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EMC Test Report

Application for FCC Grant of Equipment Authorization

FCC Part 15 Subpart C

Model 5100 Programmer Wireless Medical Device

FCC ID:	2AMRX-5100
APPLICANT:	EBR Systems 480 Oakmead Pkwy. Sunnyvale, CA 94085
TEST SITE(S):	National Technical Systems - Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
IC SITE REGISTRATION #:	2845B-3; 2845B-4, 2845B-5, 2845B-7
PROJECT NUMBER:	JD106124 / PR070534
REPORT DATE:	January 4, 2018
RE-ISSUED DATE:	January 22, 2018
FINAL TEST DATES:	August 31, November 7, 8 and 22, 2017 and January 15, 2018
TOTAL NUMBER OF PAGES:	63

ACCREDITED
Testing Cert #0214.26

VALIDATING SIGNATORIES

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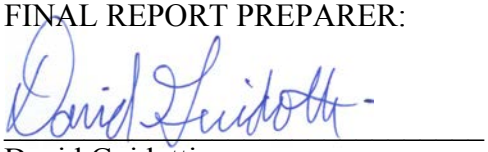

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REVISION HISTORY

Rev#	Date	Comments	Modified By
-	January 4, 2018	First release	
1	January 22, 2018	Added results below 30 MHz. Updated reference error.	David Bare

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SCOPE

An electromagnetic emissions test has been performed on the EBR Systems Model 5100 Programmer Wireless Medical Device, pursuant to the following rules:

FCC Part 15 Subpart C

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 - Silicon Valley test procedures:

ANSI C63.10-2013
FCC DTS Measurement Guidance KDB558074

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Industry Canada performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

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

OBJECTIVE

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

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification. Class II devices are required to meet the appropriate technical requirements but are exempt from certification requirements.

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 EBR Systems Model 5100 Programmer Wireless Medical Device complied with the requirements of the following regulations:

FCC Part 15 Subpart C

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.

The test results recorded herein are based on a single type test of EBR Systems Model 5100 Programmer Wireless Medical Device and therefore apply only to the tested samples. The samples were selected and prepared by Daryl Jamgotchian of EBR Systems.

DEVIATIONS FROM THE STANDARDS

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

TEST RESULTS SUMMARY

DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)

FCC Rule Part		Description	Measured Value / Comments	Limit / Requirement	Result
15.247(a)		Digital Modulation	Systems uses FSK (Digital) modulation	System must utilize a digital transmission technology	Complies
15.247 (a) (2)		6dB Bandwidth	503 kHz	>500kHz	Complies
15.247 (b) (3)		Output Power (multipoint systems)	19.8 dBm EIRP = 0.105 W Note 1	1Watt, EIRP limited to 4 Watts.	Complies
15.247(e)		Power Spectral Density	-13.0 dBm/3kHz	8dBm/3kHz	Complies
15.247(d)		Antenna Port Spurious Emissions 30MHz – 25 GHz	Performed Radiated	'-	Complies
15.247(d) / 15.209		Radiated Spurious Emissions 24MHz – 25 GHz	53.0 dBµV/m @ 7328.8 MHz (-1.0 dB)	Refer to the limits section (p19) for restricted bands, all others < -20dBc	Complies
Note 1: EIRP calculated using antenna gains of 0.4 dBi for the highest EIRP system.					

GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS

FCC Rule Part	RSS Rule part	Description	Measured Value / Comments	Limit / Requirement	Result (margin)
15.203	-	RF Connector	Internal Antenna	Unique or integral antenna required	Complies
15.207	RSS-Gen Table 3	AC Conducted Emissions	44.2 dBµV @ 0.154 MHz (-21.6 dB)	Refer to page 18	Complies
15.247 (i) 15.407 (f)	RSS 102	RF Exposure Requirements	Refer to SAR exclusion calculations in separate exhibit	Refer to OET 65, FCC Part 1 and RSS 102	Complies

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 and were calculated in accordance with UKAS document LAB 34.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF power, conducted (power meter)	dBm	25 to 7000 MHz	± 0.52 dB
RF power, conducted (Spectrum analyzer)	dBm	25 to 7000 MHz	± 0.7 dB
Conducted emission of transmitter	dBm	25 to 26500 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 26500 MHz	± 0.7 dB
Radiated emission (field strength)	dBµV/m	25 to 1000 MHz	± 3.6 dB
		1000 to 40000 MHz	± 6.0 dB
Conducted Emissions (AC Power)	dBµV	0.15 to 30 MHz	± 2.4 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The EBR Systems Model 5100 Programmer Wireless Medical Device is a pacemaker programmer that communicates with implanted cardiac devices. Since the EUT would normally be placed on a tabletop during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 5.0 VDC, USB powered. The tablet is provided with an AC Adapter with an electrical rating of 100-240V, 50-60Hz, 1.3A.
The sample was received on August 31, 2017 and tested on August 31, November 7, 8 and 22, 2017 and January 15, 2018. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
EBR Systems Inc.	5100	Communication Module	RKT1740166	2AMRX-5100
DELL	7212	Rugged Tablet	4RYQSG2	E2K-T03H002
DELL	LA45NM140	Tablet Power Supply	CN-OKXTTW-LOC00-773-7DC4-A04	-

A second Communication Module S/N: WLX17170009 was used for antenna port testing.

OTHER EUT DETAILS

The Programmer Communications Module wakes up an implant using a 2.4 GHz ISM band transmitter and communicates with the implant with a MedRadio transceiver in the 402-405 MHz band. The two radios do not transmit simultaneously. The tablet and power supply are used to run software for communication sessions with implants and power the EUT.

ANTENNA SYSTEM

The antenna system of the DTS transmitter consists of a model ANT-2.4-uSP surface mount antenna manufactured by Linx Technologies.

ENCLOSURE

The EUT (Communication Module) measures approximately 9.5x13.5x8.0cm. It is constructed of plastic.
The Tablet measures approximately 9.5x13.5x8.0cm. It is constructed of metal and plastic.
The Tablet Power Supply measures approximately 10.0x4.0x3.0cm. It is constructed of plastic.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at NTS Silicon Valley.

SUPPORT EQUIPMENT

No local support equipment was used during testing.

The following equipment was used as remote support equipment during testing:

Manufacturer	Model	Description	Serial Number	FCC ID
EBR Systems Inc.	4100	Implantable Pulse Generator	T01000	2AMRX-4100

EUT INTERFACE PORTS

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

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Tablet USB type A	Communication Module	USB	Shielded	3
Tablet USB type C	Not connected	-	-	-
Tablet micro-SD port	Not connected	-	-	-
Tablet Audio Jack	Not connected	-	-	-
Communication Module	Load	1MΩ termination	Shielded & Unshielded last 15cm	3

Only the Tablet USB type A port is used for the EBR system.

Additional on Support Equipment

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Implantable Cardiac Stimulator (Model: 4100)	Battery (Model: 3000)	2 wire	Unshielded	0.3

EUT OPERATION

During testing, the EUT was set to transmit continuously on one of the five available channels at the maximum power.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 3.3 of RSP-100, construction, calibration, and equipment data has been filed with the Commission and with industry Canada.

Site	Designation / Registration Numbers		Location
	FCC	Canada	
Chamber 4	US0027	2845B-4	41039 Boyce Road Fremont, CA 94538-2435
Chamber 5	US0027	2845B-5	

ANSI C63.4-2014 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. The results from testing performed in these chambers have been correlated with results from an open area test site. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4-2014.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.10. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4-2014 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4-2014.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 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. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

INSTRUMENT CONTROL COMPUTER

Software is used to view and convert receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers. The software used for radiated and conducted emissions measurements is NTS EMI Test Software (rev 2.10)

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

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

ANTENNAS

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

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. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.10 specifies that the test height above ground for table mounted devices shall be 80 centimeters for testing below 1 GHz and 1.5m for testing above 1 GHz. Floor mounted equipment shall be 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 as specified in ANSI C63.4-2014. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.10, and the worst-case orientation is used for final measurements.

CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

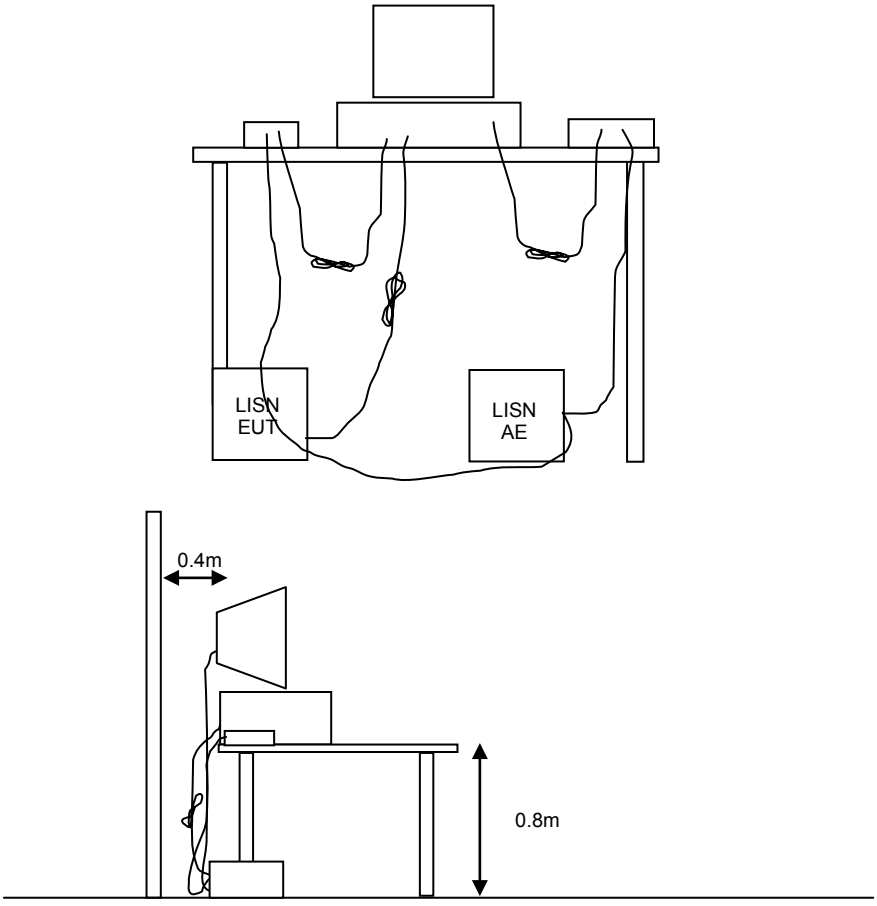


Figure 1 Typical Conducted Emissions Test Configuration

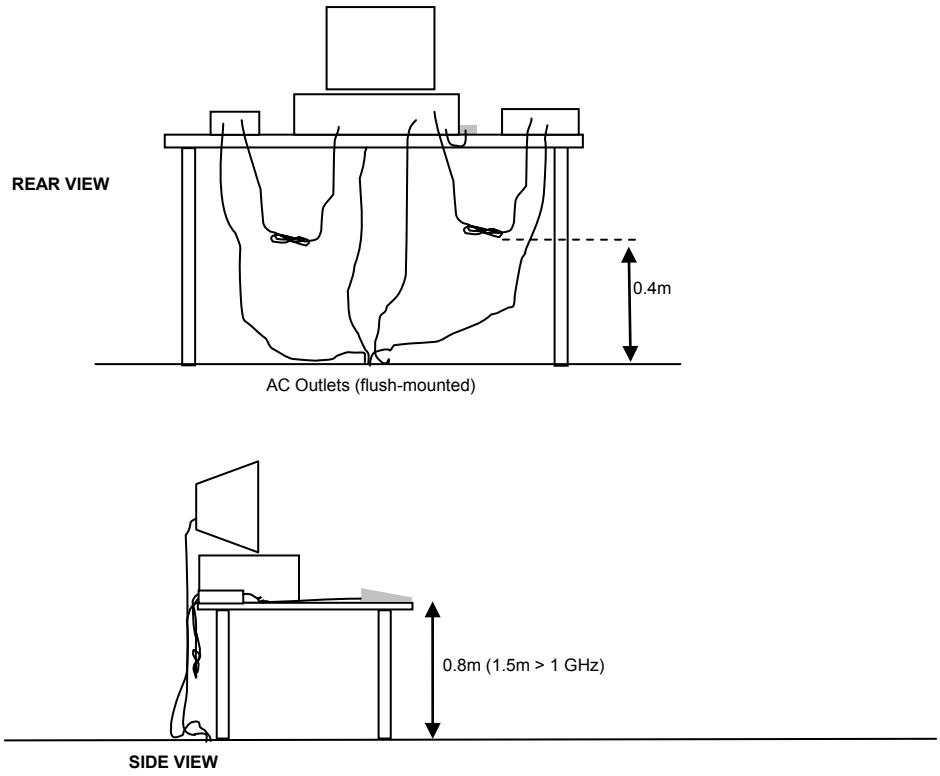
RADIATED EMISSIONS

A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

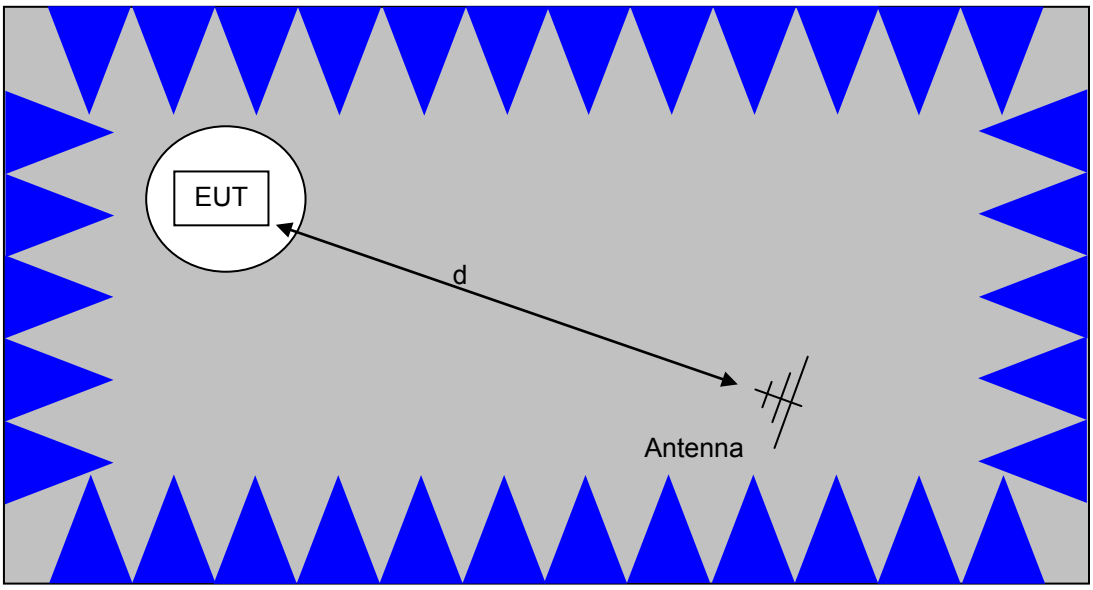
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

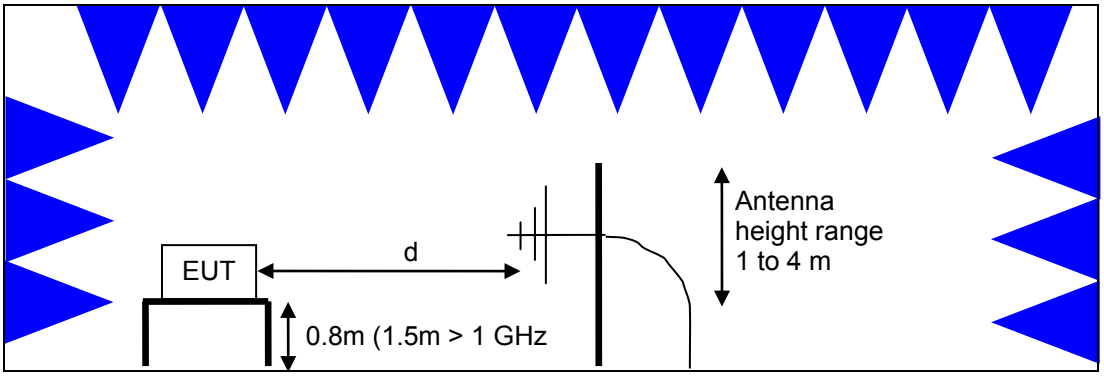


Typical Test Configuration for Radiated Field Strength Measurements



The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of ANSI C63.4-2014 for an alternate test site at the measurement distances used.

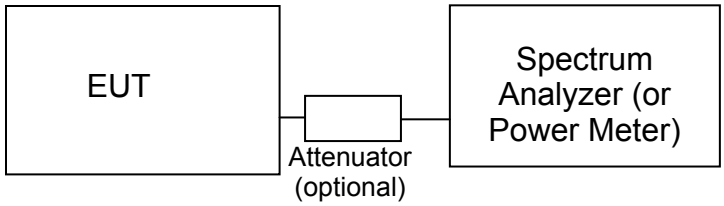
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.



Test Configuration for Radiated Field Strength Measurements
Semi-Anechoic Chamber, Plan and Side Views

CONDUCTED EMISSIONS FROM ANTENNA PORT

Direct measurements of power, bandwidth and power spectral density are performed, where possible, with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.



Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and NTS Silicon Valley's test procedures for the type of radio being tested. When power measurements are made using a resolution bandwidth less than the signal bandwidth the power is calculated by summing the power across the signal bandwidth using either the analyzer channel power function or by capturing the trace data and calculating the power using software. In both cases the summed power is corrected to account for the equivalent noise bandwidth (ENBW) of the resolution bandwidth used.

If power averaging is used (typically for certain digital modulation techniques), the EUT is configured to transmit continuously. Power averaging is performed using either the built-in function of the analyzer or, if the analyzer does not feature power averaging, using external software. In both cases the average power is calculated over a number of sweeps (typically 100). When the EUT cannot be configured to continuously transmit then either the analyzer is configured to perform a gated sweep to ensure that the power is averaged over periods that the device is transmitting or power averaging is disabled and a max-hold feature is used.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

BANDWIDTH MEASUREMENTS

The 6dB, 20dB, 26dB and/or 99% signal bandwidth are measured using the bandwidths recommended by ANSI C63.10 and RSS GEN.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; FCC 15.107(a), RSS GEN

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

Frequency (MHz)	Average Limit (dBuV)	Quasi Peak Limit (dBuV)
0.150 to 0.500	Linear decrease on logarithmic frequency axis between 56.0 and 46.0	Linear decrease on logarithmic frequency axis between 66.0 and 56.0
0.500 to 5.000	46.0	56.0
5.000 to 30.000	50.0	60.0

GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1].

Frequency Range (MHz)	Limit (uV/m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100 @ 3m	40 @ 3m
88 to 216	150 @ 3m	43.5 @ 3m
216 to 960	200 @ 3m	46.0 @ 3m
Above 960	500 @ 3m	54.0 @ 3m

OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

Operating Frequency (MHz)	Output Power	Power Spectral Density
902 – 928	1 Watt (30 dBm)	8 dBm/3kHz
2400 – 2483.5	1 Watt (30 dBm)	8 dBm/3kHz
5725 – 5850	1 Watt (30 dBm)	8 dBm/3kHz

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. Fixed point-to-point applications using the 5725 – 5850 MHz band are not subject to this restriction.

TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS 210. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

[1] The restricted bands are detailed in FCC 15.205 and RSS-Gen Table 6

SAMPLE CALCULATIONS - CONDUCTED EMISSIONS

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - S = M$$

where:
R_r = Receiver Reading in dBuV
S = Specification Limit in dBuV
M = Margin to Specification in +/- dB

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally 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, when used for electric field measurements above 30MHz, is calculated 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:

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

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

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 - FIELD STRENGTH TO EIRP CONVERSION

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of d (meters) from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{d} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

For a measurement at 3m the conversion from a logarithmic value for field strength (dBuV/m) to an eirp power (dBm) is -95.3dB.

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radiated Emissions, 30 - 26,000 MHz, 31-Aug-17					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
National Technical Systems	NTS Capture Analyzer Software (rev 3.8)	N/A	0		N/A
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	05-Oct-16	05-Oct-17
EMCO	Antenna, Horn, 1-18 GHz	3115	786	21-Dec-15	21-Dec-17
Hewlett Packard	Spectrum Analyzer (SA40) Red 30 Hz -40 GHz	8564E (84125C)	1148	31-Oct-16	01-Nov-17
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1538	11-Feb-17	11-Feb-18
A. H. Systems	Spare System Horn, 18-40GHz	SAS-574, p/n: 2581	2162	04-Aug-17	04-Aug-19
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	2237	27-Jun-16	27-Jun-18
Micro-Tronics	High Pass Filter 2700 MHz	HPM50111	2326	07-Feb-17	07-Feb-18
Hewlett Packard	9KHz-1300MHz pre-amp	8447F	2777	27-Jan-17	27-Jan-18
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	9482	28-Oct-16	28-Oct-17
Radiated Emissions, 1,000 - 25,000 MHz, 07-Nov-17					
EMCO	Antenna, Horn, 1-18 GHz (SA40-Red)	3115	1142	9/29/2016	9/29/2018
Hewlett Packard	Spectrum Analyzer (SA40) Blue 9 kHz - 40 GHz	8564E (84125C)	1393	4/10/2017	4/10/2018
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1538	2/11/2017	2/11/2018
Hewlett Packard	High Pass filter, 3.5 GHz (Purple System)	P/N 84300-80038 (84125C)	1768	10/6/2017	10/6/2018
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	1780	8/31/2017	8/31/2018
A. H. Systems	Purple System Horn, 18-40GHz	SAS-574, p/n: 2581	2160	8/18/2017	8/18/2018
Micro-Tronics	Band Reject Filter, 2400-2500 MHz	BRM50702-02	2249	5/17/2017	5/17/2018
Radio Antenna Port (Power and Spurious Emissions), 07-Nov-17					
Agilent Technologies	3Hz -44GHz PSA Spectrum Analyzer	E4446A	2796	5/22/2017	5/22/2018
Radiated Emissions, 30 - 1,000 MHz, 08-Nov-17					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1548	10/12/2016	10/12/2018
Com-Power	Preamplifier, 30-1000 MHz	PA-103	1632	3/8/2017	3/8/2018
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1756	7/8/2017	7/8/2018
Radiated Emissions, 08-Nov-17					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
Hewlett Packard	Spectrum Analyzer (Spare SA26) 9 KHz-26.5 GHz, Non-Program	8563E	284		3/15/2018

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	785	9/8/2017	9/8/2018
EMCO	Antenna, Horn, 1-18GHz	3115	868	6/30/2016	6/30/2018
Conducted Emissions - AC Power Ports, 22-Nov-17					
National Technical Systems	NTS EMI Software (rev 2.10)	N/A	0		N/A
EMCO	LISN, 10 kHz-100 MHz	3825/2	1292	8/8/2017	8/8/2018
Rohde & Schwarz	Pulse Limiter	ESH3 Z2	1401	2/3/2017	2/3/2018
Rohde & Schwarz	EMI Test Receiver, 20 Hz-7 GHz	ESIB 7	1756	7/8/2017	7/8/2018
Radiated Emissions, 15-Jan-18					
Sunol Sciences	Biconilog, 30-3000 MHz	JB3	1657	27-Jul-16	27-Jul-18
Rohde & Schwarz	EMI Test Receiver, 20 Hz-40 GHz	ESI 40	2493	17-Mar-17	17-Mar-18
Hewlett Packard	9KHz-1300MHz pre-amp	8447F	2777	27-Dec-17	27-Dec-18
Compower	Magnetic Loop Antenna, 9 kHz-30 MHz	AL-130	3003	09-Aug-16	09-Aug-18

Appendix B Test Data

T106196 Pages 25 – 62

Client:	EBR Systems	Job Number:	JD106124
Product	5100	T-Log Number:	T106196
System Configuration:	-	Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Emissions Standard(s):	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	B
Immunity Standard(s):	-	Environment:	Medical , Radio

EMC Test Data

For The

EBR Systems

Product

5100

Date of Last Test: 1/15/2018

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

RSS-247 and FCC 15.247 (DTS) Radiated 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

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 18-21 °C
Rel. Humidity: 38-42 %

Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Mode	Channel	Target Power	Power Setting	Test Performed	Limit	Result / Margin
1	b	1 2443MHz	26	26	Restricted Band Edge (2390 MHz)	FCC Part 15.209 / 15.247(c)	62.5 dBµV/m @ 2364.8 MHz (-11.5 dB)
	b	5 2457MHz	26	26	Restricted Band Edge (2483.5 MHz)	FCC Part 15.209 / 15.247(c)	41.7 dBµV/m @ 2493.1 MHz (-12.3 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.

Sample Notes

Communication Module S/N: RKT1740166
Software Version 1.0.0 Build 23511
Tablet: SW Version 1.0.0 Build 23532
Tablet: Dell Model 7212 Rugged, S/N 4RYQSG2

Date of Test: 11/07/17
Test Engineer: M. Birgani
Test Location: Chamber #5

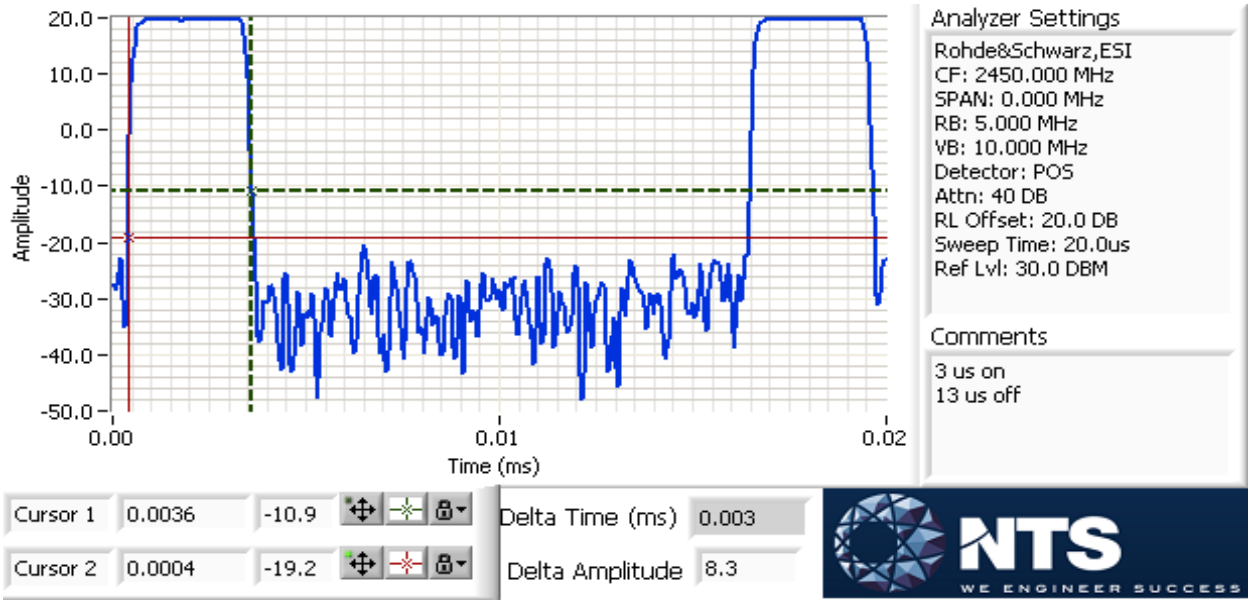
Config. Used: 1
Config Change: -
EUT Voltage: 120V/60Hz

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has a duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear average mode, auto sweep time, max hold.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
-	113kbps	18.8%	Yes	0.003	7.3	14.5	Note 3



Measurement Specific Notes:

Note 1:	Emission in non-restricted band, but limit of 15.209 used.
Note 2:	Emission in non-restricted band, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 3:	Average measurment was calculated using peak level and corrected by duty cycle (20*log(18.75%))

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

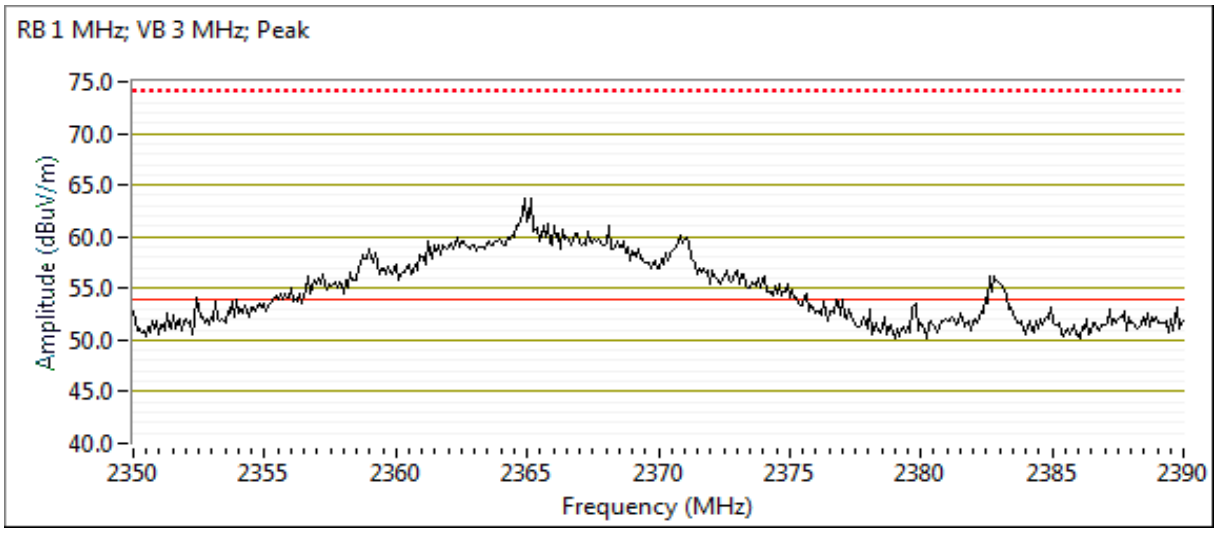
Run #1: Radiated Bandedge Measurements

Channel: 1 Mode: -

Tx Chain: Main Data Rate: 113kbps

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2364.830	62.5	V	74.0	-11.5	PK	193	1.0	POS; RB 1 MHz; VB: 3 MHz
2368.200	38.4	H	54.0	-15.6	AVG	294	1.0	Note 3
2368.200	52.9	H	74.0	-21.1	PK	294	1.0	POS; RB 1 MHz; VB: 3 MHz
2364.830	48.0	V	74.0	-26.0	AVG	193	1.0	Note 3

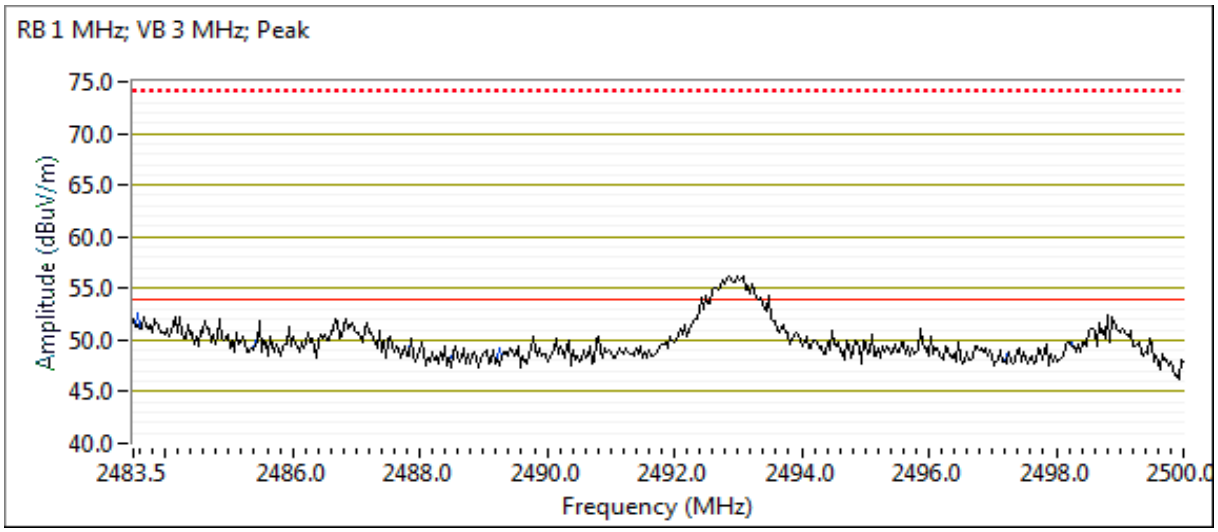


Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Channel: 5 Mode: -
Tx Chain: Main Data Rate: 113kbps

Band Edge Signal Field Strength - Direct measurement of field strength

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2493.060	41.7	V	54.0	-12.3	AVG	190	1.0	Note 3
2493.060	56.2	V	74.0	-17.8	PK	190	1.0	POS; RB 1 MHz; VB: 3 MHz
2493.060	47.0	H	74.0	-27.0	PK	255	1.1	POS; RB 1 MHz; VB: 3 MHz
2493.060	32.5	H	74.0	-41.5	AVG	255	1.1	Note 3



Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

RSS-247 and FCC 15.247 (DTS) Radiated 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

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 24 °C
Rel. Humidity: 38 %

Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Mode	Channel	Power Setting	Measured Power	Test Performed	Limit	Result / Margin
1a	2.4GHz	low	26		Radiated Emissions, 30-1000MHz	FCC Part 15	Pass
1b	2.4GHz	center	26		Radiated Emissions, 30-1000MHz	FCC Part 15	Pass
1c	2.4GHz	high	26		Radiated Emissions, 30-1000MHz	FCC Part 15	Pass
2	2.4GHz	center	26		Radiated Emissions, 24 -30MHz	FCC Part 15	Pass

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.

Sample Notes

Sample S/N: RKT 1740166

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Run #1: Radiated Spurious Emissions, 30 - 1000 MHz. Operating Mode: 2.4GHz

Date of Test: 11/8/2017 Config. Used: 1

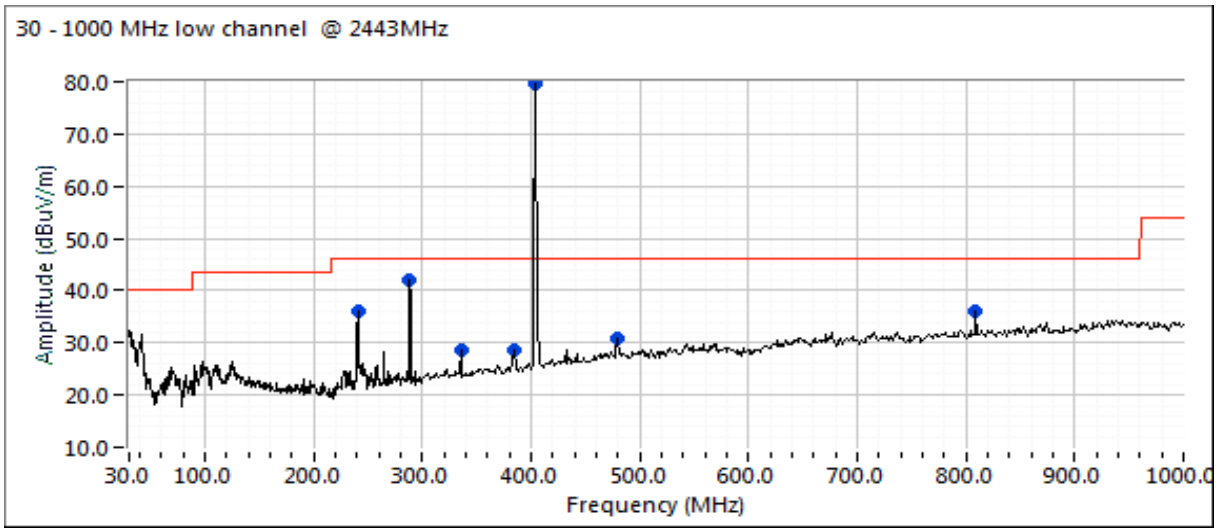
Test Engineer: Joseph Cadigal Config Change: none

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

Run #1a: Low Channel @ 2443 MHz

Other Spurious Emissions

Frequency	Level	Pol	FCC 15		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
288.008	42.2	H	46.0	-3.8	QP	358	1.0	QP (1.00s)
240.010	36.1	H	46.0	-9.9	QP	212	1.5	QP (1.00s)
808.418	30.0	H	46.0	-16.0	QP	227	1.0	QP (1.00s)
338.310	19.4	V	46.0	-26.6	QP	20	1.0	QP (1.00s)
384.008	28.0	H	46.0	-18.0	QP	150	1.0	QP (1.00s)
480.005	31.3	H	46.0	-14.7	QP	261	2.0	QP (1.00s)
404.808	79.7	H	-	-	Peak	233	1.0	Fundamental

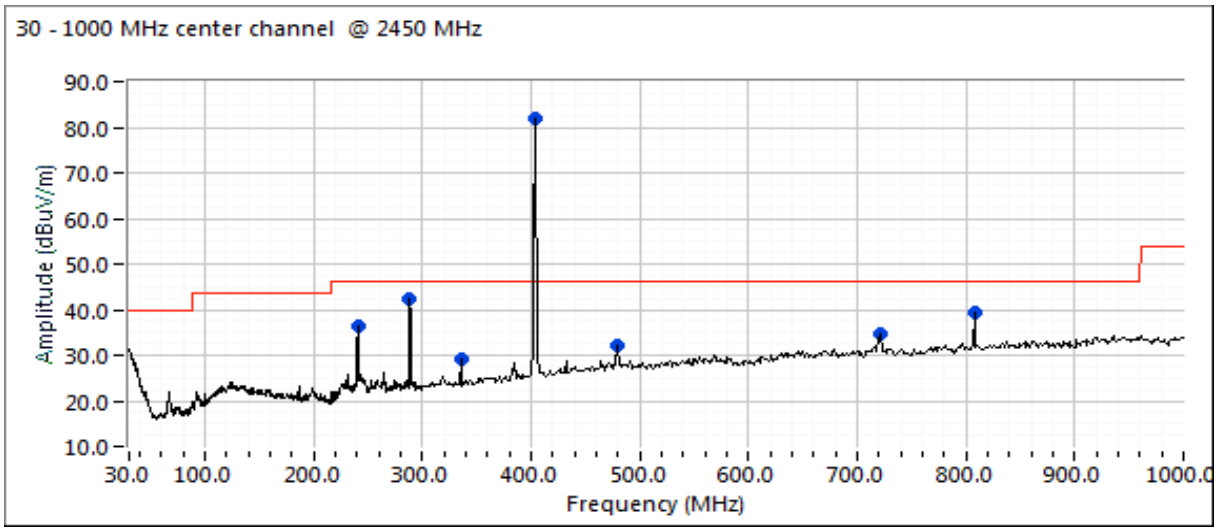


Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Run #1b: Center Channel @ 2450 MHz

Other Spurious Emissions

Frequency	Level	Pol	FCC 15		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
288.008	36.2	V	46.0	-9.8	QP	21	1.0	QP (1.00s)
336.004	29.2	H	46.0	-16.8	QP	71	1.0	QP (1.00s)
807.875	28.9	H	46.0	-17.1	QP	196	1.0	QP (1.00s)
480.005	31.3	H	46.0	-14.7	QP	196	1.0	QP (1.00s)
240.010	36.0	H	46.0	-10.0	QP	211	1.5	QP (1.00s)
721.372	26.4	V	46.0	-19.6	QP	359	4.0	QP (1.00s)
403.934	81.9	H	-	-	Peak	217	1.0	Fundamental

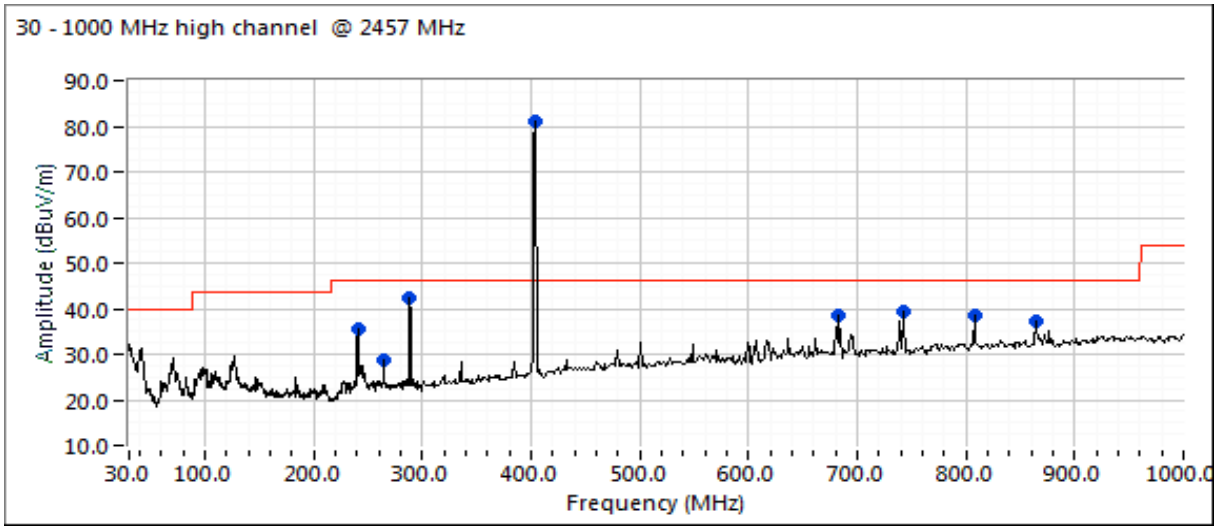


Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Run #1c: High Channel @ 2457 MHz

Other Spurious Emissions

Frequency	Level	Pol	FCC 15		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
240.004	35.3	H	46.0	-10.7	QP	214	1.0	QP (1.00s)
265.844	19.2	V	46.0	-26.8	QP	159	1.0	QP (1.00s)
288.008	43.0	H	46.0	-3.0	QP	18	1.0	QP (1.00s)
682.486	25.9	V	46.0	-20.1	QP	360	1.0	QP (1.00s)
740.882	26.6	V	46.0	-19.4	QP	360	1.0	QP (1.00s)
807.202	33.6	H	46.0	-12.4	QP	215	1.0	QP (1.00s)
866.461	28.2	V	46.0	-17.8	QP	360	1.0	QP (1.00s)
403.808	*81.2*	*H*	-	-	*Peak*	*230*	*1.0*	*Fundamental*



Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Run #2: Center Channel @ 2450 MHz

Date of Test: 1/15/2018
Test Engineer: Mehran Birgani
Test Location: FT Chamber#4

Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

No emissions from the device were found below 30 MHz. The noise floor was measured to be 7 dBuV/m @ 30 meters.

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

RSS-247 and FCC 15.247 (DTS) Radiated 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

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

Ambient Conditions:

Temperature: 18-21 °C

Rel. Humidity: 38-42 %

Summary of Results - Device Operating in the 2400-2483.5 MHz Band

Run #	Mode	Channel		Power Setting	Test Performed	Limit	Result / Margin
1		Lowest		26	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	53.0 dBµV/m @ 7328.8 MHz (-1.0 dB)
		Middle		26	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	51.3 dBµV/m @ 2293.9 MHz (-2.7 dB)
		Highest		26	Radiated Emissions, 1 - 25 GHz	FCC Part 15.209 / 15.247(c)	52.0 dBµV/m @ 7370.5 MHz (-2.0 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.

Sample Notes

Communication Module S/N: RKT 1740166

Software Version 1.0.0 Build 23511

Tablet: SW Version 1.0.0 Build 23532

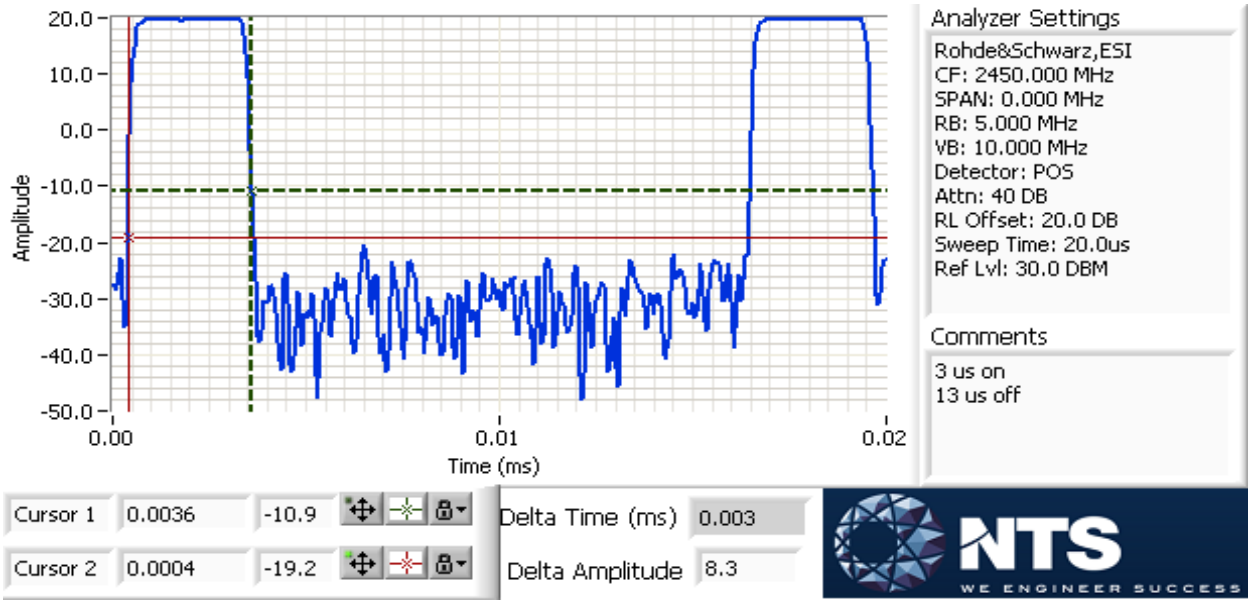
Tablet: Dell Model 7212 Rugged, S/N 4RYQSG2

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Emission has duty cycle of 18.75% and the average levels were calculated from the peak values using 20*log(18.75%) factor.

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
-	113kbps	18.8%	Yes	0.003	7.3	14.5	Note 3



Measurement Specific Notes:

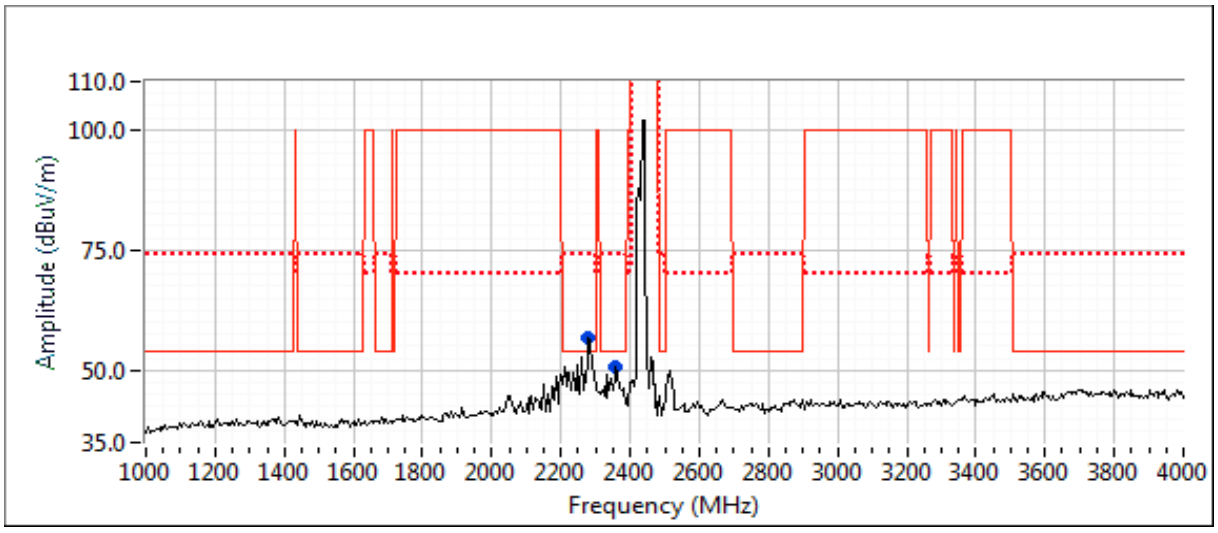
Note 1:	Emission in non-restricted band, but limit of 15.209 used.
Note 2:	Emission in non-restricted band, the limit was set 30dB below the level of the fundamental and measured in 100kHz.
Note 3:	Average measurment was calculated using peak level and corrected by duty cycle (20*log(18.75%))

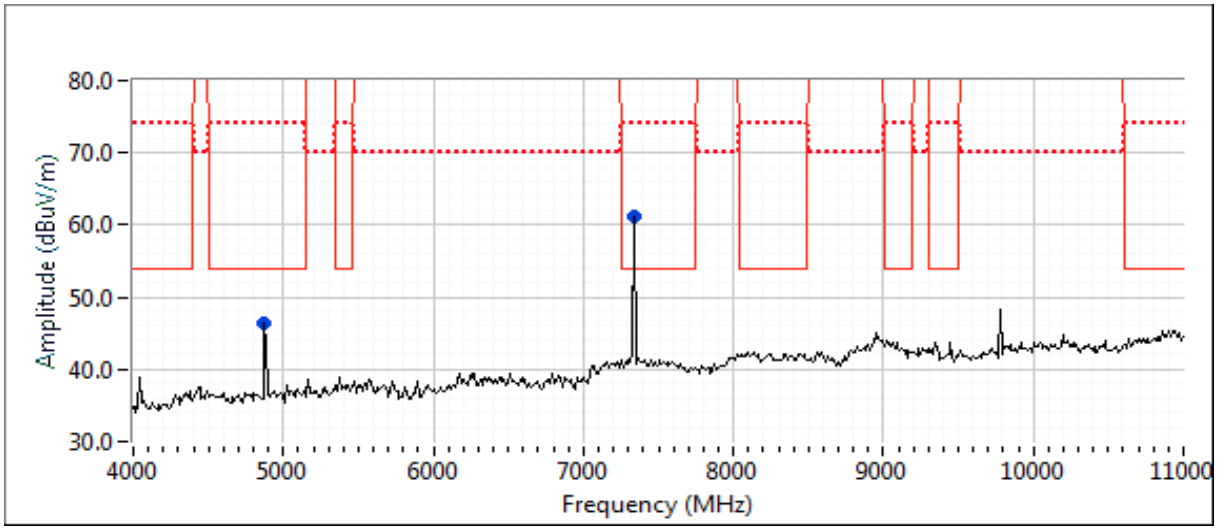
Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Run #1: Radiated Spurious Emissions, 1,000 - 25000 MHz.
Run #1a: Low Channel (2443MHz)

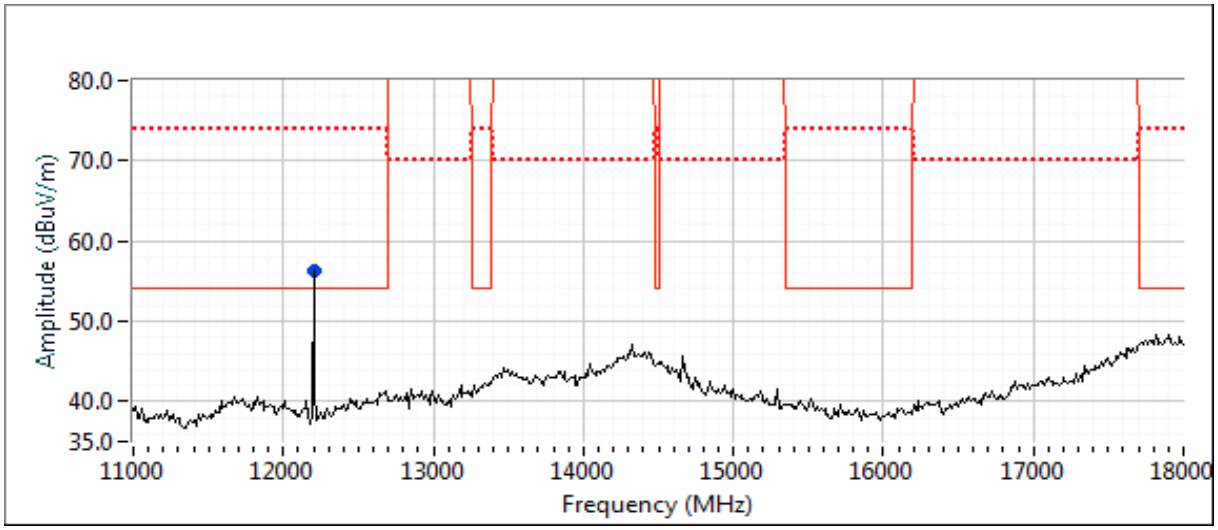
Date of Test: 11/07/17 Config. Used: 1
Test Engineer: M. Birgani Config Change: -
Test Location: Chamber #5 EUT Voltage: 120V/ 60Hz

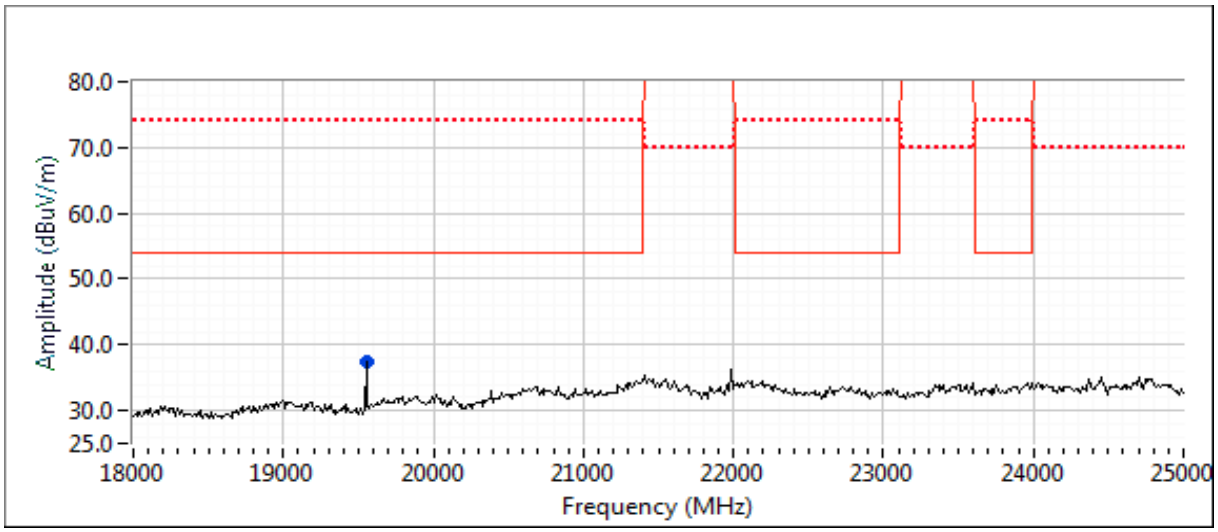
Channel: 1 Data Rate: 113kbps





Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A





Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Run #1a: Low Channel (2443MHz)
Channel: 1 Data Rate: 113kbps

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7328.790	53.0	H	54.0	-1.0	PK	304	1.2	Note 3
2286.770	51.8	V	54.0	-2.2	AVG	174	1.6	Note 3
2363.850	49.6	V	54.0	-4.4	AVG	174	1.5	Note 3
7328.790	67.5	H	74.0	-6.5	PK	304	1.2	RB 1 MHz;VB 3 MHz;Peak
2288.330	66.3	V	74.0	-7.7	PK	174	1.6	RB 1 MHz;VB 3 MHz;Peak
2365.060	64.1	V	74.0	-9.9	PK	174	1.5	RB 1 MHz;VB 3 MHz;Peak
12205.740	42.1	V	54.0	-11.9	AVG	264	1.0	Note 3
4885.910	50.8	V	74.0	-23.2	PK	304	1.2	RB 1 MHz;VB 3 MHz;Peak
12205.740	56.6	V	74.0	-17.4	PK	264	1.0	RB 1 MHz;VB 3 MHz;Peak
19549.600	28.3	V	54.0	-25.7	AVG	238	1.6	Note 3
19549.600	42.8	V	74.0	-31.2	PK	238	1.6	RB 1 MHz;VB 3 MHz;Peak
4885.910	36.3	V	54.0	-17.7	AVG	304	1.2	Note 3

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Run #1b: Center Channel

Date of Test: 08/31/17 Config. Used: 1

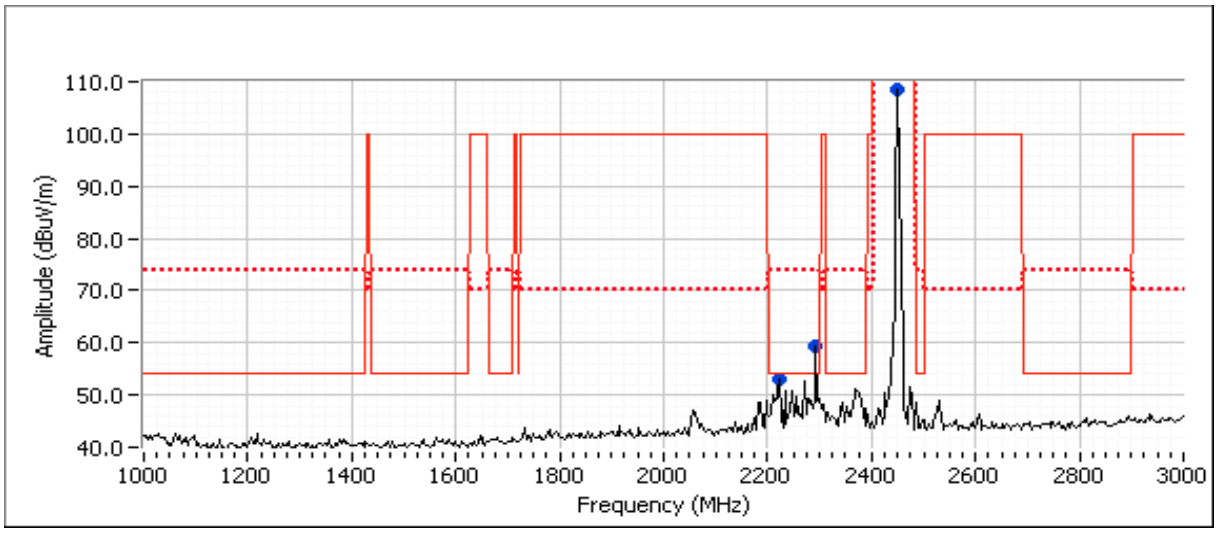
Test Engineer: Deniz Demirci Config Change: None

Test Location: FT Ch #3 EUT Voltage: 5 VDC USB powered, Tablet 120 VAC/ 60 Hz

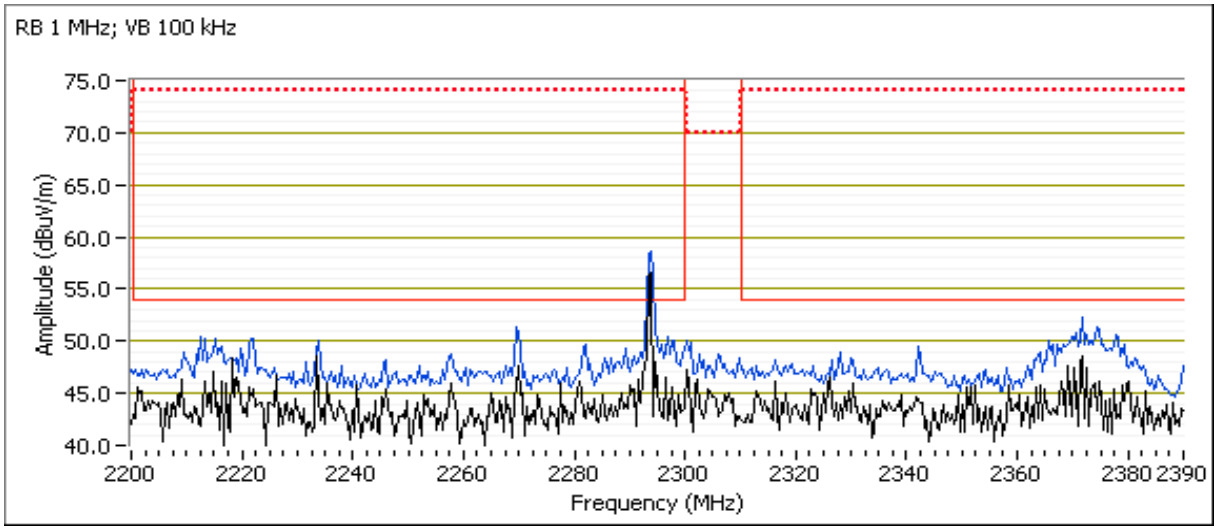
Channel: 3 Data Rate: 113kbps

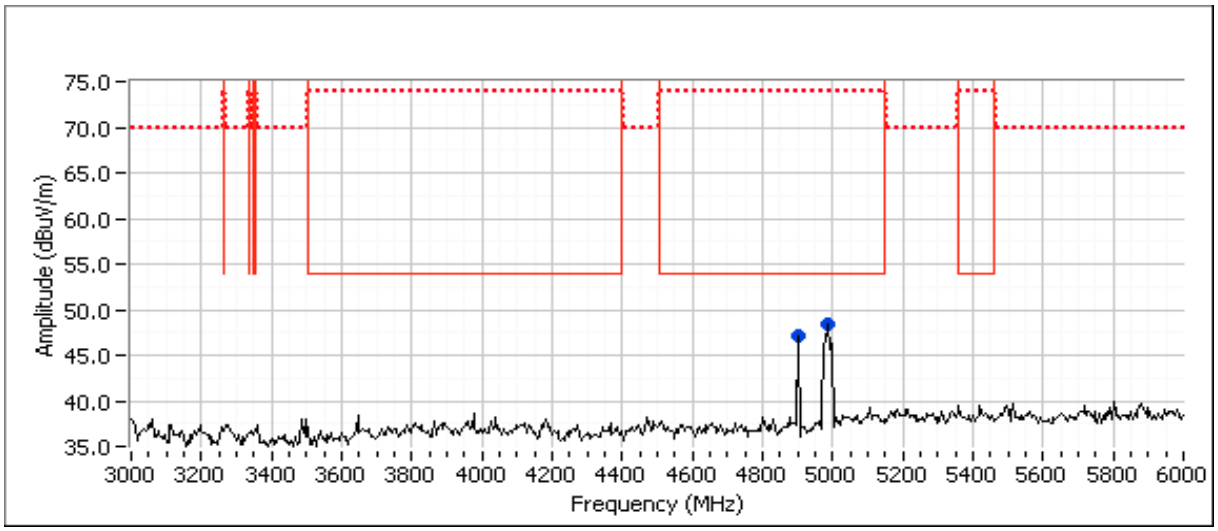
Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
2293.920	51.3	V	54.0	-2.7	AVG	147	1.3	Note 3
9799.620	51.2	H	54.0	-2.8	AVG	49	1.9	Notes 1, 3
7349.620	47.9	H	54.0	-6.1	AVG	305	2.1	Note 3
2293.810	65.8	V	74.0	-8.2	PK	147	1.3	POS; RB 1 MHz; VB: 3 MHz
9799.470	65.7	H	74.0	-8.3	PK	49	1.9	Note 1 - RB 1 MHz;VB 3 MHz;Peak
7349.740	62.4	H	74.0	-11.6	PK	305	2.1	RB 1 MHz;VB 3 MHz;Peak
4981.350	42.0	H	54.0	-12.0	AVG	221	1.8	Note 3
4899.800	38.6	H	54.0	-15.4	AVG	165	1.5	Note 3
4984.900	56.7	H	74.0	-17.3	PK	221	1.8	RB 1 MHz;VB 3 MHz;Peak
4899.680	53.1	H	74.0	-20.9	PK	165	1.5	RB 1 MHz;VB 3 MHz;Peak
2449.630	115.4	V	120.0	-4.6	PK	157	1.5	Carrier - POS; RB 3 MHz; VB: 10 MH

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

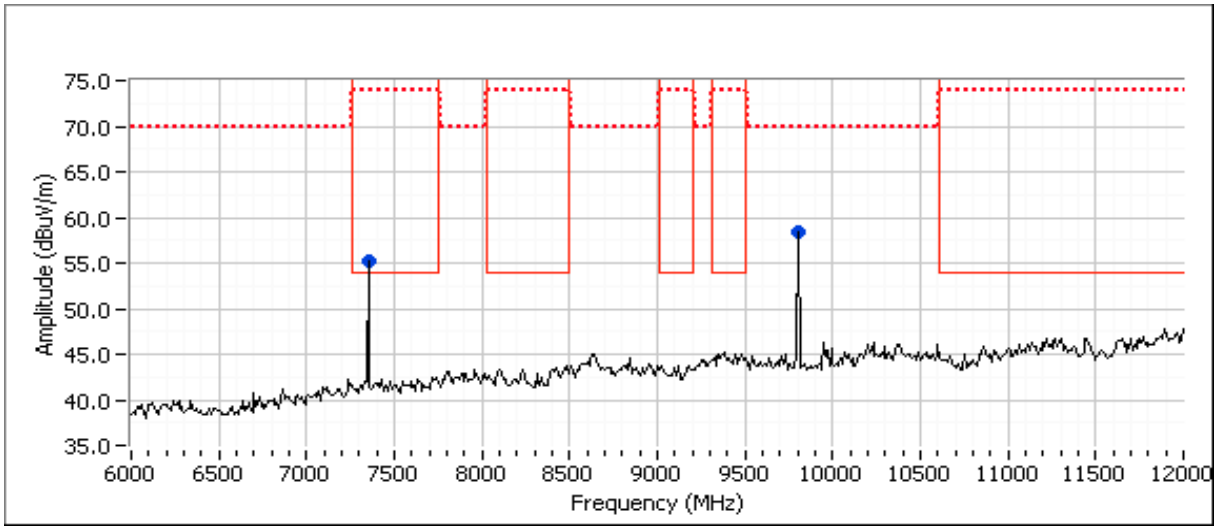


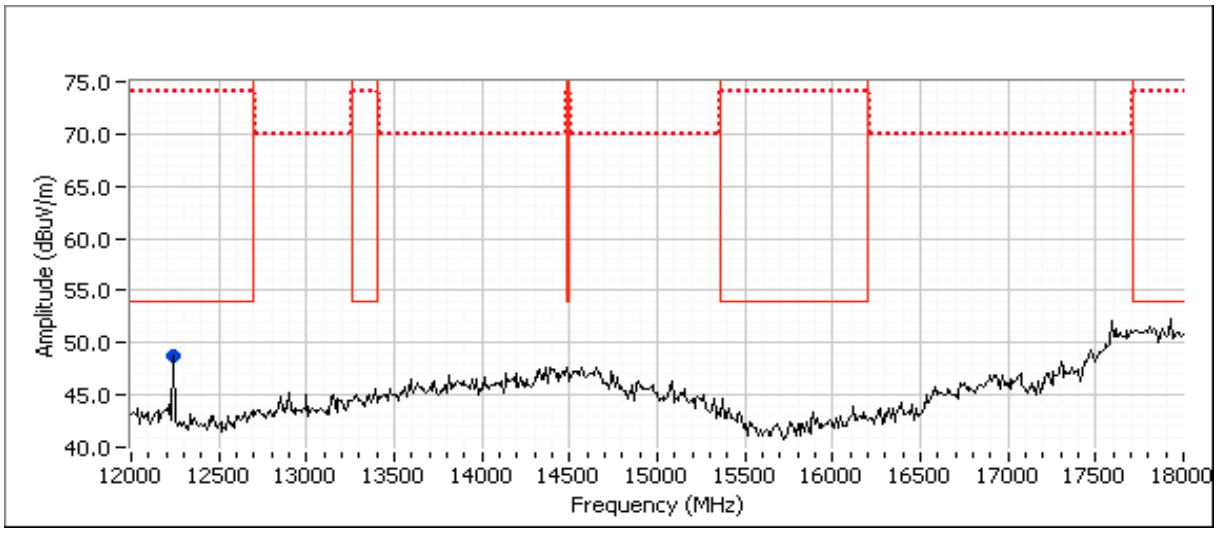
Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A



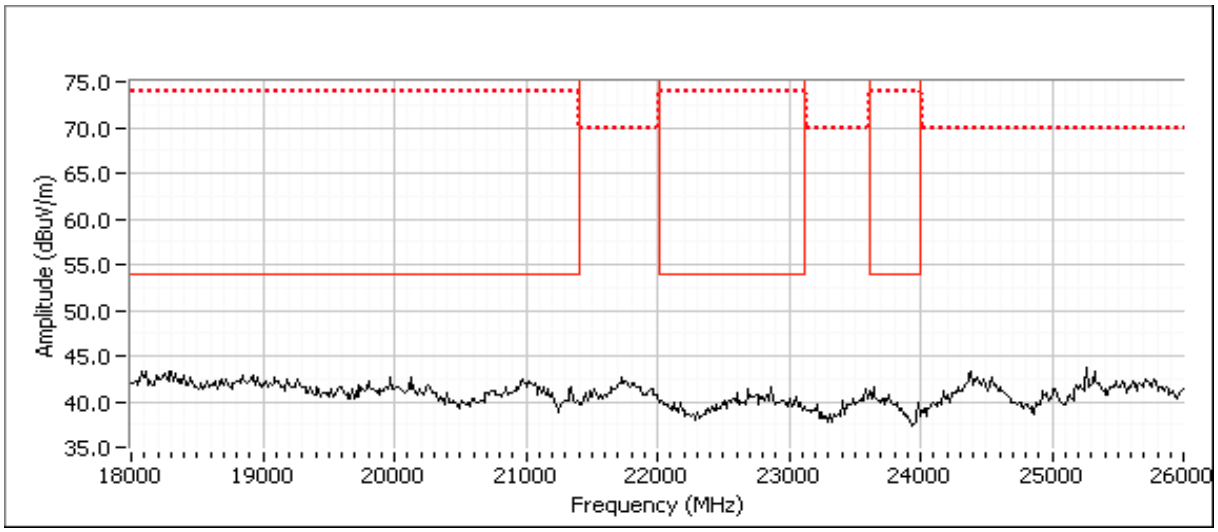


Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A





Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A



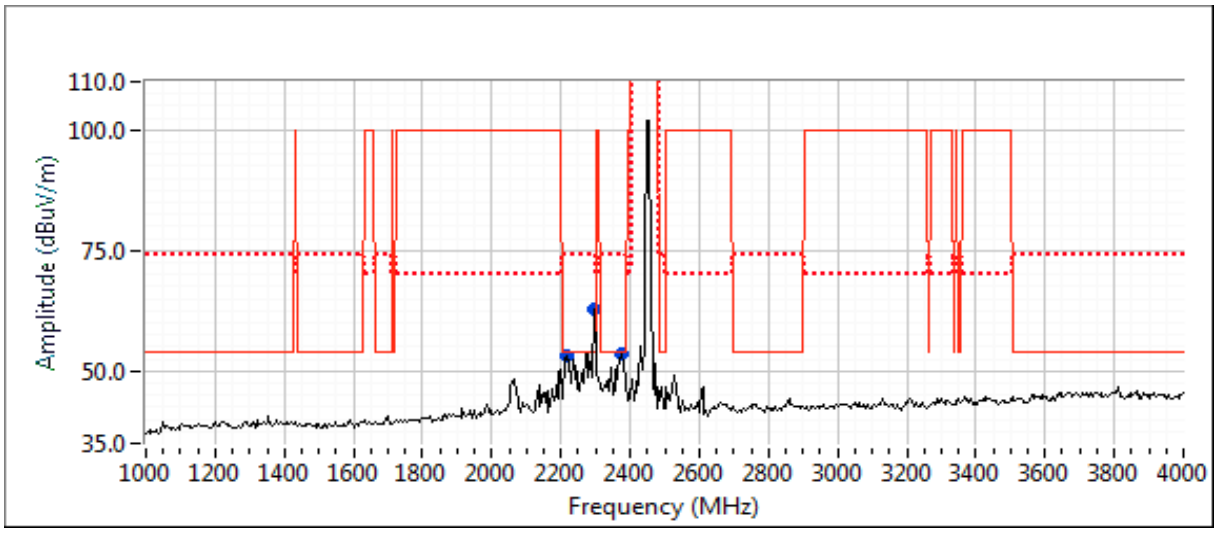
Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

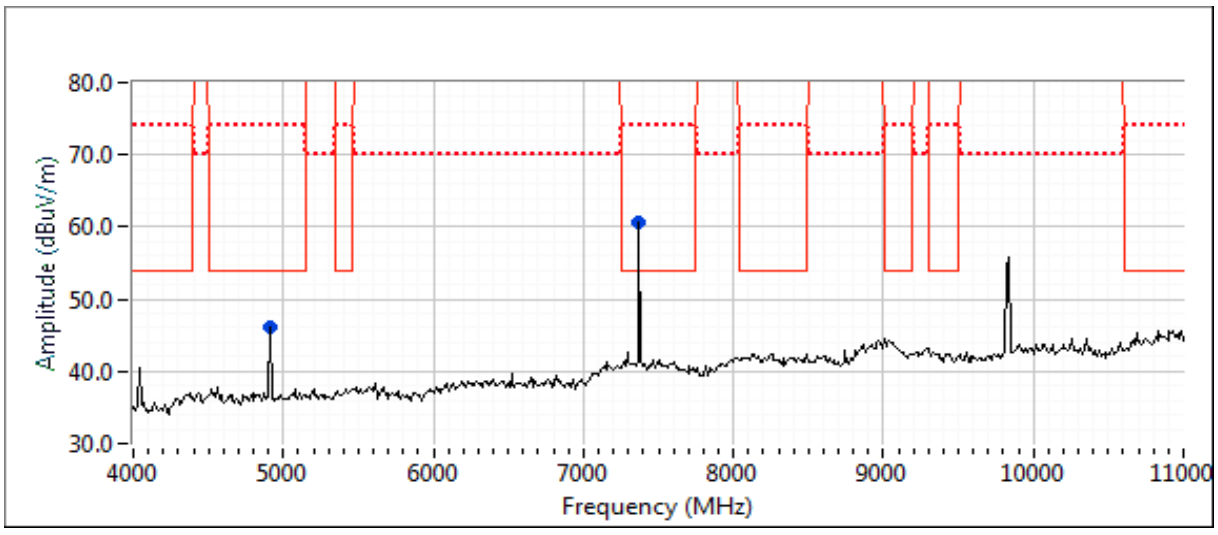
Run #1c: High Channel

Date of Test: 11/07/17
Test Engineer: M. Birgani
Test Location: Chamber #5

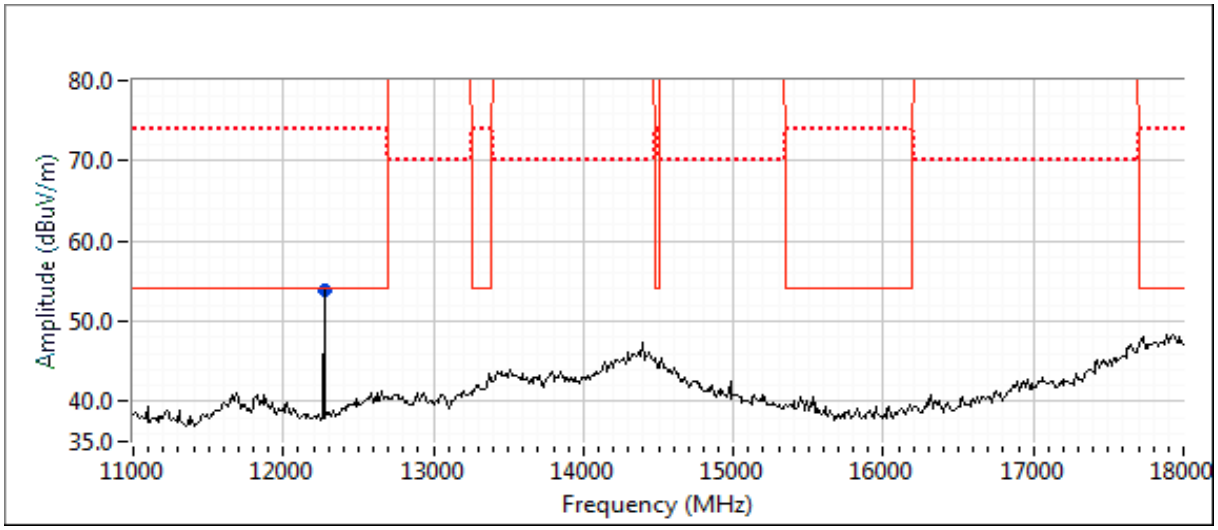
Config. Used: 1
Config Change: -
EUT Voltage: 120V/ 60Hz

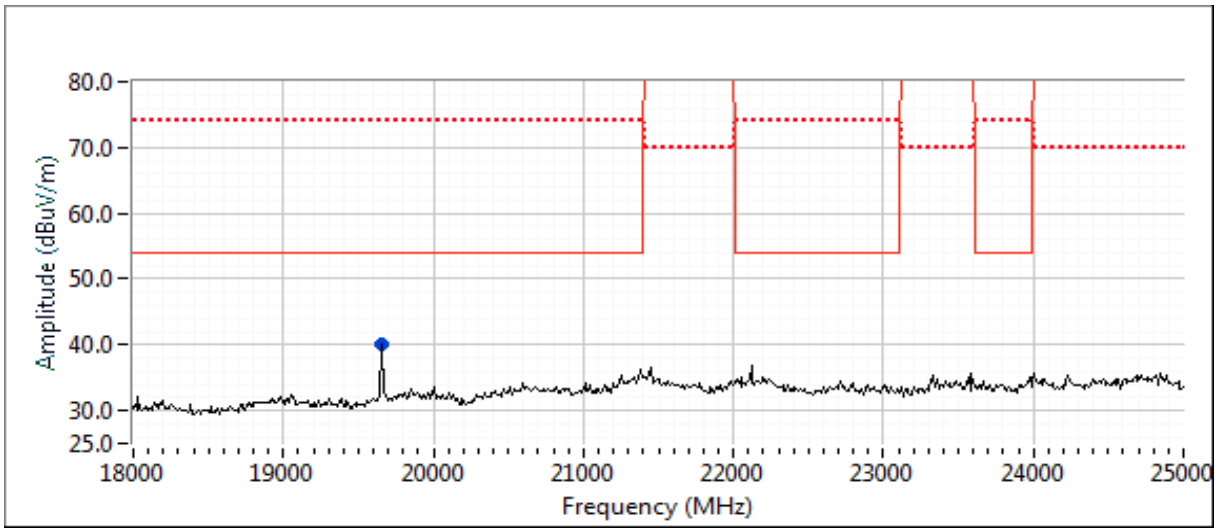
Channel: 5 Data Rate: 113kbps





Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A





Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Run #1c: High Channel

Channel: 5 Data Rate: 113kbps

Frequency	Level	Pol	15.209 / 15.247		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
7370.480	52.0	H	54.0	-2.0	AVG	299	1.0	Note 3
2276.940	49.3	V	54.0	-4.7	AVG	178	1.6	Note 3
2382.540	48.3	V	54.0	-5.7	AVG	185	1.3	Note 3
2228.780	47.9	V	54.0	-6.1	AVG	159	1.9	Note 3
2299.990	47.4	V	54.0	-6.6	AVG	159	1.9	Note 3
7370.480	66.5	H	74.0	-7.5	PK	299	1.0	RB 1 MHz;VB 3 MHz;Peak
2288.760	44.6	V	54.0	-9.4	AVG	172	1.6	Note 3
2276.940	63.8	V	74.0	-10.2	PK	178	1.6	RB 1 MHz;VB 3 MHz;Peak
2382.540	62.8	V	74.0	-11.2	PK	185	1.3	RB 1 MHz;VB 3 MHz;Peak
2228.780	62.4	V	74.0	-11.6	PK	159	1.9	RB 1 MHz;VB 3 MHz;Peak
2299.990	61.9	V	74.0	-12.1	PK	159	1.9	RB 1 MHz;VB 3 MHz;Peak
2288.760	59.1	V	74.0	-14.9	PK	172	1.6	RB 1 MHz;VB 3 MHz;Peak
4913.820	38.1	V	54.0	-15.9	AVG	299	1.0	Note 3
12269.050	36.2	V	54.0	-17.8	AVG	72	1.0	Note 3
4913.820	52.6	V	74.0	-21.4	PK	299	1.0	RB 1 MHz;VB 3 MHz;Peak
12269.050	50.7	V	74.0	-23.3	PK	72	1.0	RB 1 MHz;VB 3 MHz;Peak
19655.090	30.4	V	54.0	-23.6	AVG	238	1.6	Note 3
19655.090	44.9	V	74.0	-29.1	PK	238	1.6	RB 1 MHz;VB 3 MHz;Peak

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

RSS-247 and FCC 15.247 (DTS) Antenna Port Measurements

Power, PSD, Bandwidth 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.

Date of Test: 11/7/2017
Test Engineer: M. Birgani
Test Location: Fremont EMC Lab #4A

Config. Used: conducted
Config Change: -
EUT Voltage: 120V/60Hz

General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

Ambient Conditions:

Temperature: 18-21 °C
Rel. Humidity: 38-42 %

Summary of Results

Run #	Pwr setting		Test Performed	Limit	Pass / Fail	Result / Margin
1	26		Output Power	15.247(b)	Pass	19.8 dBm
2	26		Power spectral Density (PSD)	15.247(d)	Pass	-13.0 dBm/3kHz
3	26		Minimum 6dB Bandwidth	15.247(a)	Pass	503 kHz
3	26		99% Bandwidth	RSS GEN	-	2.91 MHz
4	26		Spurious emissions	15.247(b)	Pass	Performed Radiated

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

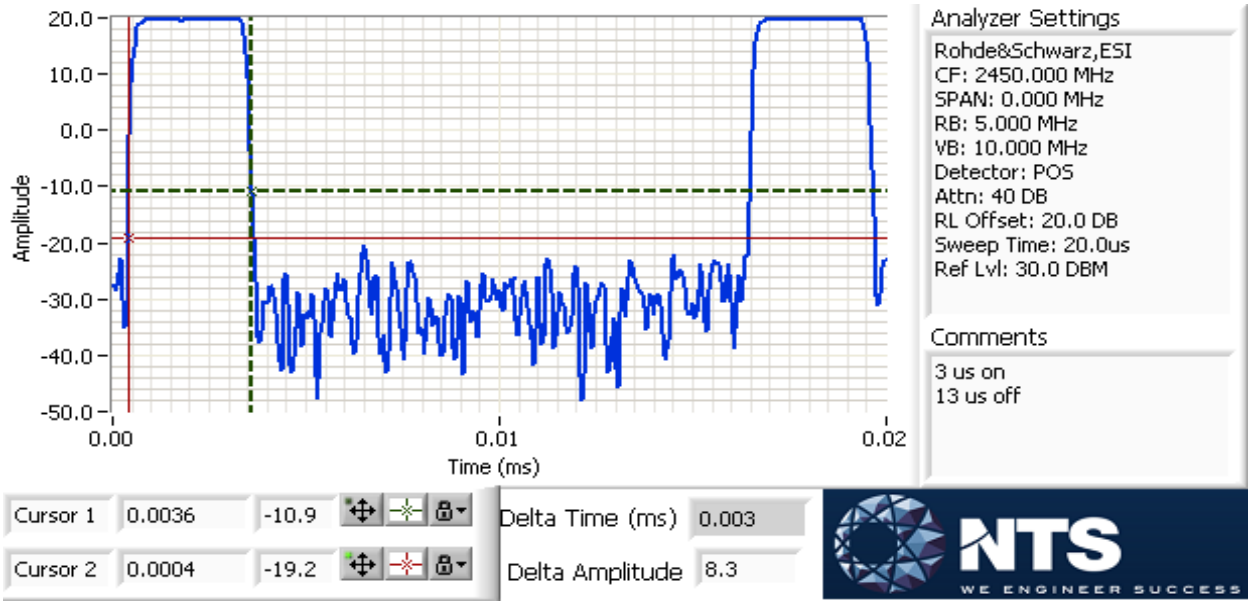
No deviations were made from the requirements of the standard.

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Procedure Comments:

Measurements performed in accordance with FCC KDB 558074

Mode	Data Rate	Duty Cycle (x)	Constant DC?	T (ms)	Pwr Cor Factor*	Lin Volt Cor Factor**	Min VBW for FS (Hz)
-	113kbps	18.8%	Yes	0.003	7.3	14.5	-



Sample Notes

Communication Module S/N: WLX17170009
Software Version 1.0.0 Build 23511
Tablet: SW Version 1.0.0 Build 23532
Tablet: Dell Model 7212 Rugged, S/N 4RYQSG2

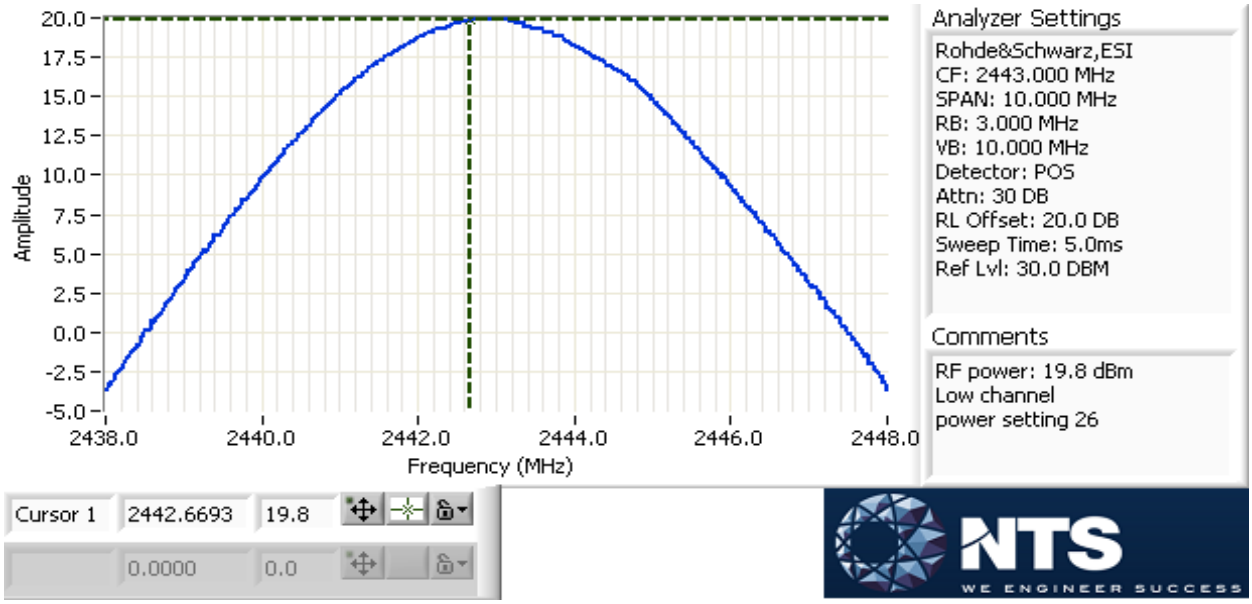
Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Run #1: Output Power

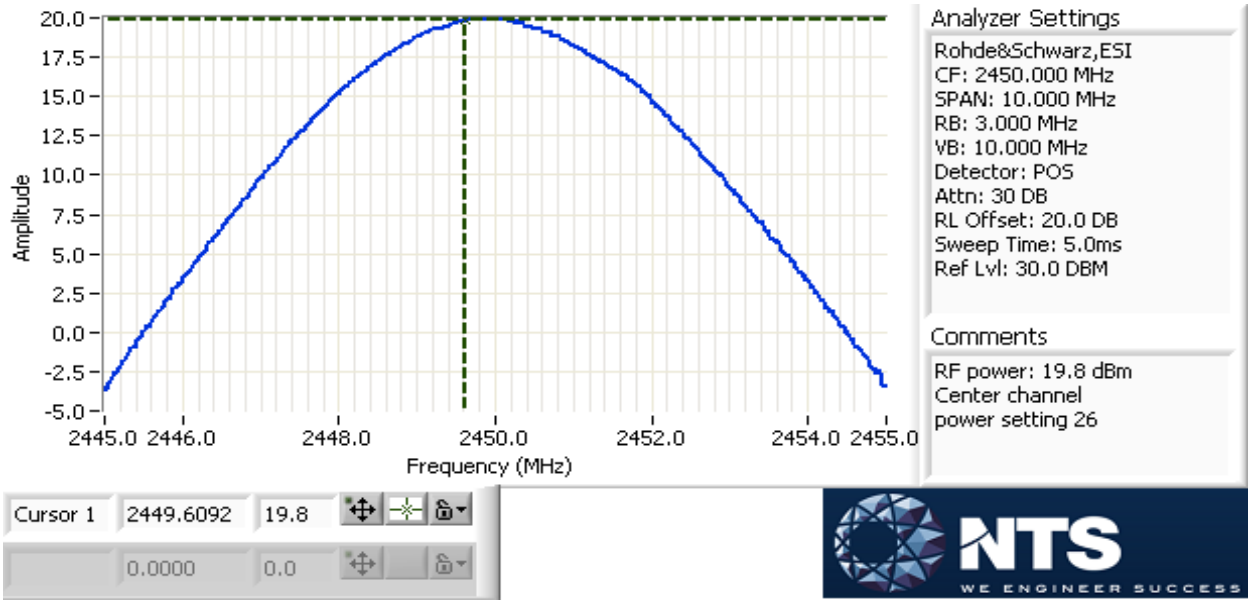
Maximum antenna gain: 0.4 dBi

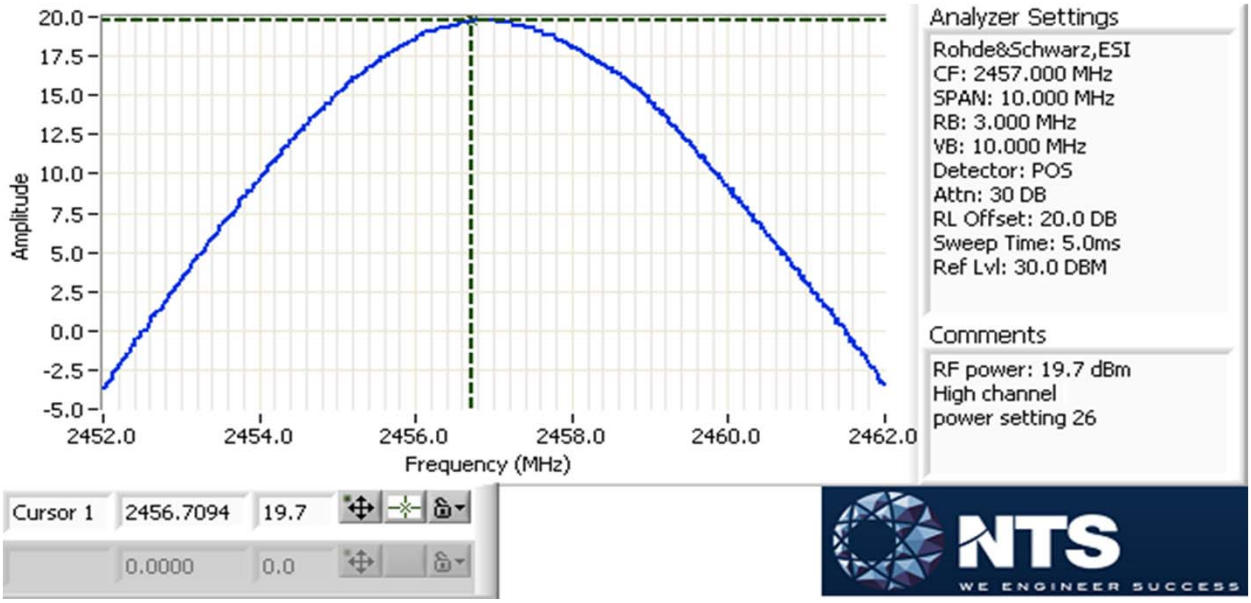
PWR setting	Channel	Frequency (MHz)	Res BW	Output Power (dBm)	Output Power (W)	EIRP (W)
26	Low	2443	3 MHz	19.8	0.095	0.105
26	Mid	2450	3 MHz	19.8	0.095	0.105
26	High	2457	3 MHz	19.7	0.093	0.102

Note 1:	Output power measured using spectrum analyzer (see plots), with RBW > OBW and VBW x3 of the RBW.



Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A



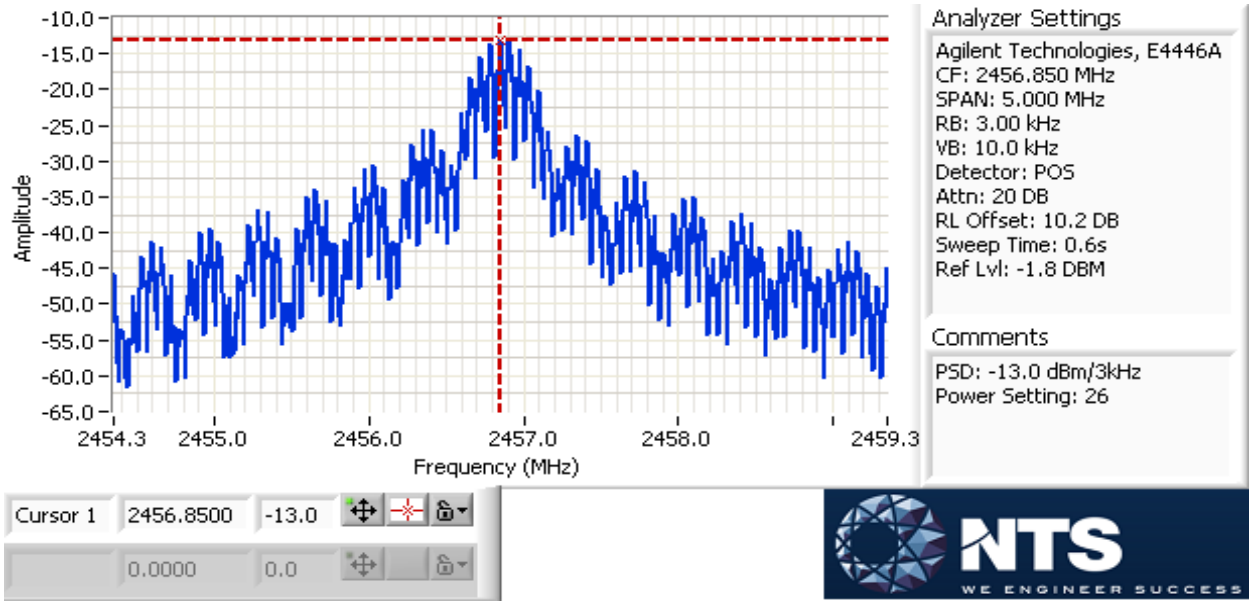


Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Run #2: Power spectral Density

Power Setting	Frequency (MHz)	PSD (dBm/3kHz) Note 1	Limit dBm/3kHz	Result
26	2442.85	-13.4	8.0	Pass
26	2449.85	-13.2	8.0	Pass
26	2456.85	-13.0	8.0	Pass

Note 1:	Test performed per method PKSPD, in KDB 558074. Power spectral density measured using: 3kHz ≤ RBW ≤ 100kHz, VBW=3*RBW, peak detector, span = 1.5*DTS BW, auto sweep time, max hold.

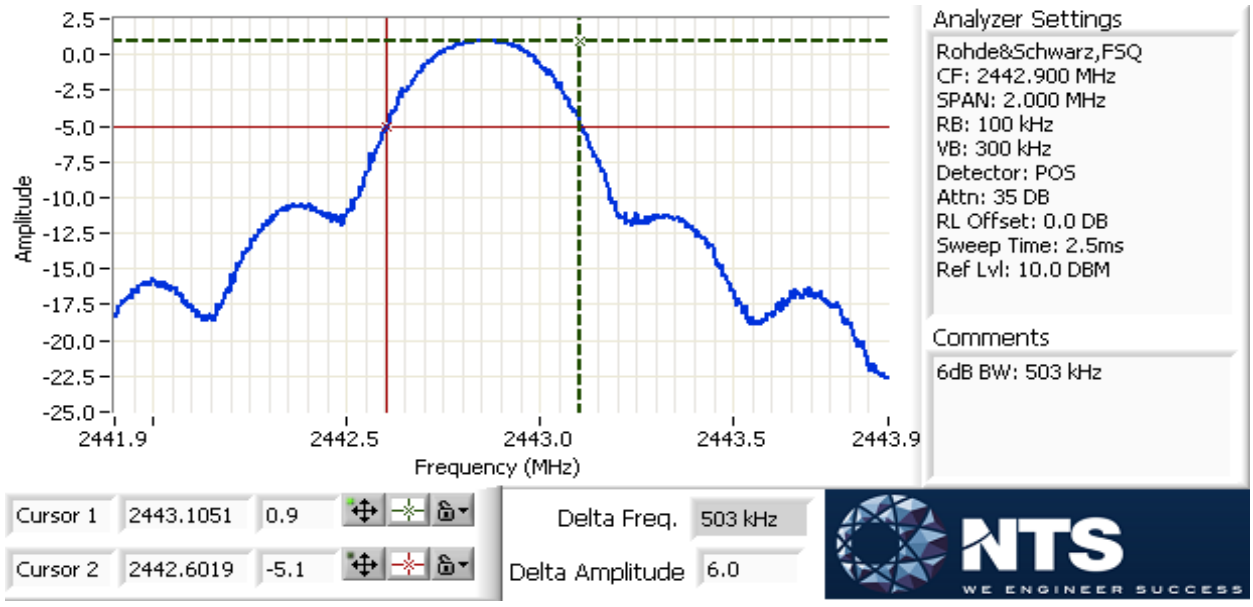


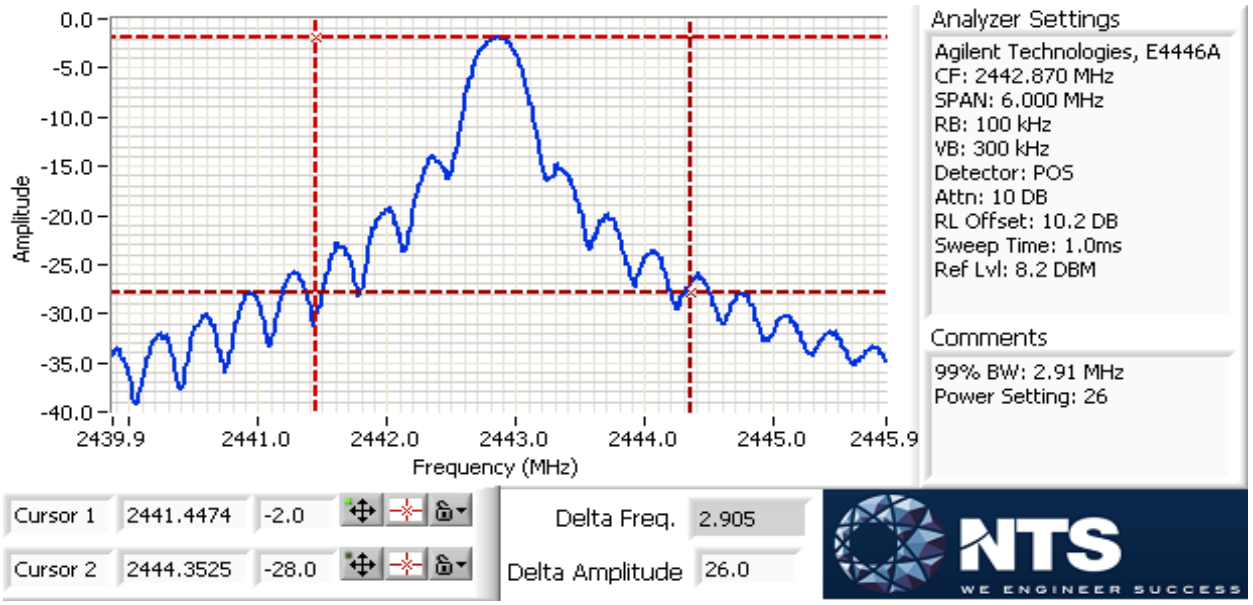
Run #3: Signal Bandwidth

Power Setting	Frequency (MHz)	Bandwidth (MHz)		RBW Setting (kHz)	
		6dB	99%	DTS	99%
26	2443	0.503	2.91	100	100
26	2450	0.506	2.88	100	100
26	2457	0.519	2.89	100	100

Note 1:	DTS BW: RBW=100kHz, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time, Span 2-5 times measured BW. 99% BW: RBW=1-5% of 99%BW, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time. Span 1.5-5 times OBW.

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A





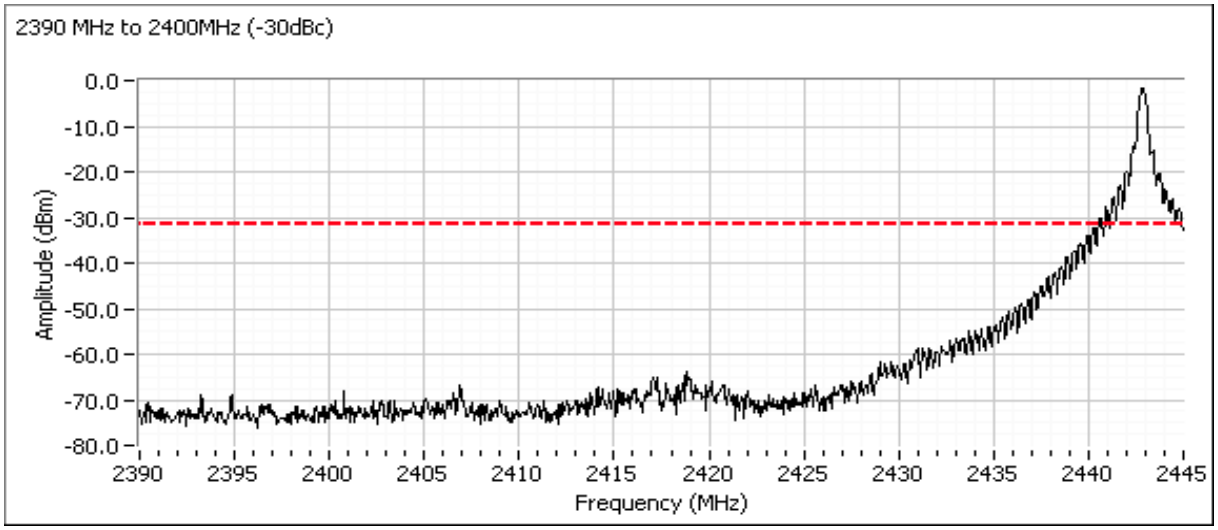
Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Run #4a: Out of Band Spurious Emissions

RBW = 100 kHz and VBW = 300 kHz for all plots.

Plots for low channel

Additional plot showing compliance with -30dBc limit from 2390 MHz to 2400 MHz. Radiated measurements used to show compliance with the limits in the restricted band below 2390 MHz.



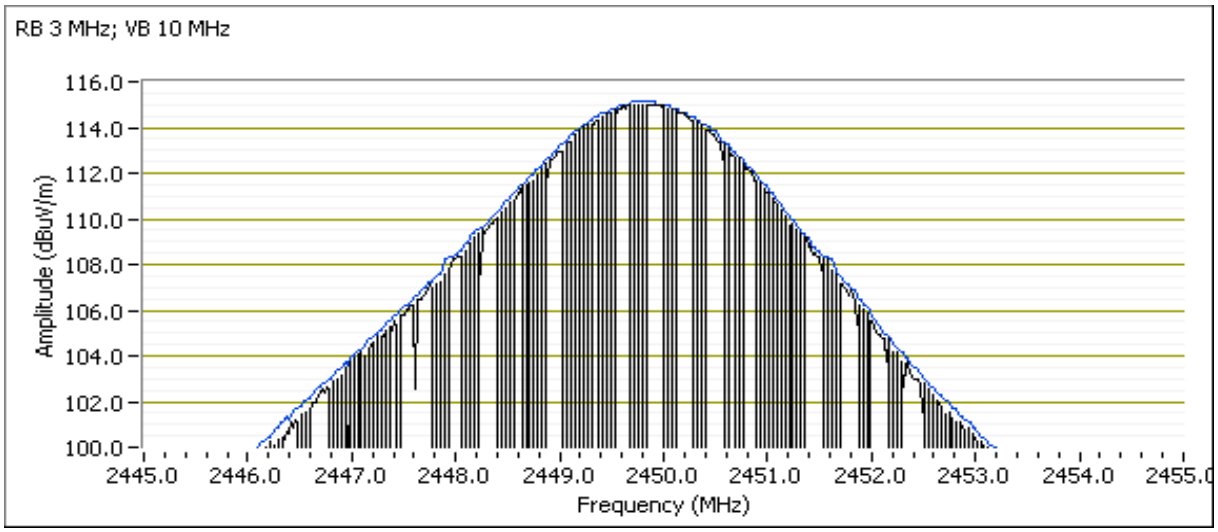
Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	N/A

Radiated Power and Antenna Gain

The following measurement of maximum field strength was made using a spectrum analyzer with the noted settings and the device configured in a continuous transmit mode. The radiated power was calculated form the field strength and then the antenna gain calculated from the measured antenna conducted power.

Date of Test: 8/31/2017
Test Engineer: Deniz Demirci
Test Location: Fremont Chamber #4

Radiated field strenght:	115.4	dBuV/m @ 3 m
Radiated e.i.r.p. power:	20.2	dBm e.i.r.p.
Conducted power:	19.8	dBm
Antenna gain (2.4 GHz):	0.4	dBi



Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	B

Conducted 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: 11/22/2017
Test Engineer: Joseph Cadigal/Jude Semana
Test Location: Fremont Chamber #4

Config. Used: 1
Config Change: none
EUT Voltage: 120V/60Hz

General Test Configuration

For tabletop equipment, the EUT was located on a wooden table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN. A second LISN was used for all local support equipment. Remote support equipment was located outside of the semi-anechoic chamber. Any cables running to remote support equipment where routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

Ambient Conditions:

Temperature: 24 °C
Rel. Humidity: 38 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	CE, AC Power,120V/60Hz	Class B	Pass	44.2 dBµV @ 0.154 MHz (-21.6 dB)
2	CE, AC Power,230V/50Hz	Class B	Pass	45.8 dBµV @ 0.155 MHz (-19.9 dB)

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

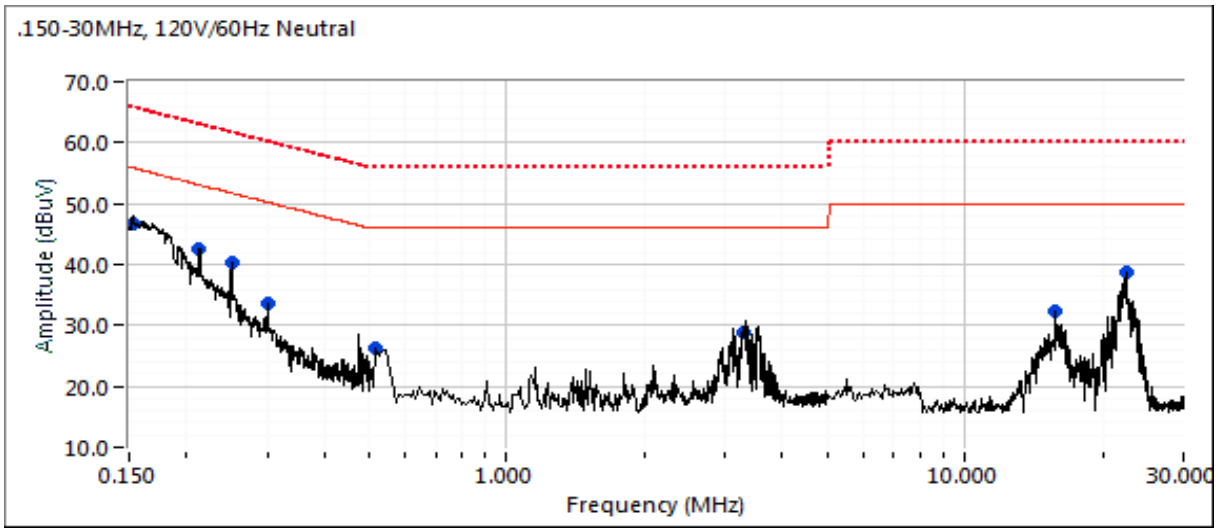
No deviations were made from the requirements of the standard.

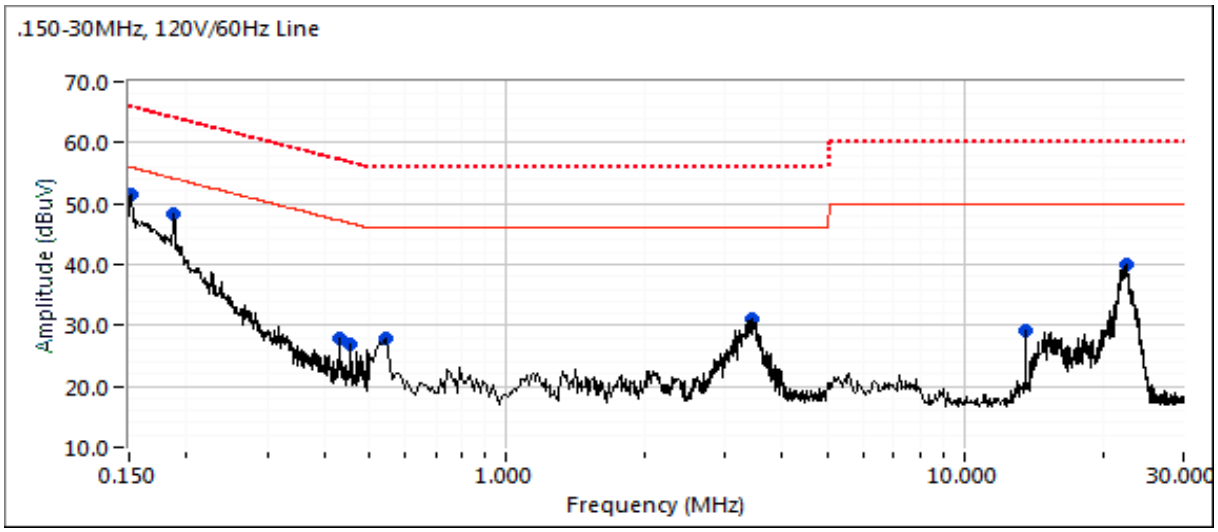
Setup of EUT

EUT was transmitting at the fundamental during scans

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	B

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz





Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	B

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

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.252	40.4	Neutral	51.7	-11.3	Peak	
0.213	42.6	Neutral	53.1	-10.5	Peak	
0.154	46.6	Neutral	55.8	-9.2	Peak	
0.302	33.6	Neutral	50.2	-16.6	Peak	
0.524	26.3	Neutral	46.0	-19.7	Peak	
3.282	28.7	Neutral	46.0	-17.3	Peak	
22.500	38.8	Neutral	50.0	-11.2	Peak	
15.745	32.2	Neutral	50.0	-17.8	Peak	
0.151	51.5	Line	55.9	-4.4	Peak	
0.188	48.4	Line	54.1	-5.7	Peak	
0.431	28.0	Line	47.2	-19.2	Peak	
0.456	27.0	Line	46.8	-19.8	Peak	
0.544	27.8	Line	46.0	-18.2	Peak	
3.455	31.2	Line	46.0	-14.8	Peak	
13.550	29.0	Line	50.0	-21.0	Peak	
22.475	40.0	Line	50.0	-10.0	Peak	

Final quasi-peak and average readings

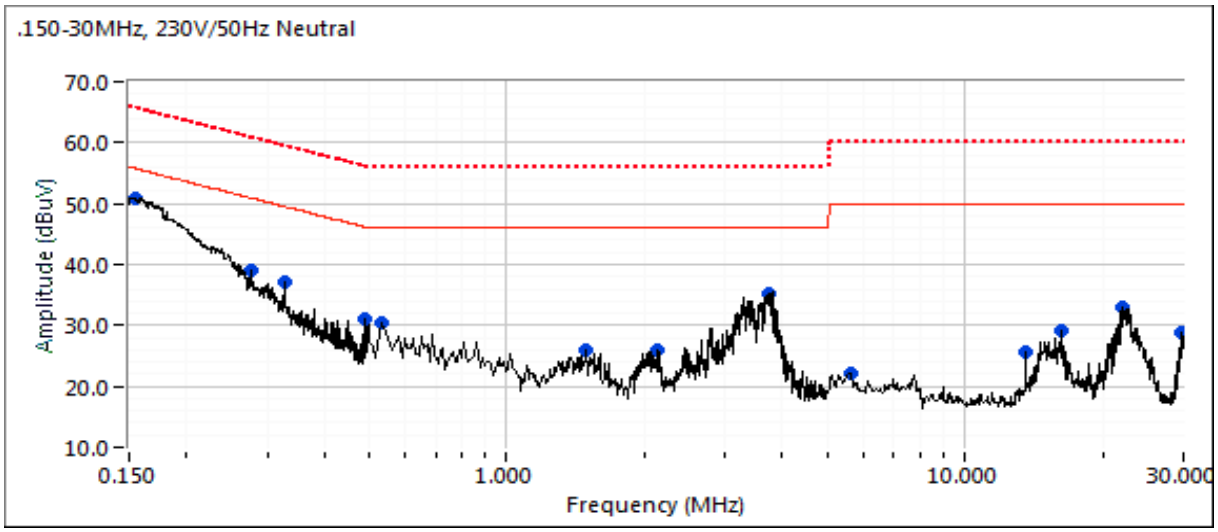
Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.154	44.2	Neutral	65.8	-21.6	QP	QP (1.00s)
0.151	42.4	Line	65.9	-23.5	QP	QP (1.00s)
0.188	37.4	Line	64.1	-26.7	QP	QP (1.00s)
0.154	28.4	Neutral	55.8	-27.4	AVG	AVG (0.10s)
0.213	34.6	Neutral	63.1	-28.5	QP	QP (1.00s)
0.151	26.7	Line	55.9	-29.2	AVG	AVG (0.10s)
0.188	22.8	Line	54.1	-31.3	AVG	AVG (0.10s)
0.252	30.1	Neutral	61.7	-31.6	QP	QP (1.00s)
22.500	28.0	Neutral	60.0	-32.0	QP	QP (1.00s)
0.213	21.0	Neutral	53.1	-32.1	AVG	AVG (0.10s)
22.475	27.9	Line	60.0	-32.1	QP	QP (1.00s)
0.252	18.6	Neutral	51.7	-33.1	AVG	AVG (0.10s)
0.302	13.2	Neutral	50.2	-37.0	AVG	AVG (0.10s)
0.302	22.5	Neutral	60.2	-37.7	QP	QP (1.00s)
0.544	18.3	Line	56.0	-37.7	QP	QP (1.00s)
0.431	8.0	Line	47.2	-39.2	AVG	AVG (0.10s)
0.524	6.5	Neutral	46.0	-39.5	AVG	AVG (0.10s)
0.544	6.5	Line	46.0	-39.5	AVG	AVG (0.10s)

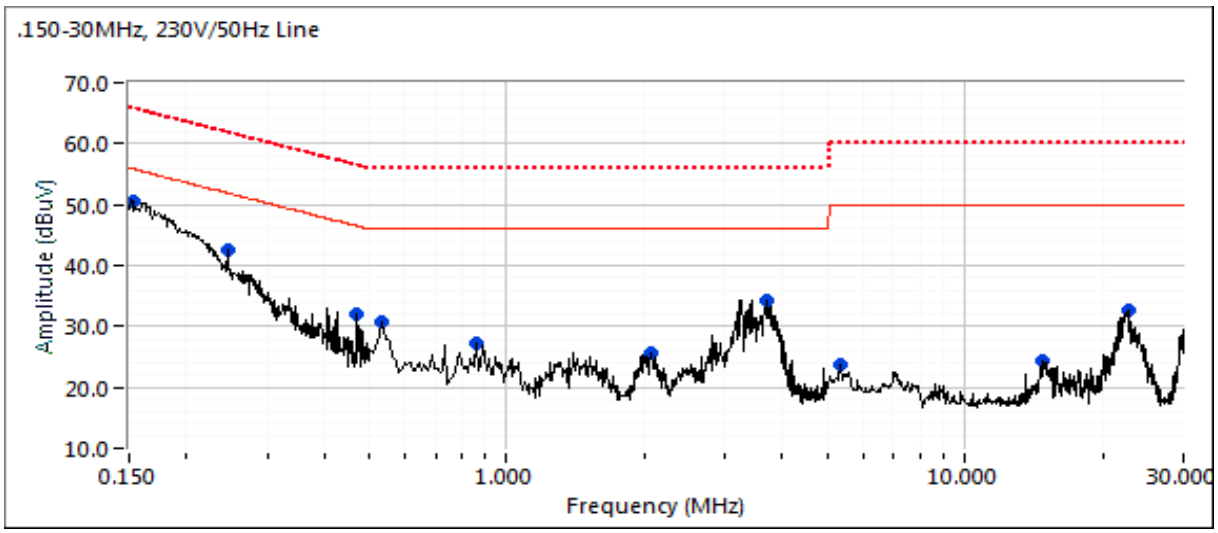
Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	B

3.282	16.5	Neutral	56.0	-39.5	QP	QP (1.00s)
0.524	16.4	Neutral	56.0	-39.6	QP	QP (1.00s)
0.456	6.6	Line	46.8	-40.2	AVG	AVG (0.10s)
3.455	15.8	Line	56.0	-40.2	QP	QP (1.00s)
0.431	16.0	Line	57.2	-41.2	QP	QP (1.00s)
0.456	15.6	Line	56.8	-41.2	QP	QP (1.00s)
15.745	18.5	Neutral	60.0	-41.5	QP	QP (1.00s)
3.282	4.4	Neutral	46.0	-41.6	AVG	AVG (0.10s)
3.455	4.4	Line	46.0	-41.6	AVG	AVG (0.10s)
22.500	5.2	Neutral	50.0	-44.8	AVG	AVG (0.10s)
22.475	5.2	Line	50.0	-44.8	AVG	AVG (0.10s)
15.745	2.9	Neutral	50.0	-47.1	AVG	AVG (0.10s)
13.550	1.4	Line	50.0	-48.6	AVG	AVG (0.10s)
13.550	9.2	Line	60.0	-50.8	QP	QP (1.00s)

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	B

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz





Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	B

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

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.329	*37.2*	*Neutral*	*49.5*	*-12.3*	*Peak*	
0.276	*39.1*	*Neutral*	*50.9*	*-11.8*	*Peak*	
0.155	*50.9*	*Neutral*	*55.7*	*-4.8*	*Peak*	
0.492	*31.2*	*Neutral*	*46.1*	*-14.9*	*Peak*	
0.536	*30.5*	*Neutral*	*46.0*	*-15.5*	*Peak*	
1.492	*26.0*	*Neutral*	*46.0*	*-20.0*	*Peak*	
2.123	*26.0*	*Neutral*	*46.0*	*-20.0*	*Peak*	
3.719	*35.3*	*Neutral*	*46.0*	*-10.7*	*Peak*	
5.651	*22.2*	*Neutral*	*50.0*	*-27.8*	*Peak*	
13.567	*25.5*	*Neutral*	*50.0*	*-24.5*	*Peak*	
16.172	*29.1*	*Neutral*	*50.0*	*-20.9*	*Peak*	
21.984	*33.0*	*Neutral*	*50.0*	*-17.0*	*Peak*	
29.800	*28.9*	*Neutral*	*50.0*	*-21.1*	*Peak*	
0.153	*50.6*	*Line 1*	*55.8*	*-5.2*	*Peak*	
0.246	*42.5*	*Line 1*	*51.9*	*-9.4*	*Peak*	
0.469	*32.1*	*Line 1*	*46.5*	*-14.4*	*Peak*	
0.536	*30.8*	*Line 1*	*46.0*	*-15.2*	*Peak*	
0.861	*27.1*	*Line 1*	*46.0*	*-18.9*	*Peak*	
2.060	*25.6*	*Line 1*	*46.0*	*-20.4*	*Peak*	
3.710	*34.1*	*Line 1*	*46.0*	*-11.9*	*Peak*	
5.351	*23.8*	*Line 1*	*50.0*	*-26.2*	*Peak*	
14.770	*24.4*	*Line 1*	*50.0*	*-25.6*	*Peak*	
22.685	*32.8*	*Line 1*	*50.0*	*-17.2*	*Peak*	

Final quasi-peak and average readings

Frequency	Level	AC	Class B		Detector	Comments
MHz	dBµV	Line	Limit	Margin	QP/Ave	
0.155	45.8	Neutral	65.7	-19.9	QP	QP (1.00s)
0.152	44.9	Line 1	65.9	-21.0	QP	QP (1.00s)
0.155	29.7	Neutral	55.7	-26.0	AVG	AVG (0.10s)
0.247	35.1	Line 1	61.9	-26.8	QP	QP (1.00s)
0.152	28.6	Line 1	55.9	-27.3	AVG	AVG (0.10s)
0.276	32.0	Neutral	60.9	-28.9	QP	QP (1.00s)
0.247	21.0	Line 1	51.9	-30.9	AVG	AVG (0.10s)
0.328	27.1	Neutral	59.5	-32.4	QP	QP (1.00s)
0.276	18.0	Neutral	50.9	-32.9	AVG	AVG (0.10s)
0.328	15.2	Neutral	49.5	-34.3	AVG	AVG (0.10s)
3.711	21.0	Neutral	56.0	-35.0	QP	QP (1.00s)

Client:	EBR Systems	Job Number:	JD106124
Model:	5100	T-Log Number:	T106196
		Project Manager:	Christine Krebill
Contact:	Daryl Jamgotchian	Project Coordinator:	-
Standard:	FCC Parts 15C & 95, EN 301 839 v2.1.1, EN 300 328 v2.1.1, EN 301 489-1v2.1.1, EN301 489-27 v2.1.1	Class:	B

0.535	21.0	Line 1	56.0	-35.0	QP	QP (1.00s)
0.534	20.9	Neutral	56.0	-35.1	QP	QP (1.00s)
0.492	20.1	Neutral	56.1	-36.0	QP	QP (1.00s)
0.492	9.6	Neutral	46.1	-36.5	AVG	AVG (0.10s)
0.469	20.0	Line 1	56.5	-36.5	QP	QP (1.00s)
3.713	18.8	Line 1	56.0	-37.2	QP	QP (1.00s)
0.534	8.7	Neutral	46.0	-37.3	AVG	AVG (0.10s)
0.535	8.6	Line 1	46.0	-37.4	AVG	AVG (0.10s)
0.469	9.0	Line 1	46.5	-37.5	AVG	AVG (0.10s)
3.711	6.2	Neutral	46.0	-39.8	AVG	AVG (0.10s)
3.713	5.9	Line 1	46.0	-40.1	AVG	AVG (0.10s)
22.734	19.3	Line 1	60.0	-40.7	QP	QP (1.00s)
0.869	4.2	Line 1	46.0	-41.8	AVG	AVG (0.10s)
21.973	18.2	Neutral	60.0	-41.8	QP	QP (1.00s)
0.869	14.1	Line 1	56.0	-41.9	QP	QP (1.00s)
2.053	4.0	Line 1	46.0	-42.0	AVG	AVG (0.10s)
2.120	3.9	Neutral	46.0	-42.1	AVG	AVG (0.10s)
1.489	3.3	Neutral	46.0	-42.7	AVG	AVG (0.10s)
2.053	13.2	Line 1	56.0	-42.8	QP	QP (1.00s)
1.489	12.6	Neutral	56.0	-43.4	QP	QP (1.00s)
2.120	11.2	Neutral	56.0	-44.8	QP	QP (1.00s)
5.636	4.4	Neutral	50.0	-45.6	AVG	AVG (0.10s)
5.387	4.2	Line 1	50.0	-45.8	AVG	AVG (0.10s)
29.783	14.0	Neutral	60.0	-46.0	QP	QP (1.00s)
21.973	3.8	Neutral	50.0	-46.2	AVG	AVG (0.10s)
22.734	3.3	Line 1	50.0	-46.7	AVG	AVG (0.10s)
29.783	2.4	Neutral	50.0	-47.6	AVG	AVG (0.10s)
16.132	12.1	Neutral	60.0	-47.9	QP	QP (1.00s)
16.132	1.8	Neutral	50.0	-48.2	AVG	AVG (0.10s)
13.578	1.6	Neutral	50.0	-48.4	AVG	AVG (0.10s)
14.768	1.4	Line 1	50.0	-48.6	AVG	AVG (0.10s)
5.636	9.6	Neutral	60.0	-50.4	QP	QP (1.00s)
14.768	9.2	Line 1	60.0	-50.8	QP	QP (1.00s)
5.387	8.7	Line 1	60.0	-51.3	QP	QP (1.00s)
13.578	7.6	Neutral	60.0	-52.4	QP	QP (1.00s)

End of Report

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