

EMC TEST REPORT



NVLAP Lab Code 200033-0

Standard(s):

47 CFR FCC Part 90, Subpart M
RSS 137, Issue 2, 2009
47 CFR FCC Parts 15.107 and 15.109
FCC ID: M4Z6204
IC ID: 458C-6204

Product: Toll RFID READER and Reader Redundancy Switch

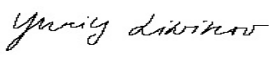
Model: 6204 and RRS

3M Division: TSSD

Report Number: RE1407019-2

Report Issue Date: November 13, 2014

Report Prepared By:

Signature: 

Yuriy Litvinov
Lead EMC Engineer

Tested By:
3M EMC Laboratory
410 E. Fillmore Avenue, Building 76-01-1
St. Paul, Minnesota 55107-1000

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1.0 Test Summary

Based on the results of our investigation, we have concluded the product tested complies with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

No	Standard	Test Requirements	Result	Comments
4.1	Part15.107/RSS Gen	Conducted Emissions	pass	
4.2	Part 15.109/RSS-Gen	Radiated Emissions	pass	
4.3	Part 90.205/RSS137, 6.4	Conducted Output Power	pass	
4.4	Part 90.210/RSS137, 6.1	Occupied Bandwidth	pass	
4.5	Part 90.210/RSS137, 6.5	Spurious Emissions at Antenna terminals	pass	
4.6	Part 90.210/RSS137, 6.5	Field Strength of Spurious Emissions	pass	
4.7	Part 90.213/RSS137, 6.3	Frequency Stability	N/A	See note below
4.8	Part 2.1091/RSS102	RF Exposure Compliance	pass	

Note:	Fixed Non-Multilateral LMS transmitters with an emission bandwidth located more than 40 kHz from the band edge are exempt from meeting the frequency stability limits.
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1.1 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements. The measurement uncertainty figures were calculated and correspond to a coverage factor of k=2, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Radiated emissions	5.20 dB
Conducted emissions	3.60 dB
Harmonics and Flicker	3.32 dB

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2.0 Equipment Description

2.1	Equipment Under Test	
Description:	The four-port Toll RFID Reader is a multi-protocol, multi-regional Radio Frequency Identification (RFID) System that operates in the 902-928 MHz UHF band. All antenna ports operate sequentially with only one port transmitting at the time from a single transmit source (RF path is switched between selected ports) 3M Reader Redundancy Switch (RRS) interfaces with two RFID Readers and associated antenna systems to provide an antenna change over facility in the event of a reader failure. The RRS is controlled by TTL level input signals.	
Model(s):	6204 and RRS (SKU#75-0302-0128)	
Serial number(s):	ID6204000021 RRS00181	
Firmware:	Version # 1.4.25483	
Client Contact:	Name:	Phone:
	Dave Missimer Randal D. Roebuck Jason Bram	919-281-1559 512-984-5688 512-984-5431
3M Division:	Traffic Safety and Security	
Modifications:	None	
Frequency Range (MHz) :	902.75 – 903.25MHz	911.25-920.45MHz
Modulation Type:	K1D	
RFID Protocols:	ISO 18000-6B ISO 18000-6C ISO 10374 (ATA)	PS111 TDM (IAG) Title 21 (T21)
Maximum Output Power:	35.0dBm	
Equipment Category:	Non-Multilateral LMS	
Rated Input Power:	Voltage: ☒ 120VAC ☐ 230VAC ☐ VDC	
	Frequency: ☐ 50Hz ☒ 60Hz Current: ☒ 2.0A	
Test Dates:	08/04-09/18/2014	
Received Date:	06/26/2014	
Received Conditions:	☐ Poor ☒ Good	
	☐ Prototype ☒ Production	

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3.0 EUT Configuration

3.1 Support Equipment

No.	Product Type	Manufacturer	Model	Comments
1	Power Supply	TDK-Lambda	DSP100-24	24VDC/4.4A
2				

3.2 Cables/Ports

No.	Name	Type	Length	Shielding	Comments
1	RS232/Ethernet/Power Interface	Reader Wire Harness	13m	Unshielded	Digital I/O Connection
2	Ethernet/TTL Interface	Switch Wire Harness	2m	Unshielded	I/O Control

3.3 Operating Condition of EUT

	Operation Modes
☐	Stand by
☒	Continuous Monitored Operation
☐	Continuous Unmonitored Operation
☒	RFID reader was programmed for FHSS operation using RTS RFID software via Command Line Interface.
☒	FCC 90 Dense mode – 911.25-920.75MHz with 500KHz channels
☒	FCC 90 Band – 910.95-920.45MHz with 200KHz channels
☒	FCC 90 Low Band – 902.75-903.25MHz with 200KHz channels

3.4 Exercising of EUT

No.	Description of EUT Exercising
1	Transmitting modulated carrier at the maximum rated RF output power
2	
3	

4.0 Test Conditions and Results

4.1	Conducted Emissions Data			
Method:	The AMN was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane. This distance was between the closest points of the AMN and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the AMN. All power was connected to the system through Artificial Mains Network (AMN). Conducted voltage measurements on mains lines were made at the output of the AMN.			
Test Verification: ☒	Laboratory Ambient Temperature	21°C		
	Relative Humidity	45%		
Reference Standard:	☐ ANSI C63.4:2003 ☒ ANSI C63.4:2009 ☐ ANSI C63.10:2009 ☒ FCC Part 15.107/RSS Gen ☐		Measurement Point ☒ Mains ☐ Telecommunication ports ☐	
Frequency Range:	☒ 150KHz to 30KHz ☐			
Nominal Voltage:	☒ 120VAC ☐ 230VAC ☐			
Tested By:	Mike Schultz <i>MS</i>		Date: 09/15/2014	
Limits				
Frequency (MHz)	Limit dB (µV)			
	Quasi-Peak	Average	Result	Comments
0.15 to 0.50	66 to 56	56 to 46	pass	
0.50 to 5	56	46	pass	
5 to 30	60	50	pass	
Modifications:				
Note:				

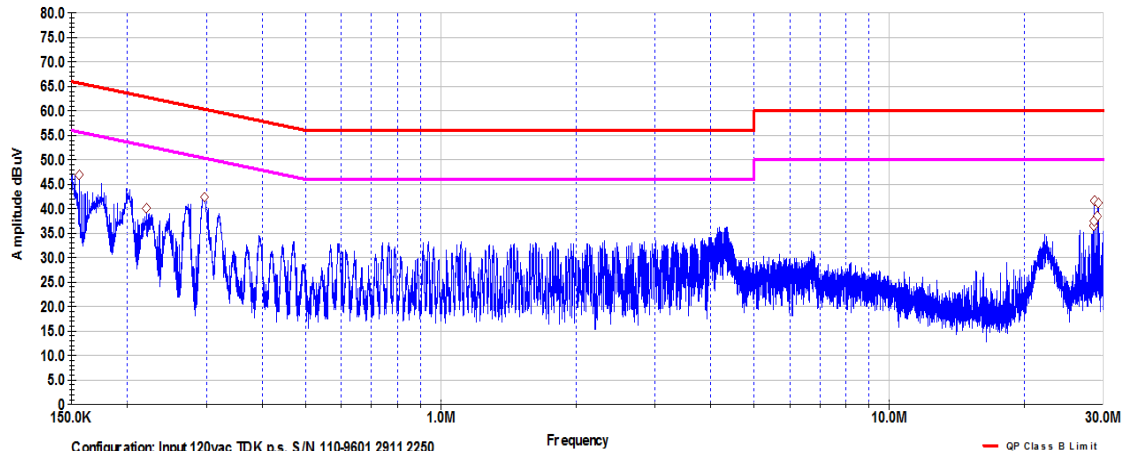


Frequency (MHz)	QP Line 1 dB (μV)	AVG Line 1 dB (μV)	QP Limit dB (μV)	AVG Limit dB (μV)	QP Margin dB	AVG Margin dB
0.154	43.31	38.33	65.78	55.78	-22.47	-17.45
0.221	38.44	34.31	62.78	52.78	-24.34	-18.47
0.294	41.4	39.16	60.42	50.42	-19.02	-11.26
28.686	41.63	38.56	60	50	-18.37	-11.44
28.687	41.22	38.21	60	50	-18.78	-11.79
29.234	40.43	36.73	60	50	-19.57	-13.27
Frequency (MHz)	QP Line 2 dB (μV)	AVG Line 2 dB (μV)	QP Limit dB (μV)	AVG Limit dB (μV)	QP Margin dB	AVG Margin dB
0.153	44.04	39.46	65.86	55.86	-21.82	-16.39
0.221	37.67	33.45	62.78	52.78	-25.11	-19.33
0.295	41.96	40.34	60.39	50.39	-18.43	-10.05
4.275	35.29	29.09	56	46	-20.71	-16.91
27.158	35.84	31.67	60	50	-24.16	-18.33
28.686	41.67	38.61	60	50	-18.33	-11.39
Voltage		☒ 120VAC ☐ 230VAC ☐				
Notes		RFID Reader 6204				



3M Company
Conducted Emissions
CISPR22_FCC Part 15, Class B, Line 1

RE Project# - RE1407019
Model # - 6204
EUT Description - RFID Reader with Reader Redundancy
Serial # - 6204000021 - RRS00181
EUT Power - 24 Vdc



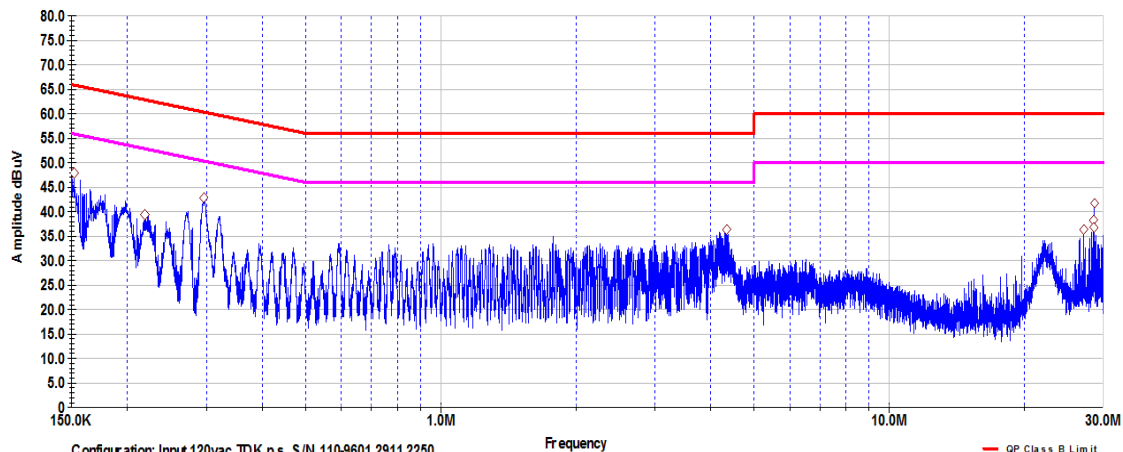
Configuration: Input 120vac TDK p.s. S/N 110-9601 2911 2250
Power Supply connected the 6204 RFID Reader.
Tested the 6204 RFID Reader with a Reader Redundancy Switch.
RFID has a dummy load attached.

— QP Class B Limit
— AVG Class B Limit
— Scan
◇ Top Peaks



3M Company
Conducted Emissions
CISPR22_FCC Part 15, Class B, Line 2

RE Project# - RE1407019
Model # - 6204
EUT Description - RFID Reader with Reader Redundancy
Serial # - 6204000021 - RRS00181
EUT Power - 24 Vdc



Configuration: Input 120vac TDK p.s. S/N 110-9601 2911 2250
Power Supply connected the 6204 RFID Reader.
Tested the 6204 RFID Reader with a Reader Redundancy Switch.
RFID has a dummy load attached.

— QP Class B Limit
— AVG Class B Limit
— Scan
◇ Top Peaks

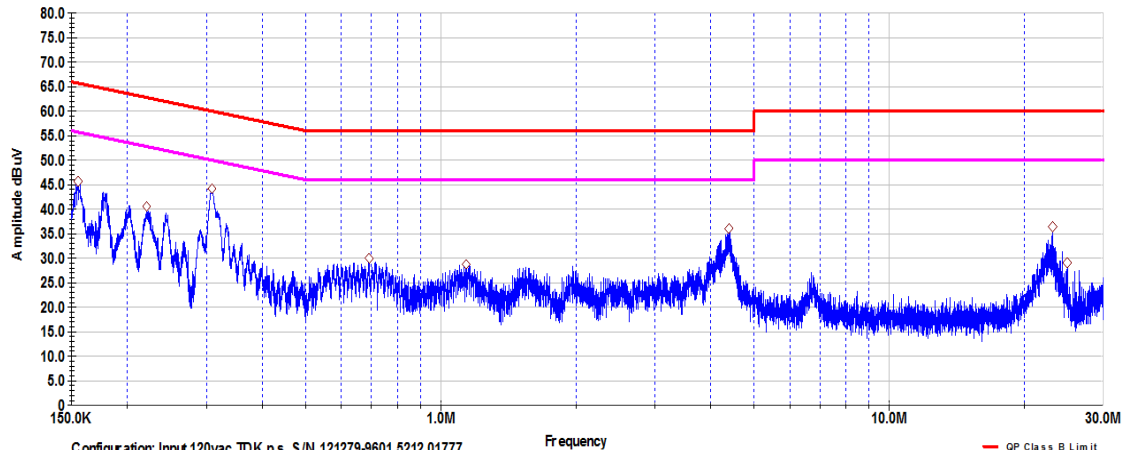


Frequency (MHz)	QP Line 1 dB (μV)	AVG Line 1 dB (μV)	QP Limit dB (μV)	AVG Limit dB (μV)	QP Margin dB	AVG Margin dB
0.155	44.33	40.33	65.75	55.75	-21.42	-15.41
0.222	38.22	34.5	62.75	52.75	-24.53	-18.25
0.308	42.6	40.09	60.02	50.02	-17.42	-9.93
0.574	27.31	23.43	56	46	-28.69	-22.57
4.362	34.6	29.45	56	46	-21.4	-16.55
23.128	37.72	34.63	60	50	-22.28	-15.37
24.348	31.62	42.73	60	50	-28.38	-7.27
Frequency (MHz)	QP Line 2 dB (μV)	AVG Line 2 dB (μV)	QP Limit dB (μV)	AVG Limit dB (μV)	QP Margin dB	AVG Margin dB
0.154	43.87	39.43	65.77	55.77	-21.9	-16.34
0.223	38.32	35.3	62.72	52.72	-24.4	-17.41
0.309	42.48	39.06	60.01	50.01	-17.53	-10.95
0.69	27.93	23.78	56	46	-28.07	-22.22
1.147	27.81	23.35	56	46	-28.19	-22.65
4.389	33.55	27.46	56	46	-22.45	-18.54
23.127	36.82	33.52	60	50	-23.18	-16.48
24.899	29.03	24.7	60	50	-30.97	-25.3
Voltage		☒ 120VAC ☐ 230VAC ☐				
Notes		RF Switch				



3M Company
Conducted Emissions
CISPR22_FCC Part 15, Class B, Line 2

RE Project# - RE1407019
Model# - 6204
EUT Description - RFID Reader with Reader Redundancy
Serial# - 6204000021 - RRS00181
EUT Power - 24 Vdc

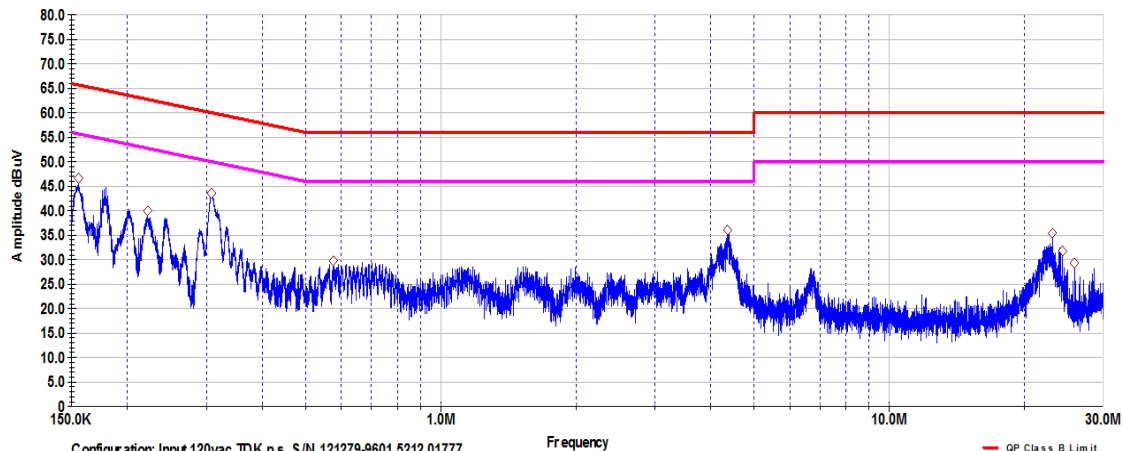


Configuration: Input 120vac TDK p.s. S/N 121279-9601 5212 01777
Power Supply connected to Reader Redundancy Switch.
Tested the 6204 RFID Reader with a Reader Redundancy Switch.
RFID has a dummy load attached.

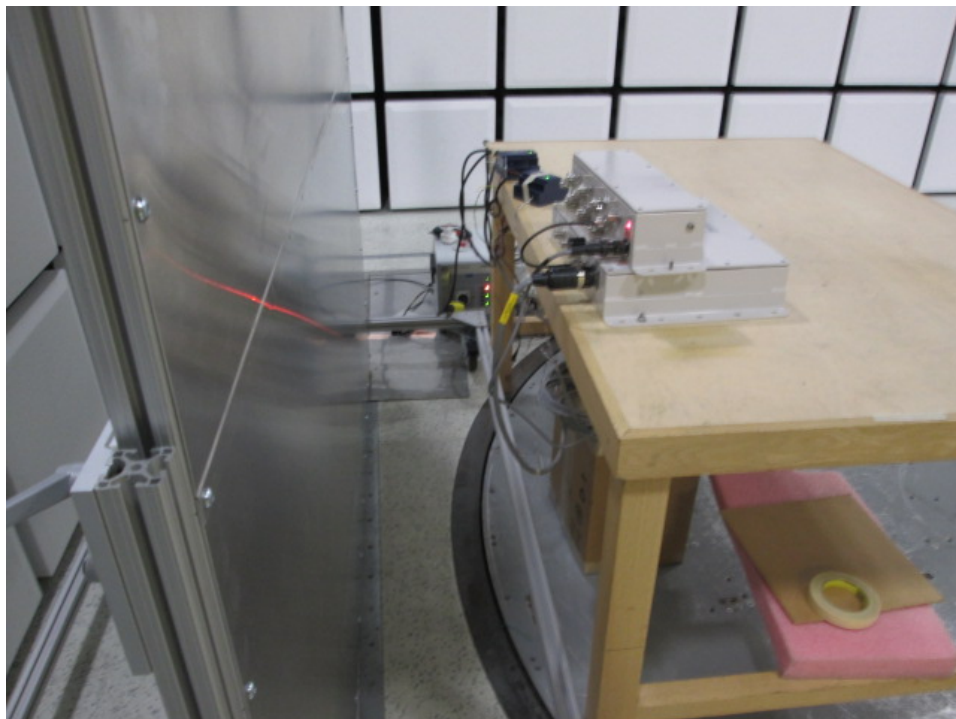


3M Company
Conducted Emissions
CISPR22_FCC Part 15, Class B, Line 1

RE Project# - RE1407019
Model# - 6204
EUT Description - RFID Reader with Reader Redundancy
Serial# - 6204000021 - RRS00181
EUT Power - 24 Vdc



Configuration: Input 120vac TDK p.s. S/N 121279-9601 5212 01777
Power Supply connected to Reader Redundancy Switch.
Tested the 6204 RFID Reader with a Reader Redundancy Switch.
RFID has a dummy load attached.

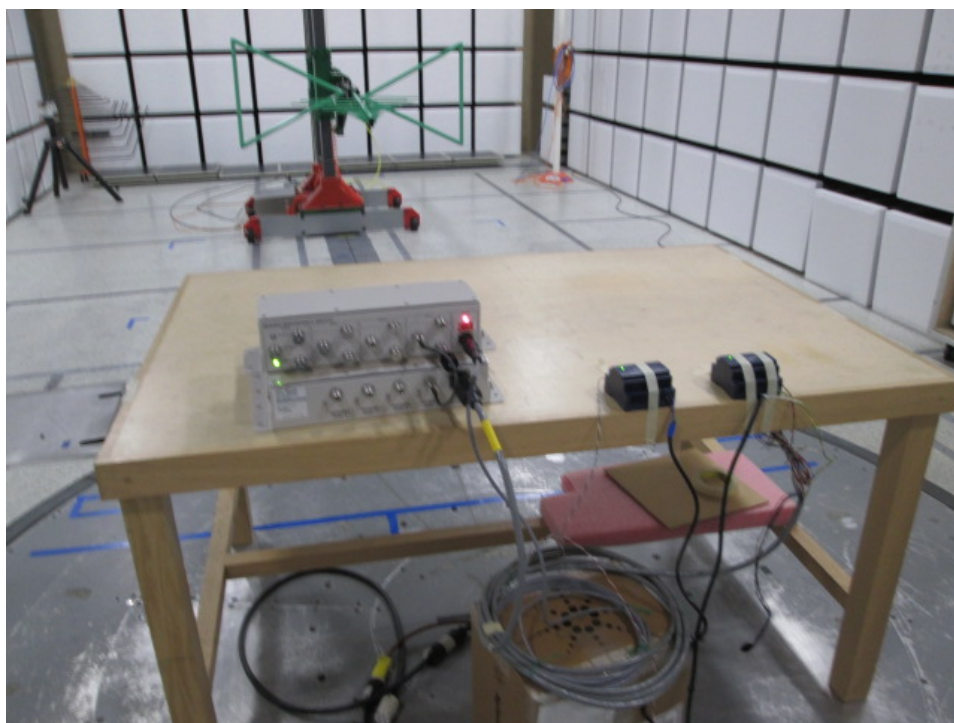


Test Set Up Photo

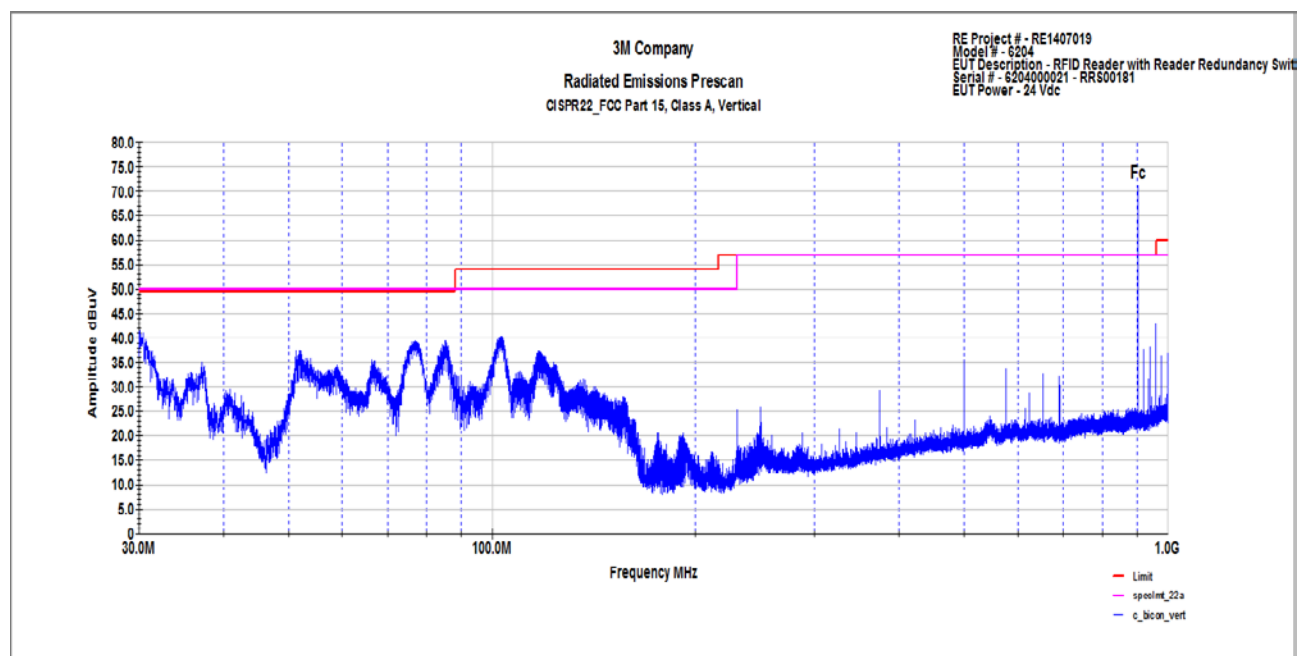
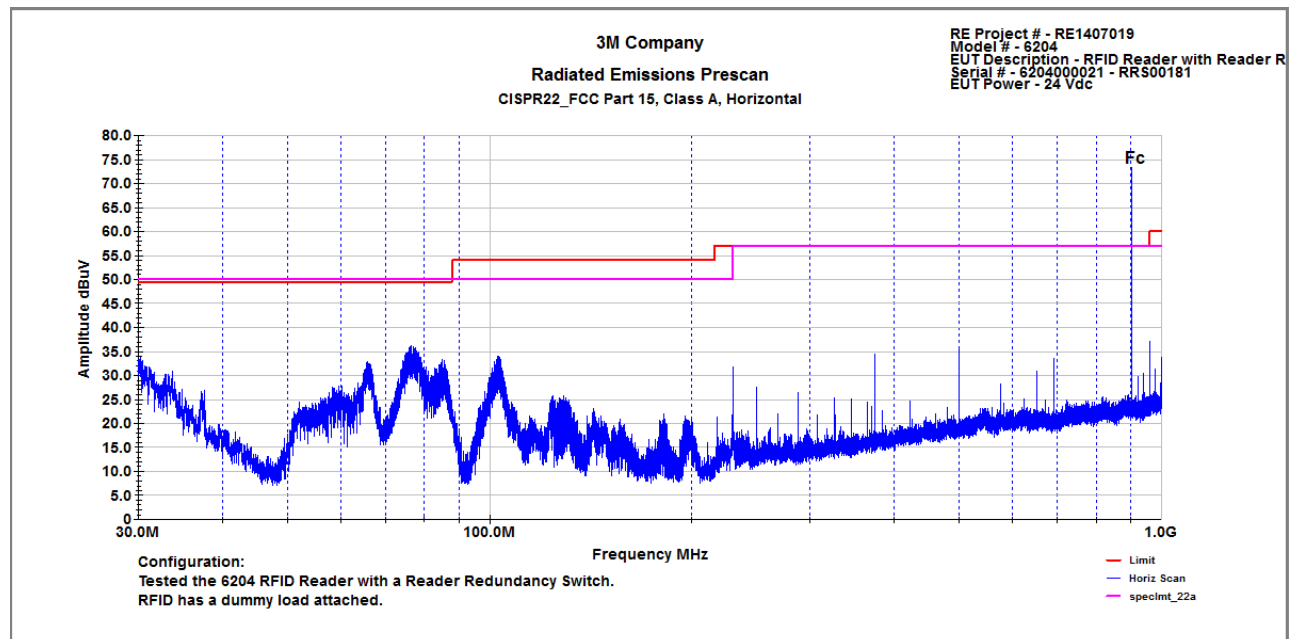
4.2	Radiated Emissions Data				
Method:	Measurements were made in a 3-meter semi-anechoic chamber that complies to CISPR 16. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in horizontal and vertical polarities. Final measurements (quasi-peak) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4 m. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.				
Test Verification: ☒		Laboratory Ambient Temperature		23°C	
		Relative Humidity		45%	
Reference Standard:		☐ ANSI C63.4:2003 ☒ ANSI C63.4:2009 ☐ ANSI C63.10:2009 ☒ FCC Part 15.109/RSS Gen ☐ FCC Part 15.209		Measurement Distance	
				☒ 3 Meters ☐	
Frequency Range:		☒ 30 MHz TO 10GHz ☐			
Nominal Voltage:		☒ 120VAC ☐ 230VAC ☐			
Tested By:		Mike Schultz <i>MS</i>		Date: 09/18/2014	
Limits - Class A					
Frequency (MHz)		Limit dB (µV/m)			
		Quasi-Peak	Average	Peak	Distance Results
30 to 230		40			10 pass
230 to 1000		47			10 pass
1000 to 3000			56	76	3 N/A
3000 to 6000			60	80	3 N/A
Limits - Class B					
30 to 230		30			10 N/A
230 to 1000		37			10 N/A
1000 to 3000			50	70	3 N/A
3000 to 6000			54	74	3 N/A

Modifications:	
Note:	For emission in the restricted bands, the limit of 15.209 was used.

Frequency (MHz)	Pol.	QP Reading dBμV/m	Total CF dB	Net at 3 m dBμV/m	Limit (dBμV/m)	Margin dB
30.12	V	18.4	21.62	40.02	49.5	-9.48
37.02	V	12.87	17.98	30.84	49.5	-18.66
51.34	V	22.86	11.31	34.17	49.5	-15.33
66.35	H	23.01	9.86	32.87	49.5	-16.63
77.1	V	25.63	10.62	36.26	49.5	-13.24
84.97	V	22.14	11.81	33.96	49.5	-15.54
102.43	V	22.92	14.96	37.87	54	-16.13
960	V	16.4	26.06	42.46	57	-14.54
Notes		Total CF = Antenna Factor + Cable Factor - AMP Gain				



Test Set Up Photo



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4.3	Conducted Output Power		
Method:	Measurements was performed with modulated carrier at the highest power level at which the transmitter is intended to operate. The carrier or mean power delivered to antenna was measured under normal test conditions. The analyzer offset was adjusted to compensate for the attenuator and other losses. The RF Power output listed in the table is the power delivered to the antenna.		
		Laboratory Ambient Temperature	23°C
		Relative Humidity	45%
Reference Standard:	☐ ANSI C63.10:2009 ☒ FCC Part 90.205/RSS 137 ☒ FCC Part 2.1046	Measurement Point ☒ Conducted ☐ Radiated ☐	
Frequency Range:	☒ 902.75-920.45MHz		
Limit ERP	902-927.25MHz	927.25-928MHz	
	☒ 30 Watts	☐ 300 Watts	
Nominal Voltage:	☒ 120VAC ☐ VDC		
Tested By:	Yuriy Litvinov	Date: 09/12/2014	

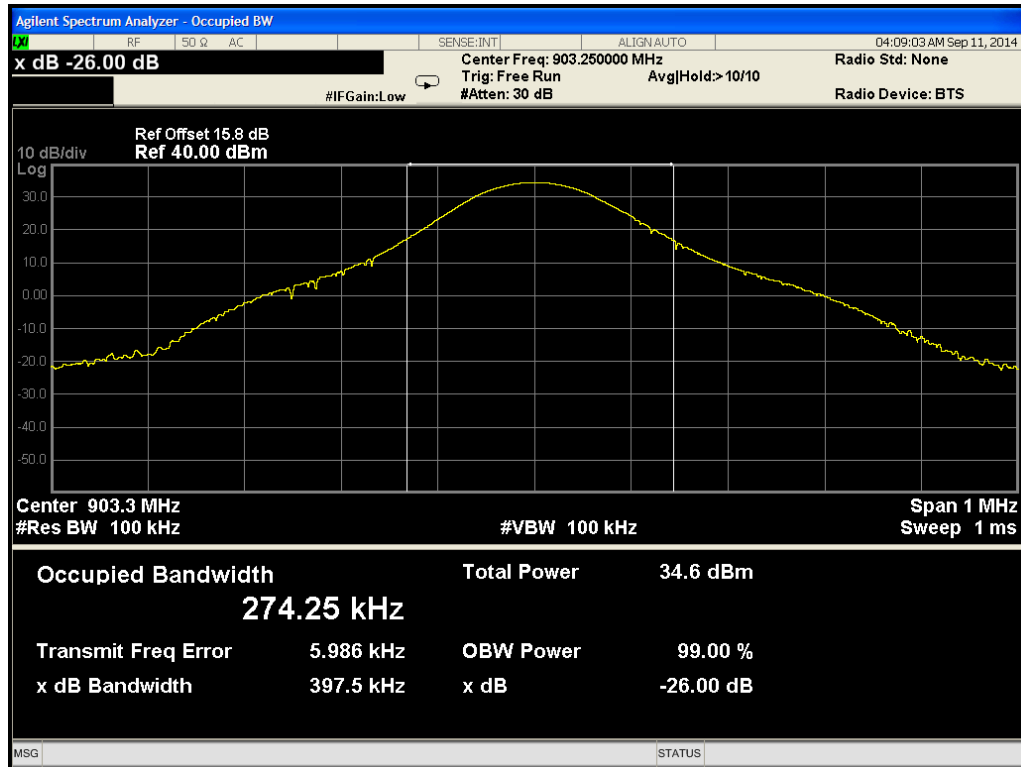
Frequency (MHz)	Operating Mode	RF Power Output (dBm)	RF Power Output (Watts)	OBW (KHz)
902.75	ISO10374(CW)	34.6	2.9	399.2
903.25	ISO10374(CW)	34.6	2.9	397.5
902.75	ISO18000-6C(ISOC)	34.8	3.0	431.8
903.25	ISO18000-6C(ISOC)	34.8	3.0	431.9
911.75	Title 21	35	3.16	1006.4
919.25	Title 21	35	3.16	1004.2
911.25	ISO18000-6C(ISOC)	34.5	2.8	423.5
920.25	ISO18000-6C(ISOC)	34.6	2.9	427.0
911.25	EASALARM	34.5	2.8	423.5
920.25	EASALARM	34.5	2.8	428.9
914.25	PS111	34	2.5	758.0
915.75	PS111	33.7	2.5	757.7
910.95	ISO18000-6C(ISOC)	34.6	2.9	421.6
920.45	ISO18000-6C(ISOC)	34.6	2.9	424.7

Note:	The devices may employ any type of modulation technique. The worst case modulations used by the device have been reported.
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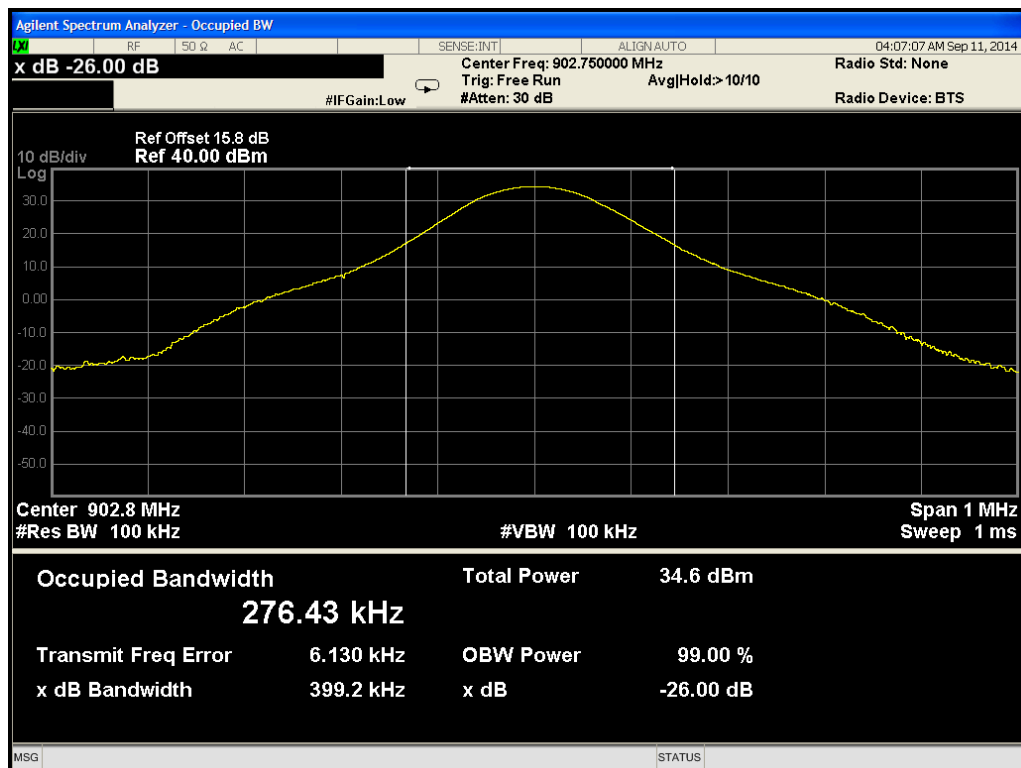
4.4	Occupied Bandwidth		
Method:	The measurements were made with transmitter set to transmit continuously modulated signal. The marker delta method was used to determine the 26dB bandwidth.		
	Laboratory Ambient Temperature	23°C	
	Relative Humidity	45%	
Reference Standard:	☐ FCC Part 15.109/ICES 003 ☒ FCC Part 90.209/RSS 137 ☒ FCC Part 2.1046	Measurement Point ☒ Conducted ☐ Radiated ☐ 	
Frequency Range:	☒ 902.75-920.45MHz		
Maximum OBW	902-904MHz	909.75-921.75MHz	
	☒ 2MHz	☒ 12MHz	
Nominal Voltage:	☒ 120VAC ☐ VDC		
Tested By:	Yuriy Litvinov	Date: 09/11/2014	

Note:	The devices may employ any type of modulation technique. The worst case modulations used by the device have been reported.
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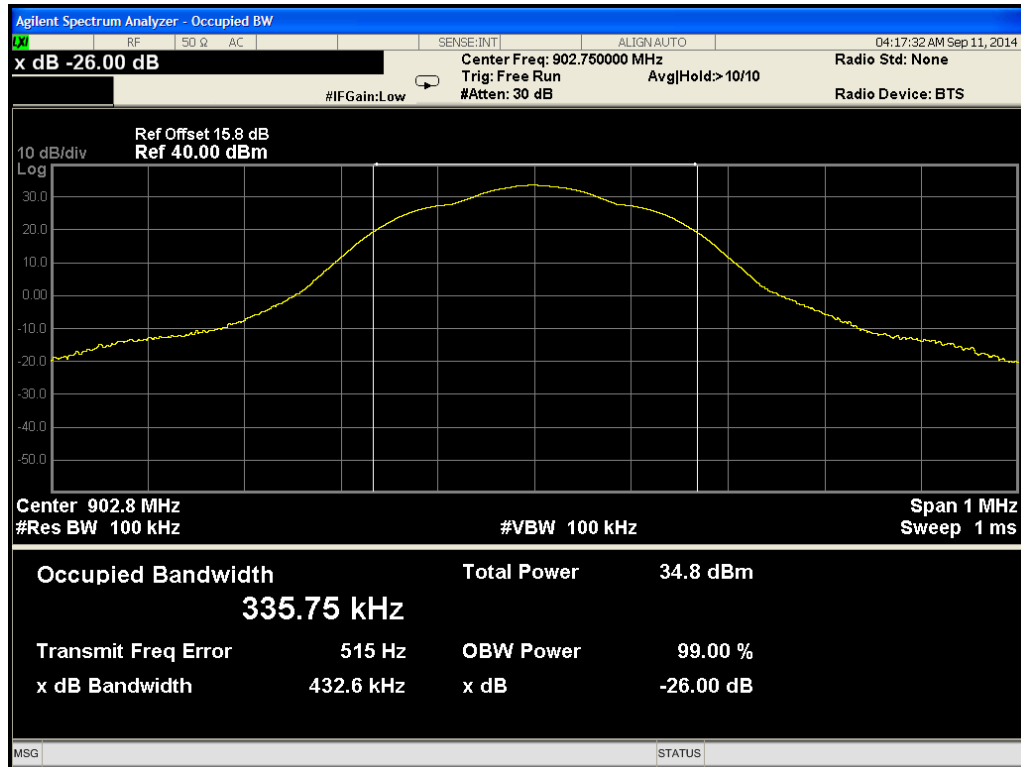
Operation Mode	Frequency Bands (MHz)	Occupied Bandwidth (KHz)
CW	902.75-903.25	399.2
ISO 18000-6C	902.75-903.25	432.6
ISO 18000-6C	911.25-920.25	427.1
PS111	914.25-915.75	755.8
Title 21	911.75-919.25	1006.4
ISO 18000-6C	910.95-920.45	421.1



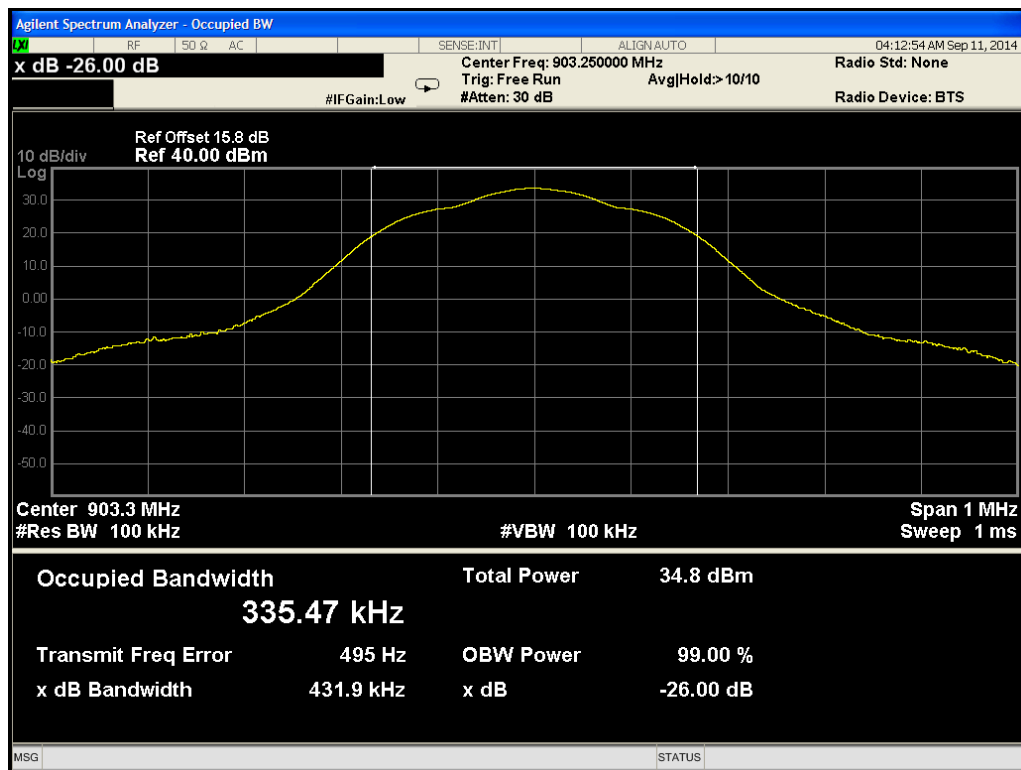
Occupied Bandwidth – Low Band CW



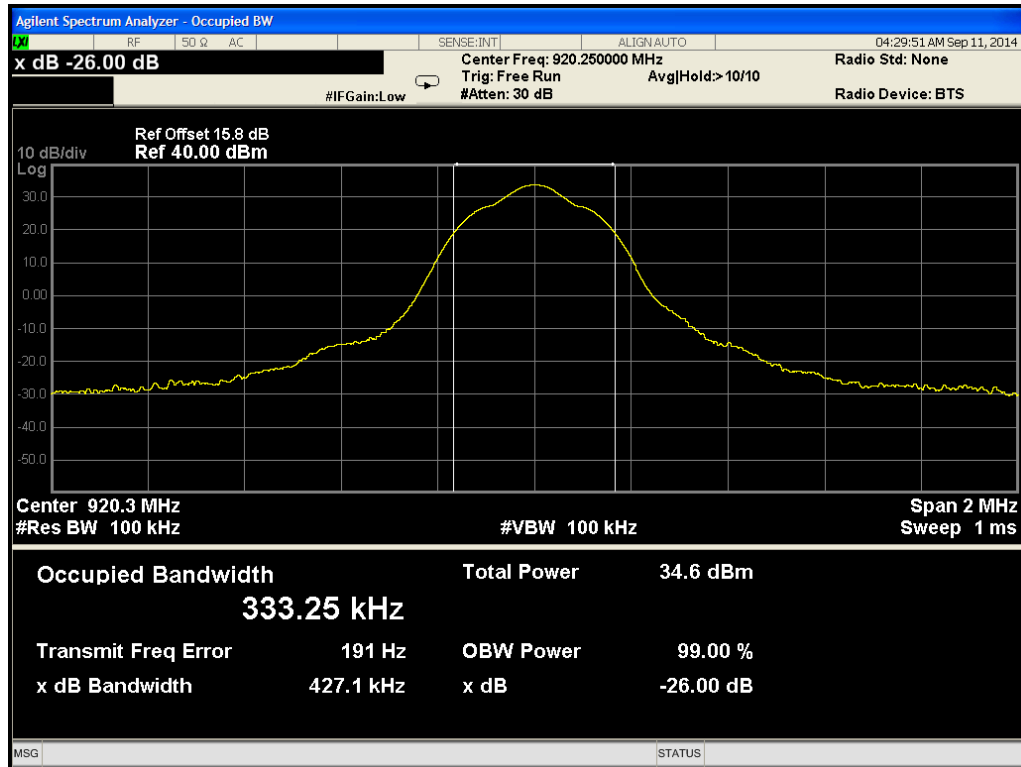
Occupied Bandwidth – Low Band CW



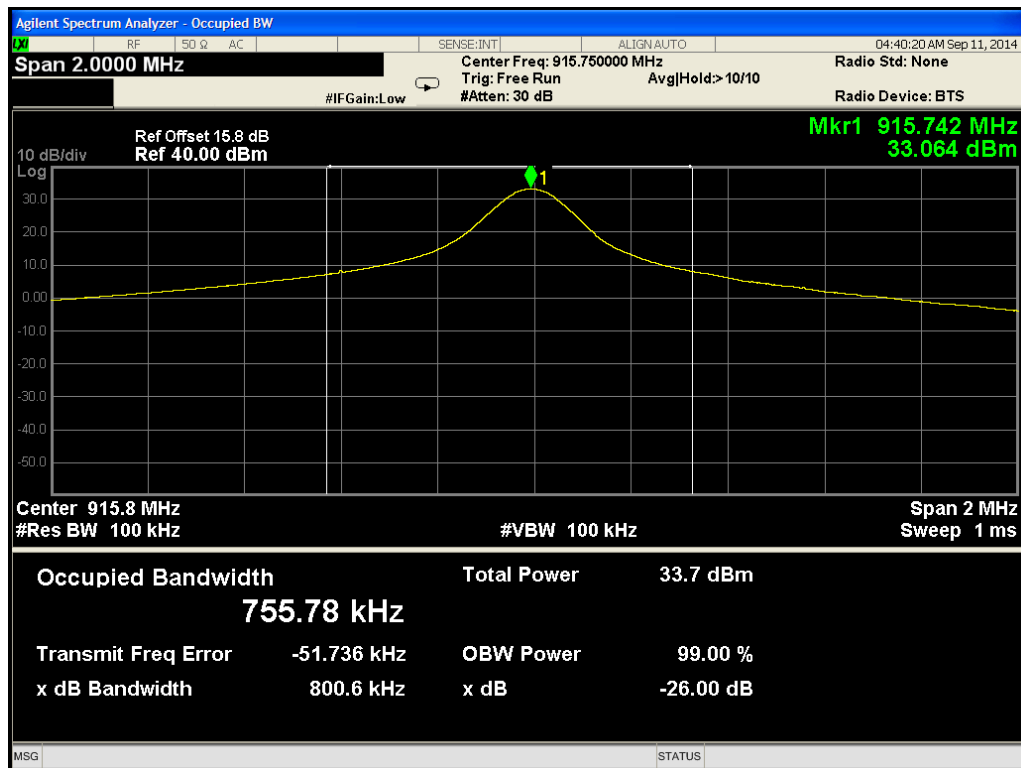
Occupied Bandwidth – Low Band ISOC



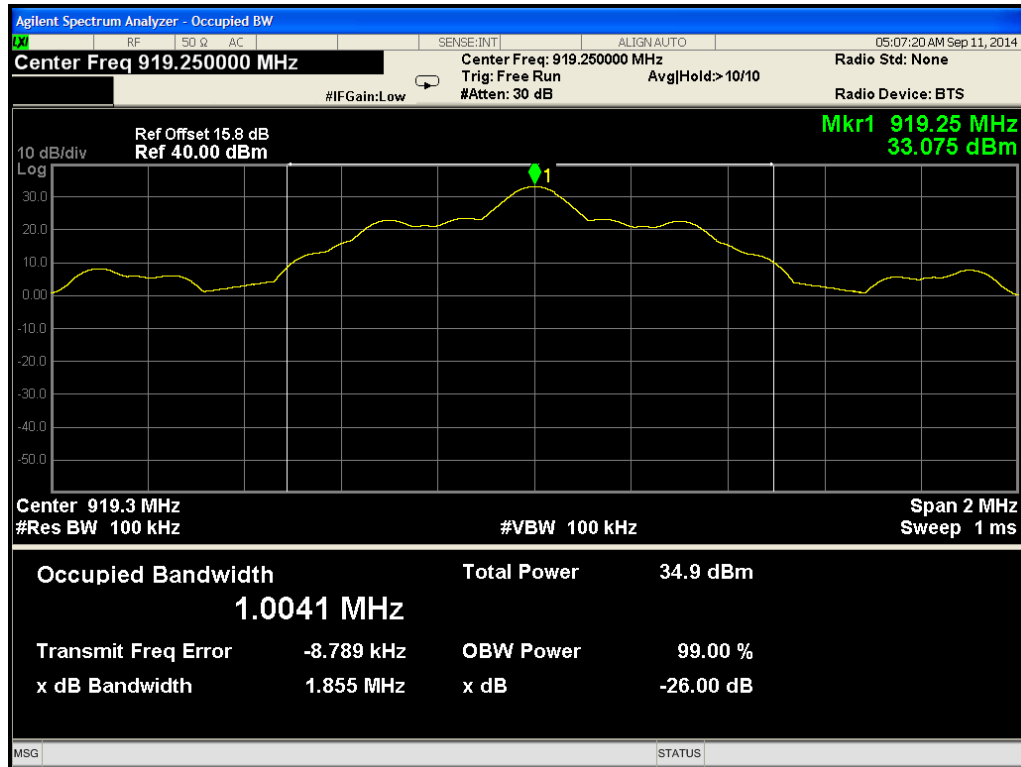
Occupied Bandwidth – Low Band ISOC



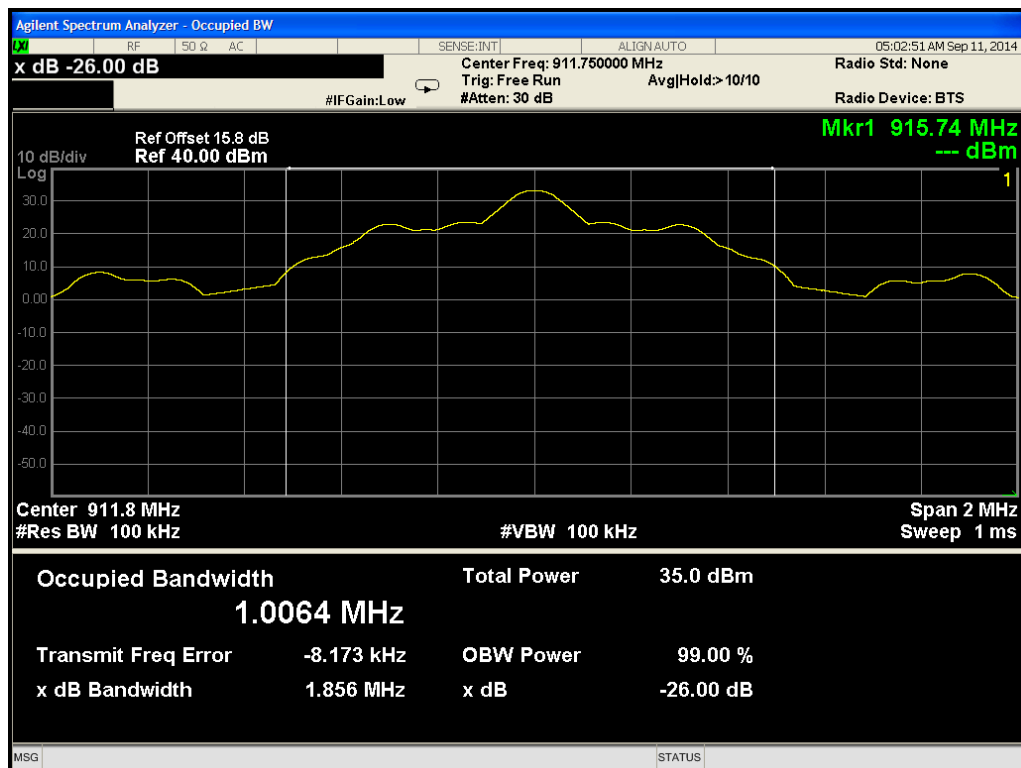
Occupied Bandwidth – FCC 90_dense ISOC



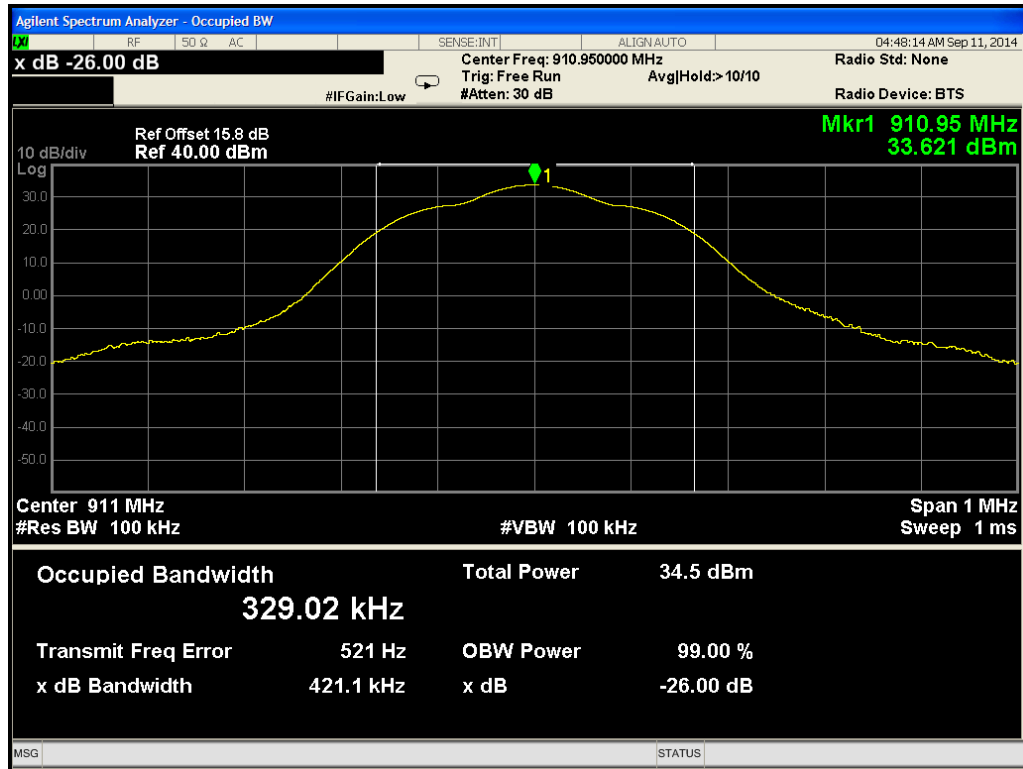
Occupied Bandwidth – FCC 90_dense PS111



Occupied Bandwidth – FCC 90_dense T21



Occupied Bandwidth – FCC 90_dense T21

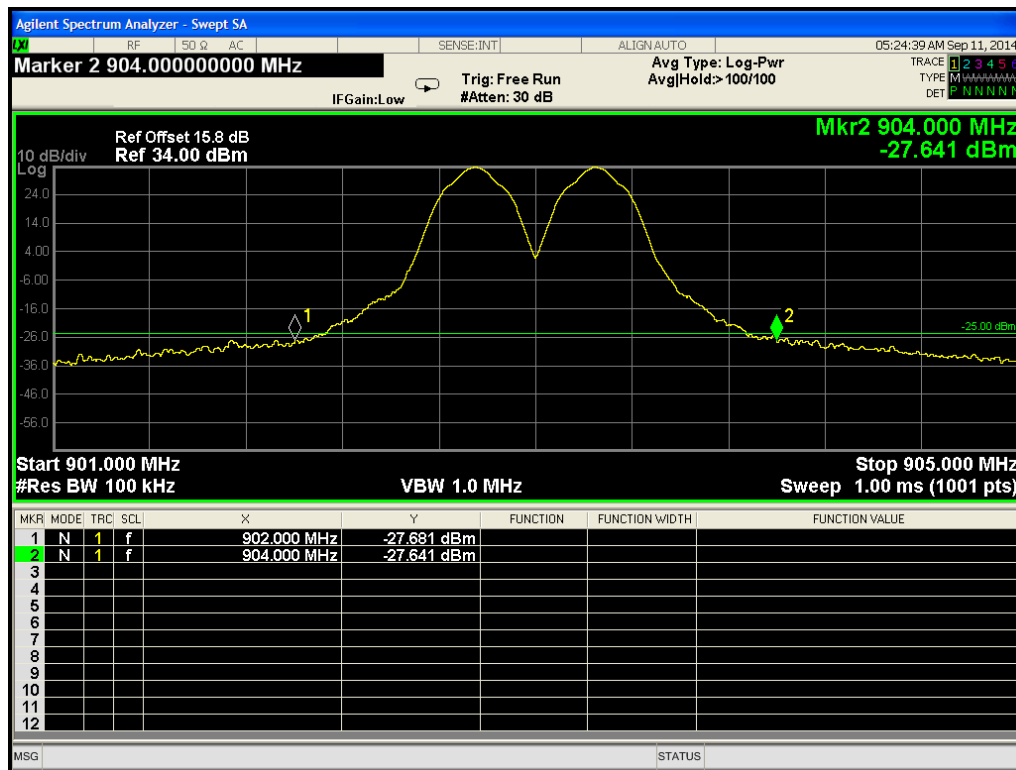


Occupied Bandwidth – FCC 90 ISOC

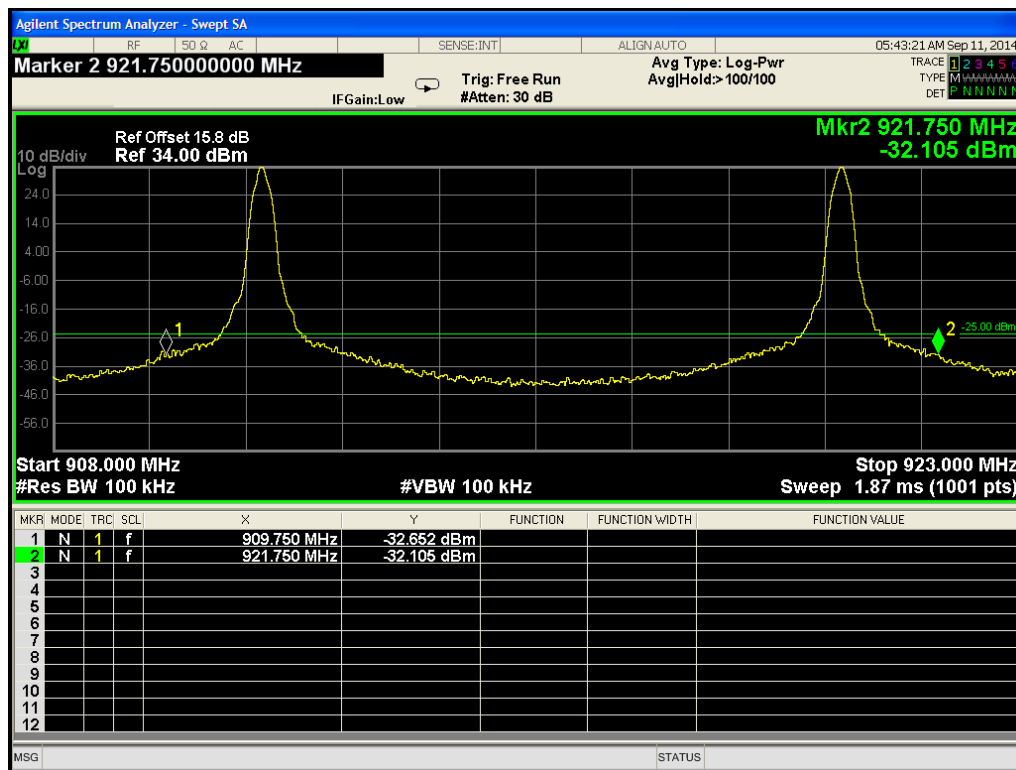
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4.5	Spurious Emissions at Antenna Terminals		
Method:	The measurements were made with transmitter set to transmit continuously with modulated. The marker delta method was used to determine band-edge compliance.		
	Laboratory Ambient Temperature	23°C	
	Relative Humidity	45%	
Reference Standard:	☐ FCC Part 90.210/RSS 137 ☒ FCC Part 2.1051	Measurement Point ☒ Conducted ☐ Radiated ☐ 	
Frequency Range:	☒ 902.75-920.45MHz		
Limit	Emission Mask "K"(RSS137 EM "C")	Results	
	☒ 55+10log(Pmax)dB ☒ >60dBc	pass	
Nominal Voltage:	☒ 120VAC ☐ VDC		
Tested By:	Yuriy Litvinov	Date:	

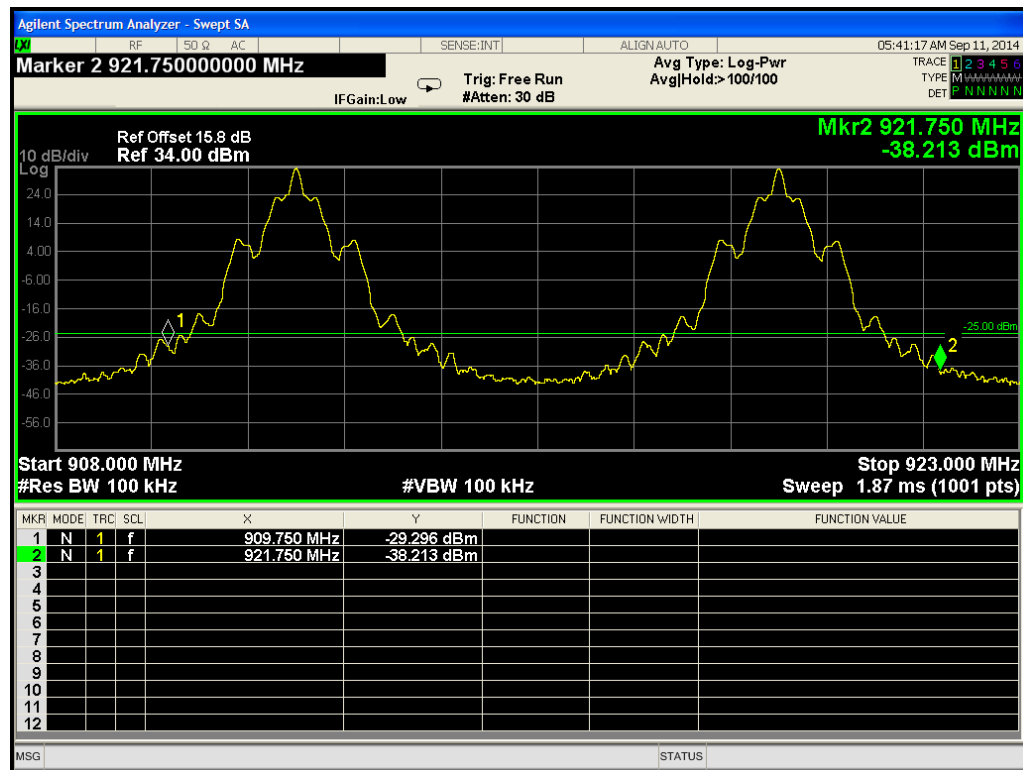
Note:	
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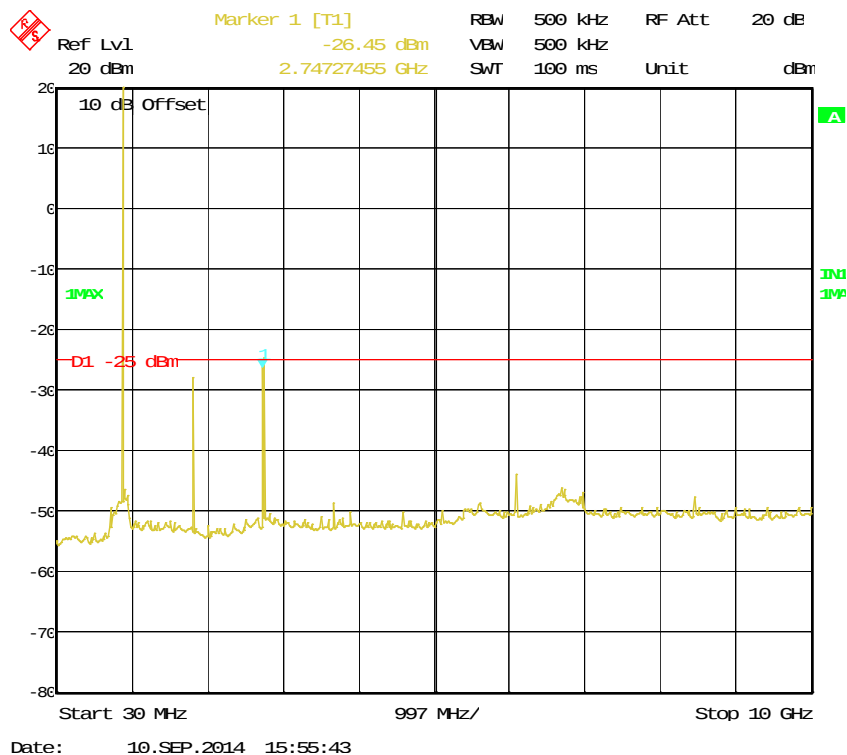
Lower and Upper Band Edge - Low Band -ISO18000-6C



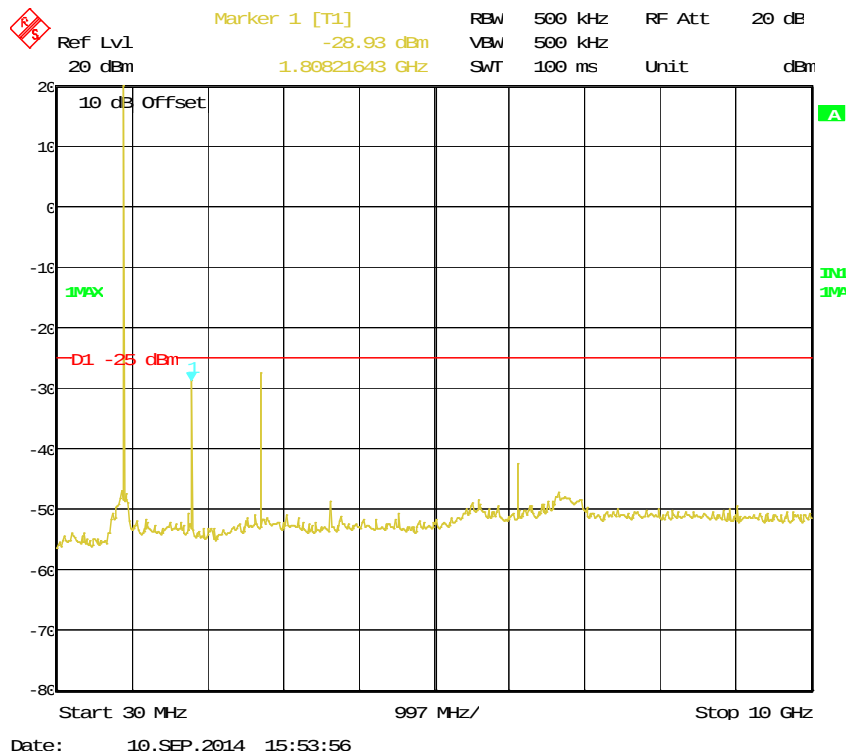
Lower and Upper Band Edge FCC_90-910.95-920.45MHz - ISO18000-6C



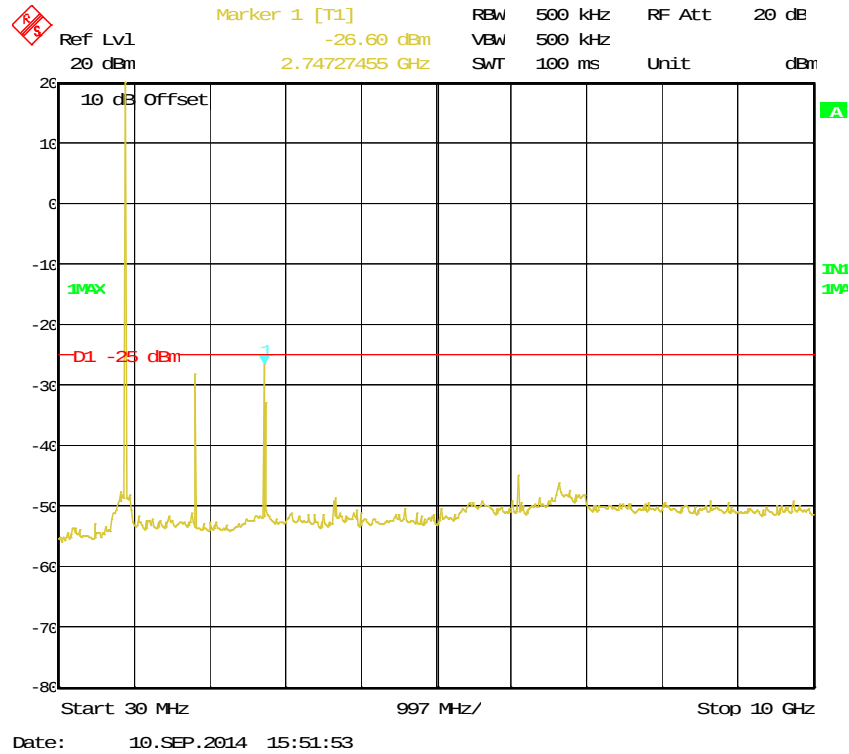
Lower and Upper Band Edge - FCC 90_dense 911.75-919.25MHz – T21



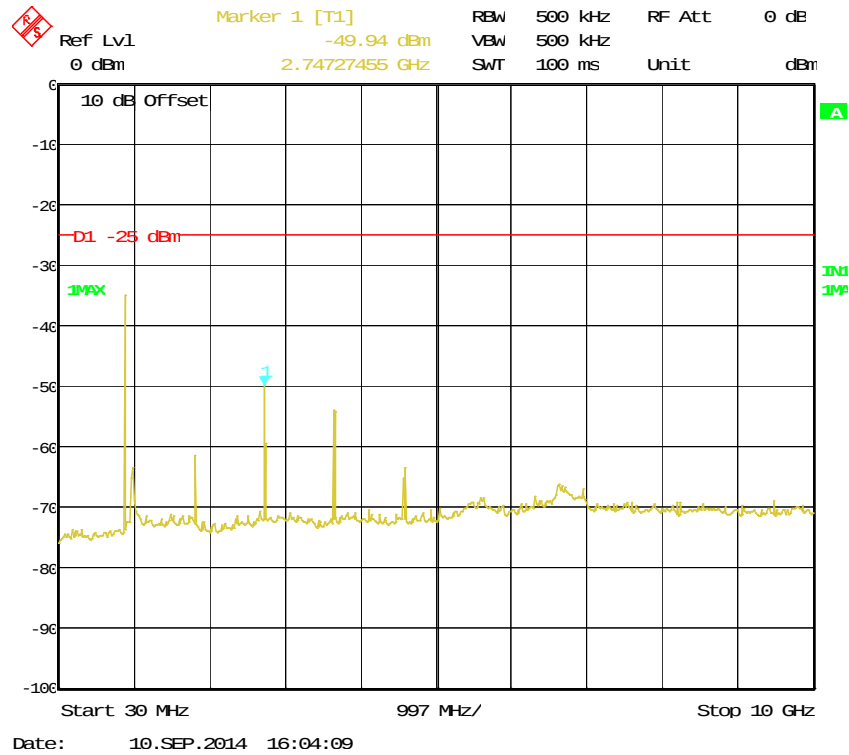
Low Band -ISO18000-6C



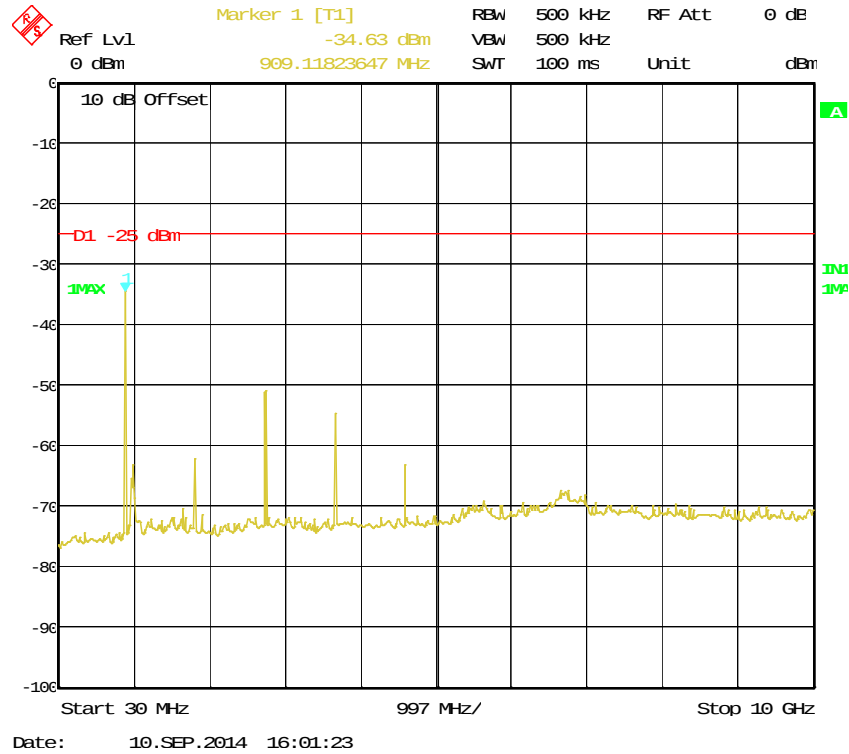
FCC_90-910.95-920.45MHz - ISO18000-6C



FCC 90_dense 911.75-919.25MHz – T21



FCC 90_dense 911.75-919.25MHz – T21 (notched)



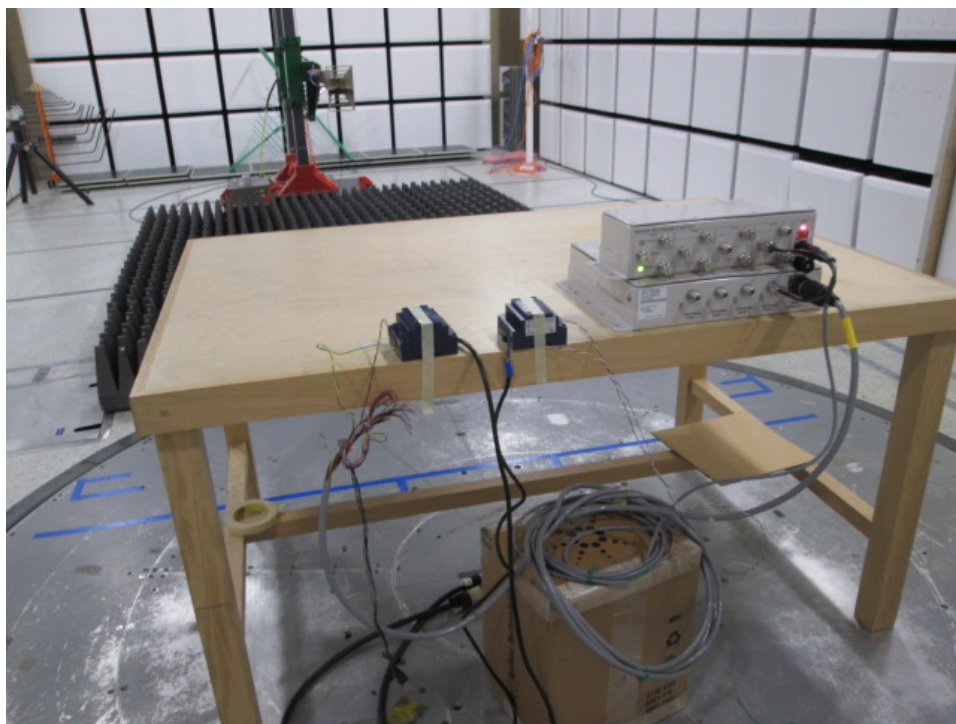
FCC_90-910.95-920.45MHz – ISO18000-6C (notched)

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4.6	Field Strength of Spurious Emissions		
Method:	The measurements were made with transmitter set to transmit continuously with modulated signal. The level of spurious emissions was measured by their effective radiated power when radiated by the cabinet and structure of the device.		
	Laboratory Ambient Temperature	23°C	
	Relative Humidity	45%	
Reference Standard:	☐ FCC Part 90.210/RSS 137 ☒ FCC Part 2.1051	Measurement Point ☒ Conducted ☐ Radiated ☐	
Frequency Range:	☒ 902.75-920.45MHz		
Limit	Emission Mask "K"(RSS137 EM "C")	Results	
	☒ 55+10log(Pmax)dB ☒ >60dBc	pass	
Nominal Voltage:	☒ 120VAC ☐ VDC		
Tested By:	Mike Schultz	Date: 09/18/2014	

Note:	Worst case modulation T21
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Pol.	Frequency (MHz)	SA Reading (dBm)	SG Reading (dBm)	Total CF (dB)	ERP Level (dBm)	EIRP Limit (dBm)	Margin (dB)
V	1248.0	57.2	-63.4	6.8	-56.6	-25	-31.6
V	1305.6	58.2	-63.4	7.1	-56.3	-25	-31.3
V	1372.9	64.0	-65.6	7.5	-58.1	-25	-33.1
H	1838.6	55.0	-68.0	10.5	-57.5	-25	-32.5
V	3513.5	46.2	-70.6	11.0	-59.6	-25	-34.6
V	5235.0	43.2	-70.6	11.3	-59.3	-25	-34.3
Notes		ERP = SG Reading (dBm) - Cable Loss(dBm) + Antenna Gain (dBi)					

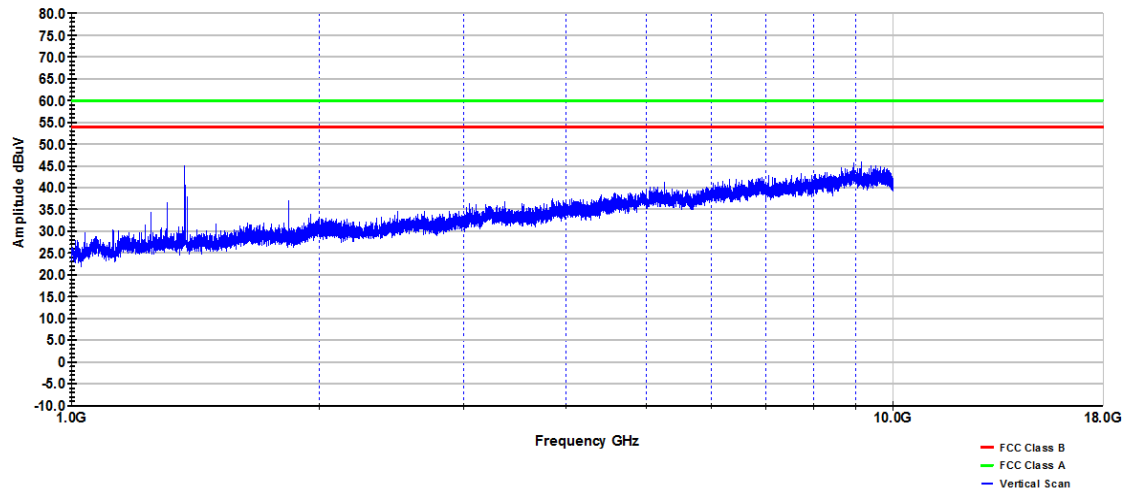


Test Set Up Photo



3M Company
FCC Part 15
RE 1GHz-18GHz, Vertical

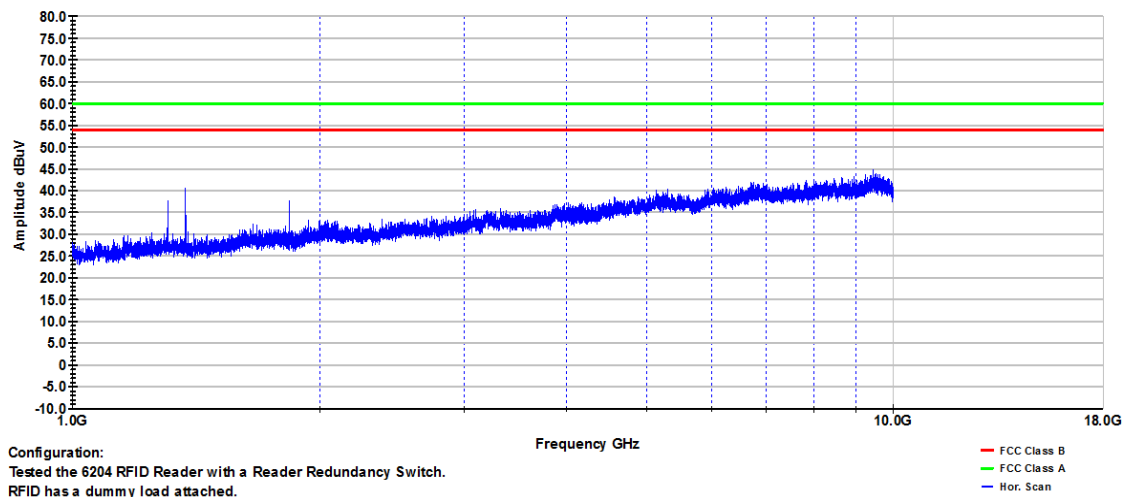
RE Project # - RE1407019
Model # - 6204
EUT Description - RFID Reader with Reader Redundancy
Serial # - 6204000021 - RRS00181
EUT Power - 24 Vdc



3M Company
FCC Part 15

RE 1GHz-18GHz, Horizontal

RE Project # - RE1407019
Model # - 6204
EUT Description - RFID Reader with Reader Redundancy
Serial # - 6204000021 - RRS00181
EUT Power - 24 Vdc



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4.7	Frequency Stability		
Method:	The measurements was made with the device set to transmit a continuous un-modulated carrier and performed at each of the applicable frequencies.		
	Laboratory Ambient Temperature	21°C	
	Relative Humidity	45%	
Reference Standard:	☒ FCC Part 90.213/RSS 137 ☐	Measurement Point ☒ Conducted ☐ Radiated ☐	
Frequency Range:	☒ 902-928MHz		
Limit	Frequency Drift	Output Power	
	☒ ±2.5ppm ☐	☐	☐
Nominal Voltage:	☐ 230VAC ☒ 120VAC		
Tested By:		Date:	

Note:	Part 90.213(a) Note 13. Fixed non-multilateration transmitters with an authorized bandwidth that is more than 40 kHz from the band edge, intermittently operated hand-held readers, and mobile transponders are not subject to frequency tolerance restrictions.
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4.8	RF Exposure Compliance	
Reference Standard:	☒ IEEE Std 1528a ☒ RSS 102, Issue 4 ☒ KDB 447498 ☐ KDB ☒ FCC Parts 2.1091 and 2.1093 ☐ OET 65	☒ MPE ☐ SAR Evaluation
Frequency Range:	☒ 902-928MHz	
Antenna Separation Distance	>120cm	
Antenna Type	LINEAR 30°, 15DBI	
Antenna Gain (maximum)	31.6 (numeric)	
Maximum Output Power at antenna terminal	35dBm (3162mW)	
Power Density	0.552 mW/cm ²	
GENERAL POPULATION/UNCONTROLLED LIMIT		
FCC/RSS102	0.610 mW/cm ²	

Note:	The highest RF output power of the unit was measured and recorded. According to §1.1310 of the FCC rules, the power density limit for General population/Uncontrolled Exposure is 0.610 mW/cm ² . The MPE shall be calculated at 20cm to show compliance with the power density limit. The following formula was used to calculate the Power Density: $S=PG/4\pi R^2$
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5.0	Test Equipment				
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Due	Check
Biconilog Antenna	Schaffner	CBL6112B	27491	10/2014	☒
Horn Antenna	AH Systems	SAS 571	1010	10/2014	☒
Loop Antenna	EMCO	ALR25M	1011	10/2014	☐
EMI Receiver	Rohde & Schwarz	ESIB 40	100235	10/2014	☐
EMI Receiver	Agilent	E4448A	1530975	09/2014	☒
Signal Analyzer	Agilent	N9000A	MY53031040	05/2014	☒
LISN	TESEQ	NNB51	1130	10/2014	☒
Harmonic/Flicker Source	Cal. Instruments	C4-5001iX	57162	10/2014	☐
Amplifier	AR	250W1000AM	14354	10/2014	☐
Amplifier	AR	25S1G4A	4003	10/2014	☐
Signal Generator	HP	8656A	2326A05125	10/2014	☐
Signal Generator	Agilent	E8257D	160895	10/2014	☐
Field Probe	AR	FL7006	25019	10/2014	☐
Field Monitor	AR	FM2000	14292	10/2014	☐
AC CDN	Schaffner	M316,	21937	10/2014	☐
AC CDN	Teseq	M016,	26131	10/2014	☐
ISN	Teseq	T4	25652	10/2014	☐
High Pass Filter	WHK	WHK1.1/1.5G	9	10/2014	☐
EMC Software	ETS-Lindgren	TILE 6		05/2014	☒
Oscilloscope	Tektronix	DPO4104	1550	03/2015	☐

6.0	Report revision history			
Revision Level	Date	Report Number	Notes	
0	10/31/2014	RE1407019-2	Original Issue	



Certificate of Conformity

3M EMC Laboratory

SEMS Global Regulatory Engineering
Building 76-01-01
St. Paul, MN 55144-1000, USA

MANUFACTURER'S NAME
NAME OF EQUIPMENT

3M COMPANY
Toll RFID READER and READER
REDUNDANCY SWITCH

MODEL NUMBER(S)
TEST REPORT NUMBER
DATE OF ISSUE

6204 and RRS
RE1407019-2
November 13, 2014

Referring to the performance criteria and operating mode during the tests specified in this report the equipment complies with the essential requirements herein specified:

47 CFR Part 90 - Subpart M - LMS
Operations in the 902-928 MHz band

FCC Part 90.353

Location and Monitoring Service in the
Band 902-928 MHz.

RSS 137, Issue 2, 2009

Emissions

47 CFR:2013, FCC Parts 15.107 and 15.109
ICES-003, Issue 5, 2012

Comments:

Yuriy Litvinov

Yuriy Litvinov
Lead EMC Engineer



NVLAP Lab Code 200033-0