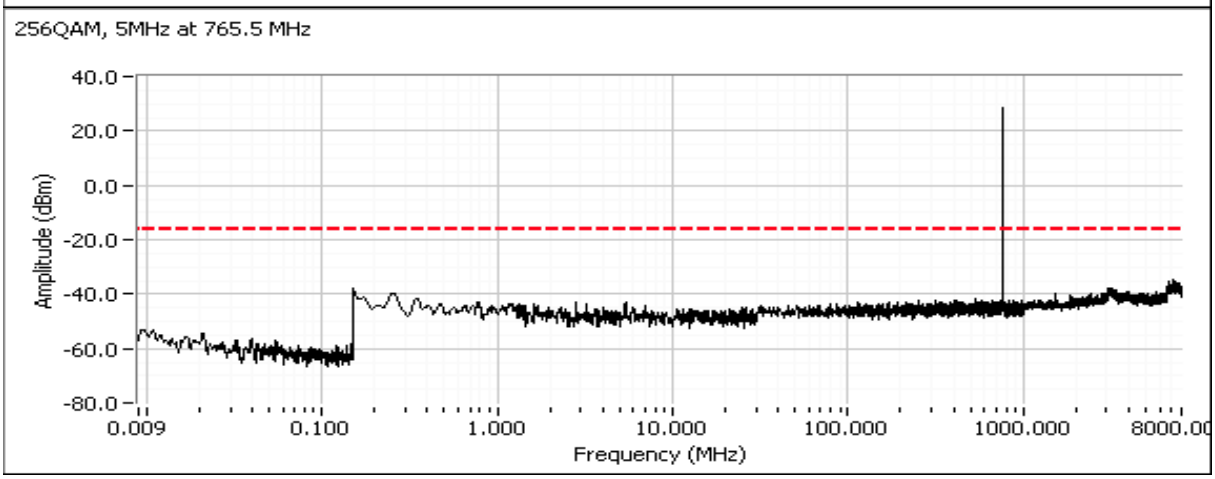




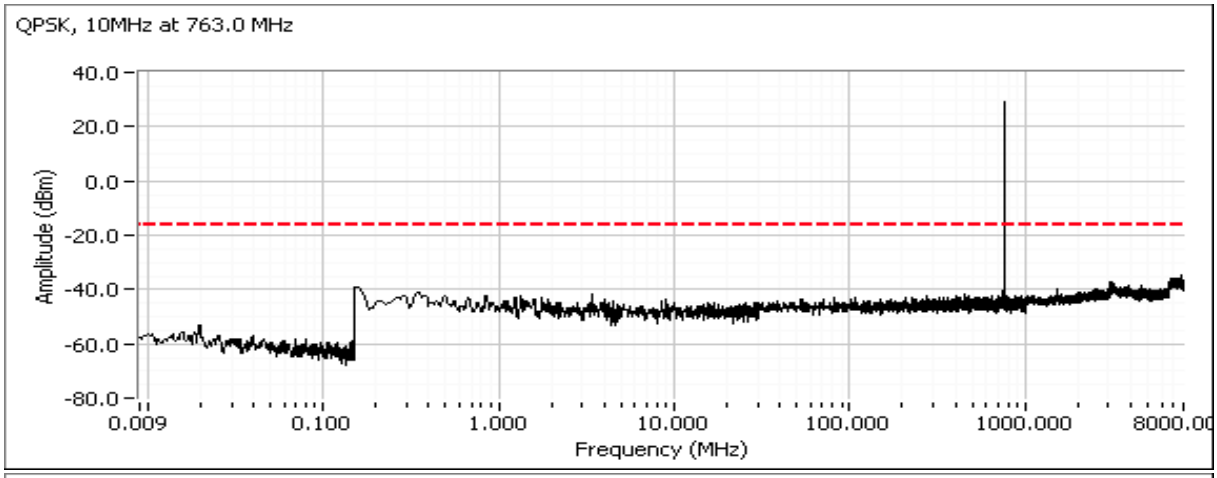
Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

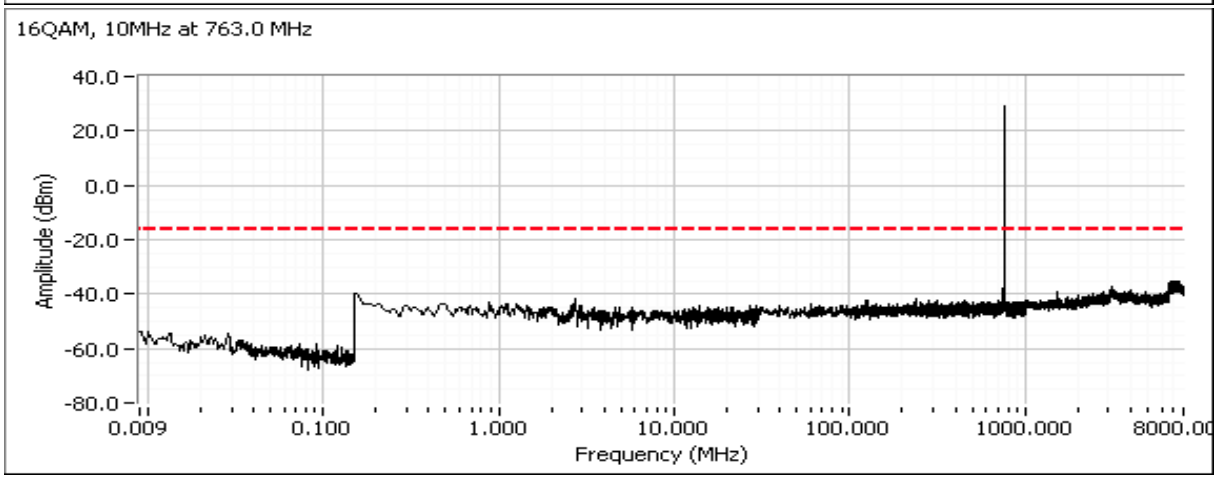




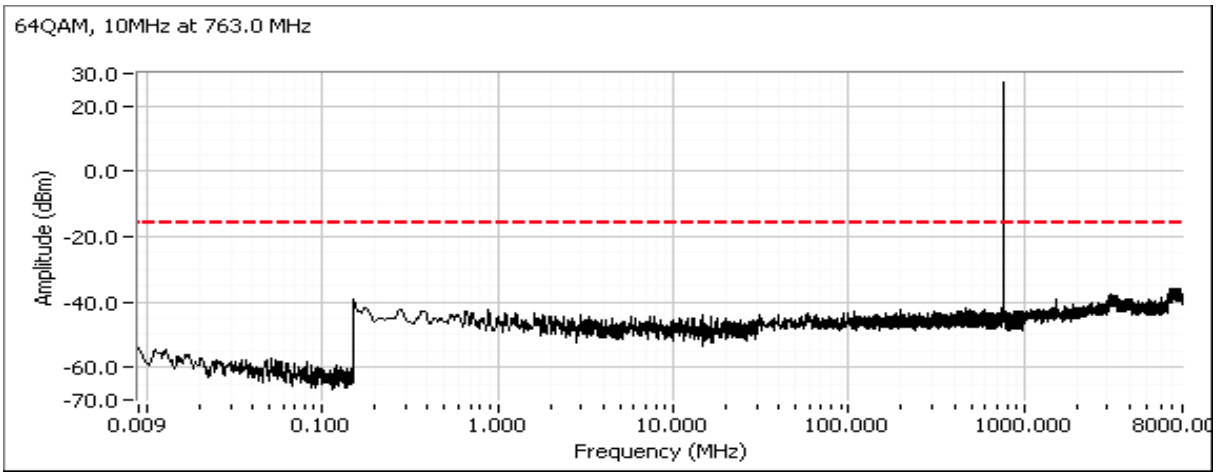


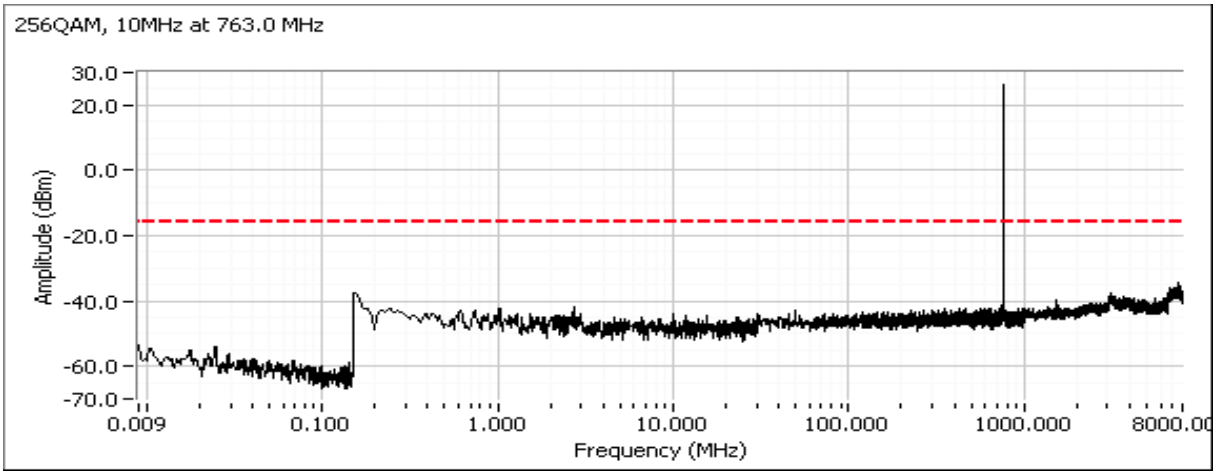
Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A





Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A





Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

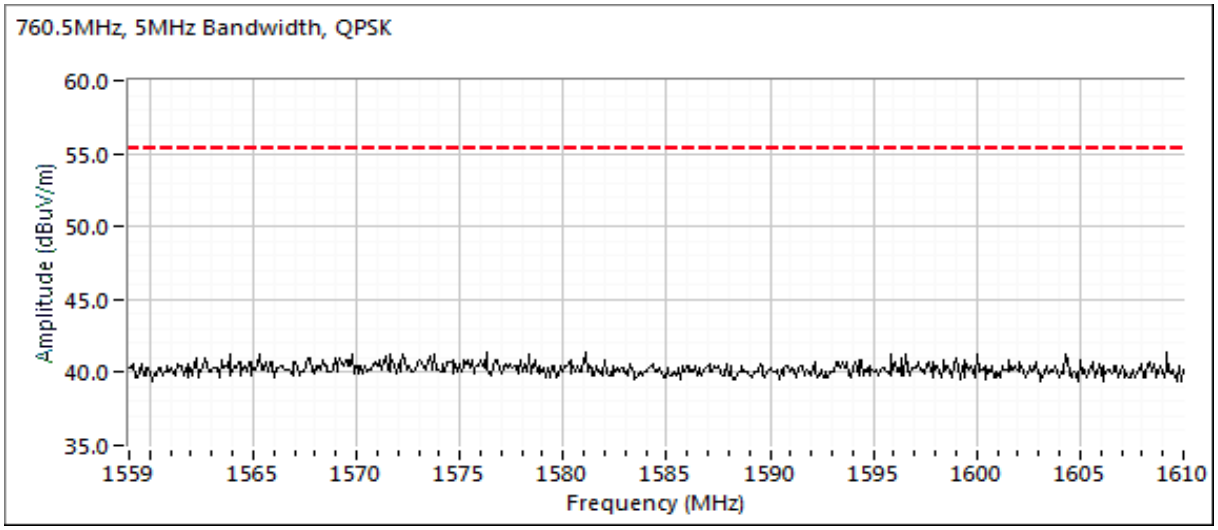
Run #5: Emissions in band 1559-1610, Radiated

Date of Test: 03/09/18 Config. Used: 1

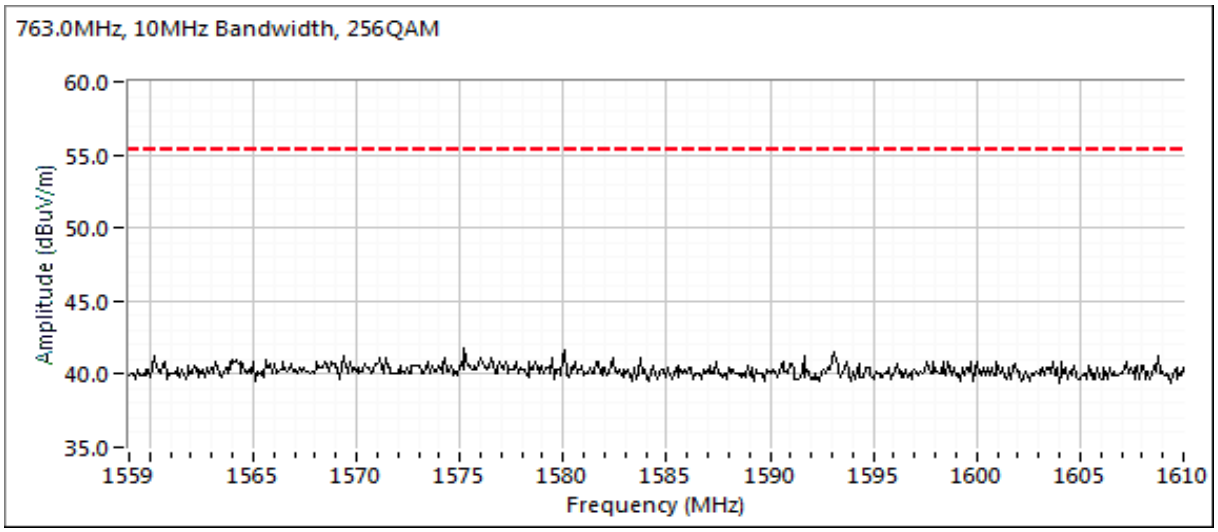
Test Engineer: Mehran Birgani Config Change: -

Test Location: Chamber 7 EUT Voltage: 120V/ 60Hz

Plots for 1559-1610MHz, low channel, 5MHz Bandwidth QPSK



Plots for 1559-1610MHz, Center channel, 10MHz Bandwidth 256QAM



Client:	Nokia Solutions and Networks	Job Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Coordinator:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	N/A

Run #6: Frequency Stability

Date of Test: 03/26/18
Test Engineer: Mehran Birgani
Test Location: Lab #4A

Config. Used: 1
Config Change: -
EUT Voltage: 120V

Nominal Frequency: 763.0 MHz

Frequency Stability Over Temperature

The EUT was soaked at each temperature for a minimum of 30 minutes prior to making the measurements to ensure the EUT and

Temperature	Frequency Measured	Drift	
(Celsius)	(MHz)	(Hz)	(ppm)
-30	763.000016	16	0.021
-20	763.000017	17	0.022
-10	763.000016	16	0.021
0	763.000015	15	0.020
10	763.000016	16	0.021
20	763.000016	16	0.021
30	763.000017	17	0.022
40	763.000017	17	0.022
50	763.000017	17	0.022
	Worst case:	17	0.022

Frequency Stability Over Input Voltage

Nominal Voltage is 120Vdc.

Voltage	Frequency Measured	Drift	
(AC)	(MHz)	(Hz)	(ppm)
85%	763.000016	16	0.0
115%	763.000016	16	0.0
	Worst case:	16	0.0

Client:	Nokia Solutions and Networks	PR Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Engineer:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	Enter on cover sheet

Radiated Emissions

(NTS Silicon Valley, Fremont Facility, Semi-Anechoic Chamber)

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 2/22/2018 & 3/26/2018
Test Engineer: John Caizzi / R. Varelas
Test Location: Fremont Chamber #4
Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

General Test Configuration

The EUTwas located on the turntable for radiated emissions testing. Any remote support equipment was located outside the semi-anechoic chamber. Any cables running to remote support equipment were routed through metal conduit and passed through a ferrite clamp upon exiting the chamber.

Radiated emissions tests above 1 GHz to FCC Part 15 were performed with floor absorbers in place in accordance with the test methods of ANSI C63.4 and CISPR 16-1-4.

The test distance and extrapolation factor (if applicable) are detailed under each run description.

Note, preliminary testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. Maximized testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

Ambient Conditions:

Temperature: 22 °C
Rel. Humidity: 35 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
2	Radiated Emissions 30 - 1000 MHz, Maximized	FCC Part 90.543(e)	Pass	39.2 dBµV/m @ 105.73 MHz (-45.2 dB)
3	Radiated Emissions 1 - 8 GHz Maximized		Pass	52.9 dBµV/m @ 3802.9 MHz (-31.5 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

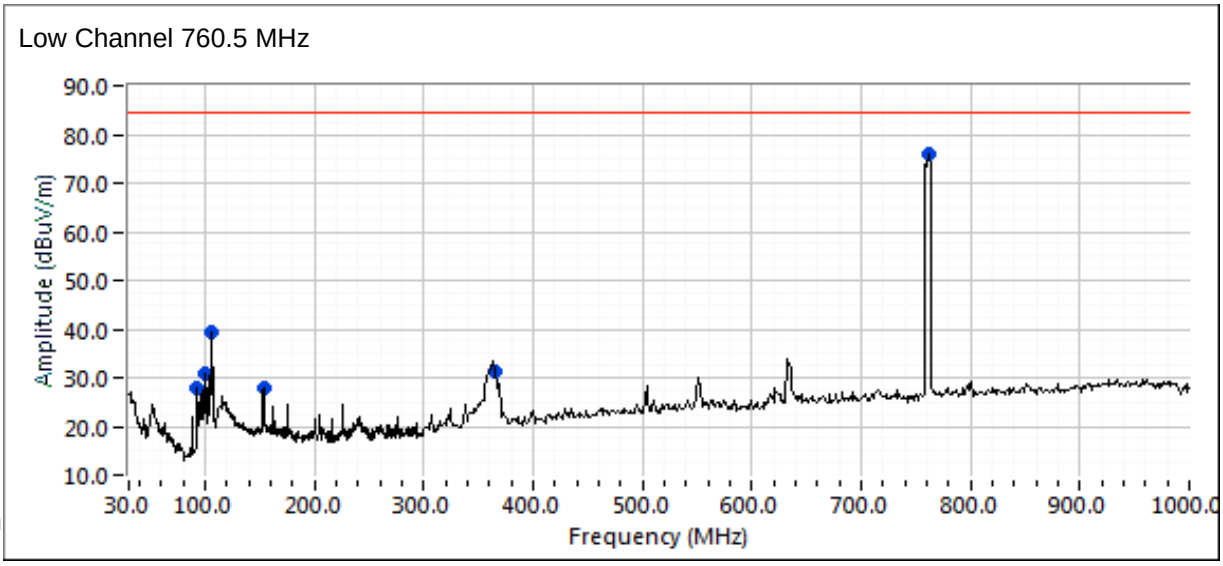
No deviations were made from the requirements of the standard.

Client:	Nokia Solutions and Networks	PR Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Engineer:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	Enter on cover sheet

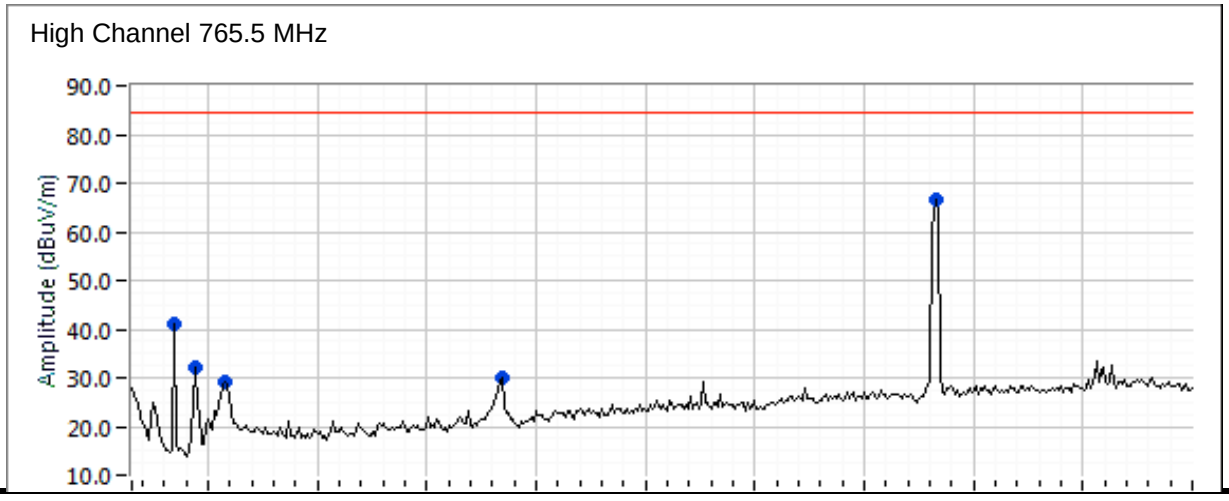
Run #1: Preliminary Radiated Emissions, 30 - 1000 MHz

Test Parameters for Preliminary Scan(s)			
Frequency Range (MHz)	Prescan Distance (meters)	Limit Distance (meters)	Extrapolation Factor (dB, applied to data)
30 - 1000	3	3	0.0

Low Channel

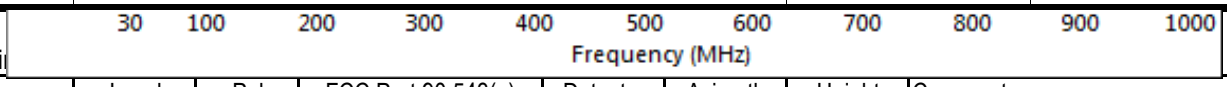


High



Client:	Nokia Solutions and Networks	PR Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Engineer:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	Enter on cover sheet

Preli



Frequency	Level	Pol	FCC Part 90.543(e)		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Low Channel								
92.319	28.0	H	84.4	-56.4	Peak	100	2.5	
100.292	31.0	H	84.4	-53.4	Peak	269	1.5	
105.733	39.2	H	84.4	-45.2	Peak	307	1.5	
153.367	*27.8*	*V*	*84.4*	*-56.6*	*Peak*	*179*	*1.0*	
363.066	31.4	H	84.4	-53.0	Peak	207	1.0	
760.500	*76.1*	*H*	*84.4*	*-8.3*	*Peak*	*219*	*1.0*	*Fundamnetal*
High Channel								
68.878	*40.9*	*V*	*84.4*	*-43.5*	*Peak*	*192*	*1.0*	*Could not find signal.*
88.317	*32.1*	*V*	*84.4*	*-52.3*	*Peak*	*216*	*1.0*	*Could not find signal.*
115.531	*29.2*	*V*	*84.4*	*-55.2*	*Peak*	*241*	*1.0*	
368.236	*30.0*	*H*	*84.4*	*-54.4*	*Peak*	*246*	*1.0*	
764.790	*66.8*	*H*	*NA*	*NA*	*Peak*	*251*	*2.0*	*Fundamental*

Preliminary quasi-peak readings (no manipulation of EUT interface cables)

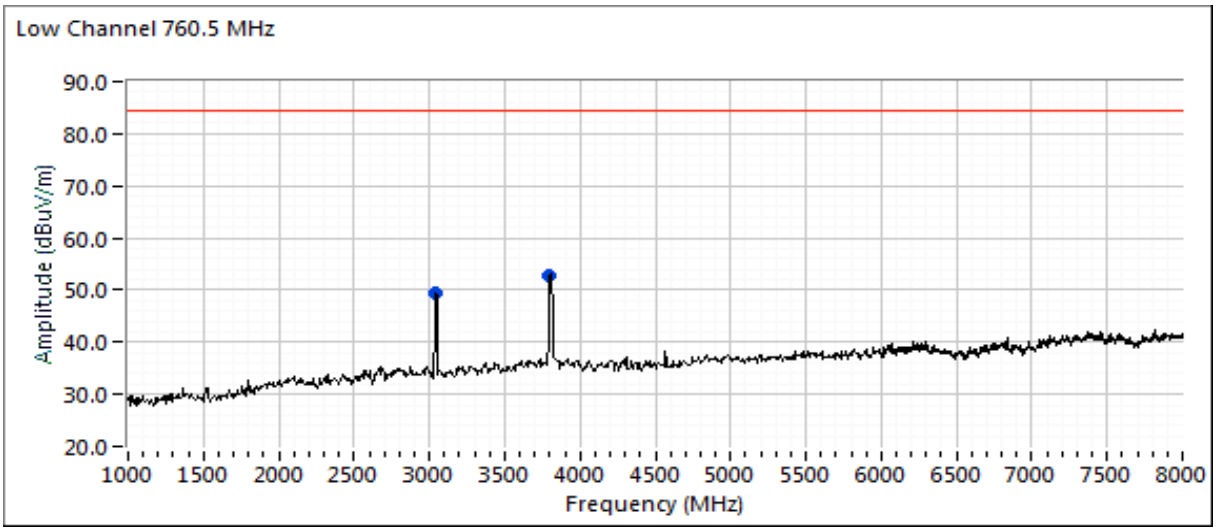
Frequency	Level	Pol	FCC Part 90.543(e)		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Low Channel								
92.319	28.0	H	84.4	-56.4	PK	100	2.5	RB 100 kHz, VB: 300 kHz
153.367	*27.8*	*V*	*84.4*	*-56.6*	PK	179	1.0	RB 100 kHz, VB: 300 kHz
363.066	32.9	H	84.4	-51.5	PK	206	1.0	RB 100 kHz, VB: 300 kHz
100.292	31.0	H	84.4	-53.4	PK	268	1.5	RB 100 kHz, VB: 300 kHz
105.733	39.2	H	84.4	-45.2	PK	307	1.5	RB 100 kHz, VB: 300 kHz
High Channel								
116.994	30.0	V	84.4	-54.4	Pk	222	1.00	RB 100 kHz, VB: 300 kHz
368.677	30.8	H	84.4	-53.6	Pk	256	1.00	RB 100 kHz, VB: 300 kHz

Client:	Nokia Solutions and Networks	PR Number:	PR069704-00
Model:	FlexiZone Micro BTS	T-Log Number:	TL069704-00 EMC
		Project Manager:	Deepa Shetty
Contact:	Terry Schwenk	Project Engineer:	Alvin ILARINA
Standard:	FCC Part 90R	Class:	Enter on cover sheet

Run #3: Maximized Readings, 1000 - 8,000 MHz

Test Parameters for Preliminary Scan(s)			
Frequency Range (MHz)	Prescan Distance (meters)	Limit Distance (meters)	Extrapolation Factor (dB, applied to data)
1000 - 6000	3	3	0.0
6000 - 8000	3	3	0.0

Low Channel



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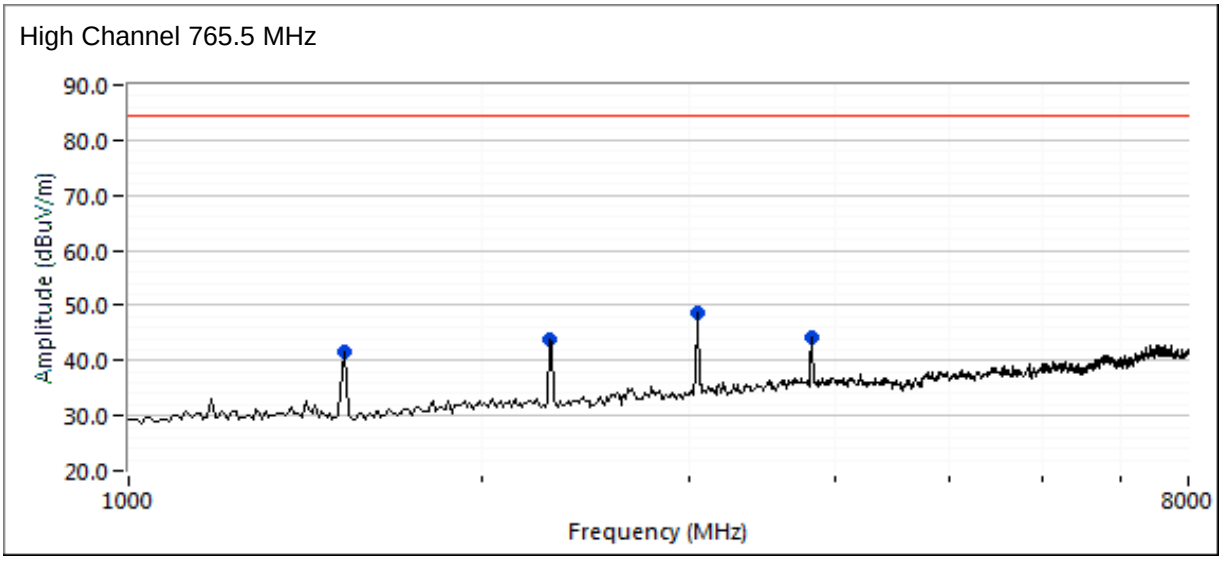
High Channel



Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

FCC limit using ANSI C63.4 test methods (i.e. floor absorbers in place)

Frequency	Level	Pol	FCC Part 90.543(e)		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Low Channel								
3042.060	49.5	H	84.4	-34.9	Peak	294	1.6	
3802.910	52.9	H	84.4	-31.5	Peak	31	2.5	
High Channel								
1525.000	*41.5*	*H*	*84.4*	*-42.9*	*Peak*	*101*	*1.0*	
2283.330	*43.7*	*H*	*84.4*	*-40.7*	*Peak*	*102*	*1.5*	*Could not find signal.*
3058.330	*48.6*	*V*	*84.4*	*-35.8*	*Peak*	*10*	*1.5*	
3816.670	*44.3*	*H*	*84.4*	*-40.1*	*Peak*	*254*	*1.0*	

Final peak readings (vs. FCC limits)

Frequency	Level	Pol	FCC Part 90.543(e)		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
Low Channel								
3042.060	49.5	H	84.4	-34.9	Peak	294	1.6	RB 100 kHz, VB 300 kHz
3802.910	52.9	H	84.4	-31.5	Peak	31	2.5	RB 100 kHz, VB 300 kHz
High Channel								
1526.570	41.6	H	84.4	-42.8	Pk	136	1.06	RB 100 kHz, VB 300 kHz
3052.160	51.8	V	84.4	-32.6	Pk	11	1.60	RB 100 kHz, VB 300 kHz
3813.400	43.3	H	84.4	-41.1	Pk	250	1.22	RB 100 kHz, VB 300 kHz

End of Report

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