



FCC TEST REPORT

Report No:STS2005237W02

Issued for

STAR SYSTEMS INTERNATIONAL LIMITED

UNIT 7B, 8/F VANTA INDUSTRIAL CENTRE, 21-33 TAI LIN PAI ROAD, KWAI CHUNG, HK

Product Name:	INTEGRATED READER
Brand Name:	TARVOS
Model Name:	HRD27000
Series Model:	HRD27001
FCC ID:	2AA7KTARVOSHRD27000
IC:	20068-TARVOS27000
Test Standard:	FCC Part 90.353 RSS-137 Issue 2, February 2009

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TEST RESULT CERTIFICATION

Applicant's Name : STAR SYSTEMS INTERNATIONAL LIMITED
Address : UNIT 7B, 8/F VANTA INDUSTRIAL CENTRE, 21-33 TAI LIN PAI ROAD, KWAI CHUNG, HK
Manufacturer's Name : STAR SYSTEMS INTERNATIONAL LIMITED
Address : UNIT 7B, 8/F VANTA INDUSTRIAL CENTRE, 21-33 TAI LIN PAI ROAD, KWAI CHUNG, HK

Product Description

Product Name : INTEGRATED READER
Brand Name : TARVOS
Model Name : HRD27000
Series Model : HRD27001

Test Standards : FCC Part 90.353
RSS-137 Issue 2, February 2009

Test Procedure : TIA TIA-603-D

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC/IC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test :

Date of receipt of test item : 26 May 2020

Date of performance of tests ... : 26 May 2020 ~ 16 July 2020

Date of Issue : 16 July 2020

Test Result : Pass

Testing Engineer :

(Chris chen)

Technical Manager :

(Sean she)

Authorized Signatory :

(Vita Li)





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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	16 July 2020	STS2005237W02	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part 90 RSS-137			
Standard	Item	Result	Remarks
Part 90.205 RSS-137 6.4	ERP Power	PASS	--
Part 90.209 RSS-137 6.1	Occupied Bandwidth	PASS	--
Part 90.210 RSS-137 6.5	Spurious Emissions at Antenna terminals	PASS	--
Part 90.210 RSS-137 6.5	Radiated Spurious emissions	PASS	--
Part 90.213 RSS-137 6.3	Frequency Stability	PASS	--

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report.
- (2) All tests are according to TIA-603-D.



1.1 TEST FACILITY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	RF output power, conducted	$\pm 0.68\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.988\text{dB}$
3	All emissions, radiated 30-1GHz	$\pm 5.6\text{dB}$
4	All emissions, radiated 1G-6GHz	$\pm 5.5\text{dB}$
5	All emissions, radiated >6G	$\pm 5.8\text{dB}$
6	Conducted Emission (9KHz-150KHz)	$\pm 3.37\text{dB}$
7	Conducted Emission (150KHz-30MHz)	$\pm 3.83\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	INTEGRATED READER
Brand Name:	TARVOS
Model Name:	HRD27000
Series Model:	HRD27001
Model Difference description:	Difference in Antenna Gain and Size. HRD27000 integrated with Cheetah II Antenna (12dbi) and optional external Avior, Cheetah II and BobcatAntenna. HRD27001 integrated with Bobcat Antenna (8dbi) and optional external Cheetah II and Bobcat Antenna.
Modulation type:	Dense reader mode for EPCglobal Gen2,RAIN,or ISO-18000-63 Single reader mode for EPCglobal Gen2,RAIN,or ISO-18000-63 Low data rate ISO-18000-62(40kbps) High data rate ISO-18000-62 (80kbps) Unmodulated ISO-10374 TDM Title 21
Adapter:	Input: AC 100-240V, 800mA, 50/60 Hz Output: DC 24V, 1.25A
Temperature Range:	-30℃-50℃
Test frequency list:	See Note 2
Software version number:	R5
Hardware version number:	1.5.2.19881
RFID Protocols	Frequency
Dense reader mode ISO-18000-63	911.25MHz -920.25MHz
Single reader mode ISO-18000-63	911.75MHz -919.25MHz
Low data rate ISO-18000-62(40kbps)	911.75MHz -919.75MHz
High data rate ISO-18000-62 (80kbps)	912.25MHz -918.75MHz
Unmodulated ISO-10374	902.75MHz and 903.25MHz, 910.75MHz -920.75MHz
TDM	913.75MHz and 916.25MHz
Title 21	913.75MHz – 917.75MHz

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2. Operation Frequency of channel					
Dense reader mode for EPCglobal Gen2,RAIN,or ISO-18000-63					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
04	911.25	11	914.75	18	918.25
05	911.75	12	915.25	19	918.75
06	912.25	13	915.75	20	919.25
07	912.75	14	916.25	21	919.75
08	913.25	15	916.75	22	920.25
09	913.75	16	917.25		
10	914.25	17	917.75		
Single reader mode for EPCglobal Gen2,RAIN,or ISO-18000-63					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
05	911.75	11	914.75	17	917.75
06	912.25	12	915.25	18	918.25
07	912.75	13	915.75	19	918.75
08	913.25	14	916.25	20	919.25
09	913.75	15	916.75		
10	914.25	16	917.25		
Low data rate ISO-18000-62(40kbps)					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
05	911.75	11	914.75	17	917.75
06	912.25	12	915.25	18	918.25
07	912.75	13	915.75	19	918.75
08	913.25	14	916.25	20	919.25
09	913.75	15	916.75	21	919.75
10	914.25	16	917.25		
High data rate ISO-18000-62 (80kbps)					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
06	912.25	11	914.75	16	917.25
07	912.75	12	915.25	17	917.75
08	913.25	13	915.75	18	918.25
09	913.75	14	916.25	19	918.75
10	914.25	15	916.75		
Unmodulated ISO-10374					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	902.75	09	913.75	17	917.75
02	903.25	10	914.25	18	918.25
03	910.75	11	914.75	19	918.75
04	911.25	12	915.25	20	919.25
05	911.75	13	915.75	21	919.75
06	912.25	14	916.25	22	920.25
07	912.75	15	916.75	23	920.75
08	913.25	16	917.25		
TDM					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
09	913.75	11	914.75	13	915.75
10	914.25	12	915.25	14	916.25



Title 21					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
09	913.75	12	915.25	15	916.75
10	914.25	13	915.75	16	917.25
11	914.75	14	916.25	17	917.75

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Antenna Cable loss (dB)	Antenna combination (dBi)
1	TARVOS	HRD27000	Avior	N/A	15	4	11
2	TARVOS	HRD27000	Cheetah II	N/A	12	4	8
3	TARVOS	HRD27000	Bobcat	N/A	8	4	4

Note: All antennas have been tested for conducted emission and radiated spurious emission, but the report only shows the worst data of the Avior antenna.



2.2 EUT OPERATION MODE

The EUT has been tested under typical operating condition and The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Mode	Modulation Type	Frenquency
Mode1	Dense reader mode for EPCglobal Gen2,RAIN,or ISO-18000-63	Low channel(911.25MHz)
		High channel(920.25MHz)
Mode2	Single reader mode for EPCglobal Gen2,RAIN,or ISO-18000-63	Low channel(911.75MHz)
		High channel(919.25MHz)
Mode3	Low data rate ISO-18000-62(40kbps)	Low channel(911.75MHz)
		High channel(919.75MHz)
Mode4	High data rate ISO-18000-62 (80kbps)	Low channel(912.25MHz)
		High channel(918.75MHz)
Mode5	Unmodulated ISO-10374	Low channel(902.75MHz)
		High channel(903.25MHz)
		Low channel(910.75MHz)
		High channel(920.75MHz)
Mode6	TDM	Low channel(913.75MHz)
		High channel(916.25MHz)
Mode7	Title 21	Low channel(913.75MHz)
		High channel(917.75MHz)

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

The EUT tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
E-2	Adapter	N/A	PSAC30U-240L6	N/A	N/A
C-1	DC Cable	N/A	N/A	100cm	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
N/A	N/A	N/A	N/A	N/A	N/A

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



2.6 TEST EQUIPMENT

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Signal Analyzer	Agilent	N9020A	MY51110105	2020.03.05	2021.03.04
Signal Generator	Agilent	N5182A	MY46240556	2019.10.09	2020.10.08
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2020.11.01
Horn Antenna	SCHWARZBECK	BBHA 9120D(1201)	9120D-1343	2018.10.19	2021.10.18
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2019.10.09	2020.10.08
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-4 5	SK2018080901	2019.10.12	2020.10.11
Pre-Amplifier (18G-40G)	SKET	LNPA_1840-50	SK2018101801	2019.10.22	2020.10.21
Attenuator	HP	8494B	DC-18G	2020.04.30	2021.04.29
Programmable power supply	Agilent	E3642A	MY40002025	2019.10.11	2020.10.10
AC Power Source	APC	KDF-11010G	F214050035	N.C.R	N.C.R
Audio analyzer	R&S	UPL	100689	2020.03.05	2021.03.04



3. MAXIMUM TRANSMITTER POWER

3.1 LIMITS

LMS systems operating pursuant to subpart M of this part in the 902-927.25 MHz band will be authorized a maximum of 30 watts ERP. LMS equipment operating in the 927.25-928 MHz band will be authorized a maximum of 300 watts ERP. ERP must be measured as peak envelope power. Antenna heights will be as specified in FCC Part §90.353(h).

3.2 TEST PROCEDURE

1. Set analyzer center frequency to channel center frequency.
2. Set the RBW to: 1MHz $\geq$ RBW
3. Set the VBW $\geq$ 3 x RBW.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level.

3.3 TEST CONDITIONS

The EUT is transmitting through a antenna cable with a stated loss of 3dB. All Firmware setting is 33dBm.

3.4 TEST RESULT

Dense reader mode ISO-18000-63								
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)	ERP (dBm)	ERP Limit (dBm)	Verdict
Low	911.25	33.499	4.000	15.000	44.499	42.349	44.77	Pass
High	920.25	33.695	4.000	15.000	44.695	42.545		
Single reader mode ISO-18000-63								
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)	ERP (dBm)	ERP Limit (dBm)	Verdict
Low	911.75	33.360	4.000	15.000	44.360	42.210	44.77	Pass
High	919.25	33.483	4.000	15.000	44.483	42.333		
Low data rate ISO-18000-62(40kbps)								
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)	ERP (dBm)	ERP Limit (dBm)	Verdict
Low	911.75	33.452	4.000	15.000	44.452	42.302	44.77	Pass
High	919.75	33.528	4.000	15.000	44.528	42.378		
High data rate ISO-18000-62 (80kbps)								
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)	ERP (dBm)	ERP Limit (dBm)	Verdict
Low	912.25	33.471	4.000	15.000	44.471	42.321	44.77	Pass
High	918.75	33.534	4.000	15.000	44.534	42.384		



Unmodulated ISO-10374								
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)	ERP (dBm)	ERP Limit (dBm)	Verdict
Low	902.75	33.167	4.000	15.000	44.167	42.017	44.77	Pass
High	903.75	33.117	4.000	15.000	44.117	41.967		
Low	910.75	33.255	4.000	15.000	44.255	42.105		
High	920.75	33.362	4.000	15.000	44.362	42.212		
TDM								
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)	ERP (dBm)	ERP Limit (dBm)	Verdict
Low	913.75	33.315	4.000	15.000	44.315	42.165	44.77	Pass
High	916.25	33.268	4.000	15.000	44.268	42.118		
Title 21								
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)	ERP (dBm)	ERP Limit (dBm)	Verdict
Low	913.75	33.254	4.000	15.000	44.254	42.104	44.77	Pass
High	917.75	33.298	4.000	15.000	44.298	42.148		

Note:

1. The EUT is transmitting through a long enough antenna cable with a stated loss of 4dB into the antenna with type N connector 15dBi gain.
2. $EIRP = \text{conducted power} + \text{antenna gain} - \text{cable loss}$; $ERP = EIRP - 2.15$
3. Worst case modulation used by the device.

KDB 594280. Professional installation or authorized service personnel is required to configure radio parameters of the transmitter using the software for adjusting total EIRP (30W) power at local installation to ensure compliance with FCC Rules.



4. OCCUPIED BANDWIDTH

4.1 LIMIT

The maximum authorized bandwidth shall be 12 MHz for non-multilateration LMS operations in the band 909.75-921.75 MHz and 2 MHz in the band 902.00-904.00 MHz. The maximum authorized bandwidth for multilateration LMS operations shall be 5.75 MHz in the 904.00-909.75 MHz band; 2 MHz in the 919.75-921.75 MHz band; 5.75 MHz in the 921.75-927.25 MHz band and its associated 927.25-927.50 MHz narrowband forward link; and 8.00 MHz if the 919.75-921.75 MHz and 921.75-927.25 MHz bands and their associated 927.25-927.50 MHz and 927.50-927.75 MHz narrowband forward links are aggregated.

4.2 MEASUREMENT PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 26 dB Bandwidth :100KHz For 99% Bandwidth :1% to 5% of the occupied bandwidth
VBW	For 26dB Bandwidth : $\geq 3 \times \text{RBW}$ For 99% Bandwidth : approximately $3 \times \text{RBW}$
Trace	Max hold
Sweep	Auto

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB and 99% relative to the maximum level measured in the fundamental emission.

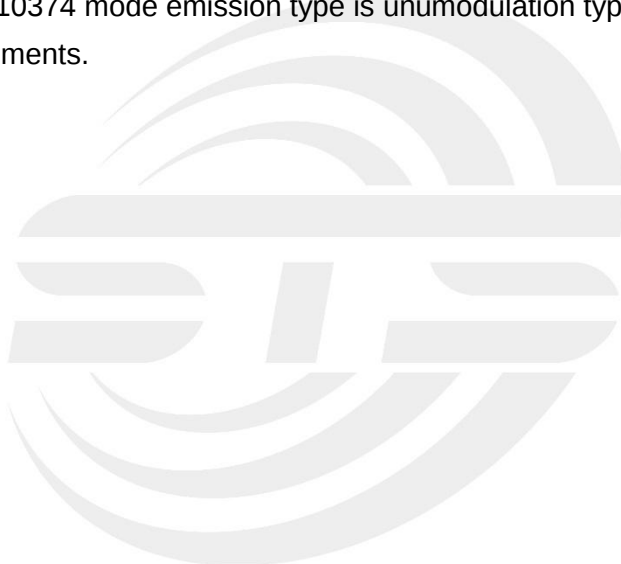
4.3 TEST RESULT

Dense reader mode ISO-18000-63			
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)	99% Bandwidth(KHz)
Low	911.25	347.90	102.35
High	920.25	357.10	116.24
Single reader mode ISO-18000-63			
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)	99% Bandwidth(KHz)
Low	911.75	439.30	273.21
High	919.25	438.40	270.94
Low data rate ISO-18000-62(40kbps)			
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)	99% Bandwidth(KHz)
Low	911.75	457.50	238.79
High	919.75	445.60	235.50
High data rate ISO-18000-62 (80kbps)			
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)	99% Bandwidth(KHz)
Low	912.25	646.80	481.99
High	918.75	634.70	479.51



Unmodulated ISO-10374			
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)	99% Bandwidth(KHz)
Low	902.75	289.10	23.04
High	903.25	289.40	23.09
Low	910.75	289.50	23.09
High	920.75	289.40	23.07
TDM			
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)	99% Bandwidth(KHz)
Low	913.75	620.30	153.03
High	916.25	615.20	151.06
Title 21			
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)	99% Bandwidth(KHz)
Low	913.75	1031.00	897.96
High	917.75	1031.00	890.58

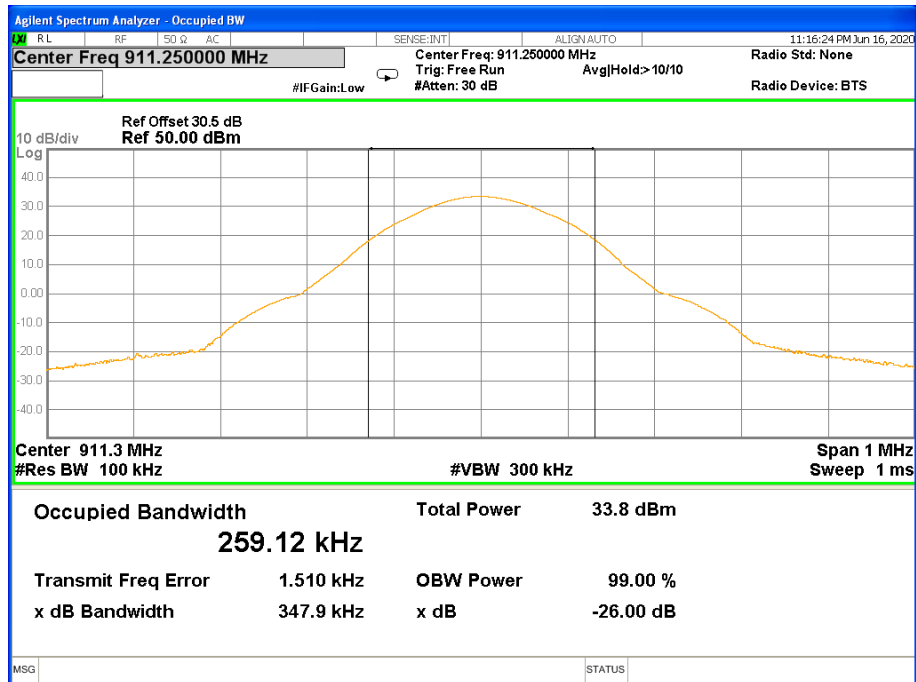
Note: Unmodulated ISO-10374 mode emission type is unmodulation type, which cannot meet the 1%-5% OBW test requirements.



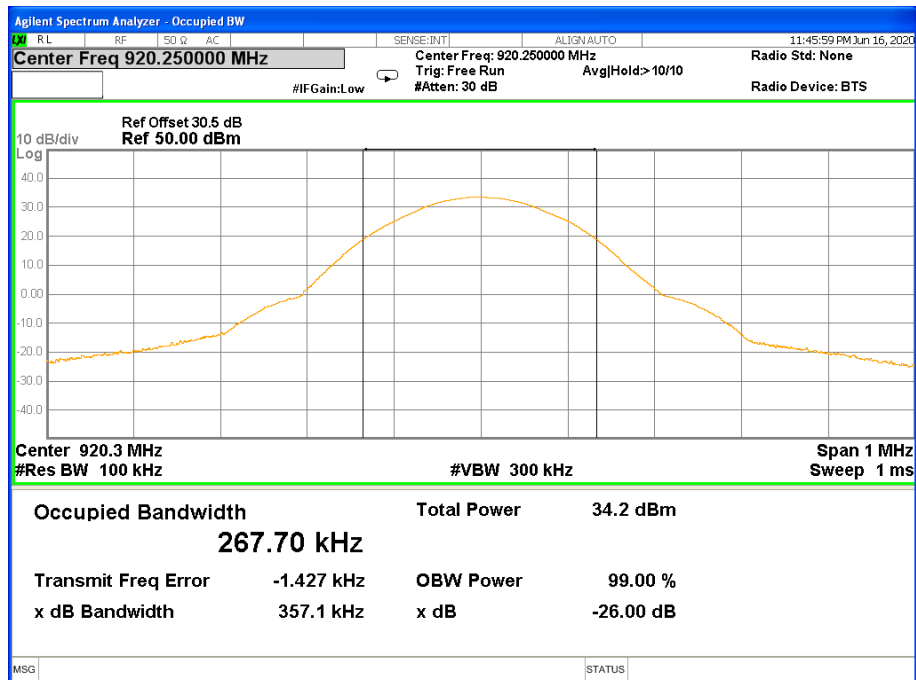
**26 dB Bandwidth**

Dense reader mode ISO-18000-63

Low channel(911.25MHz)



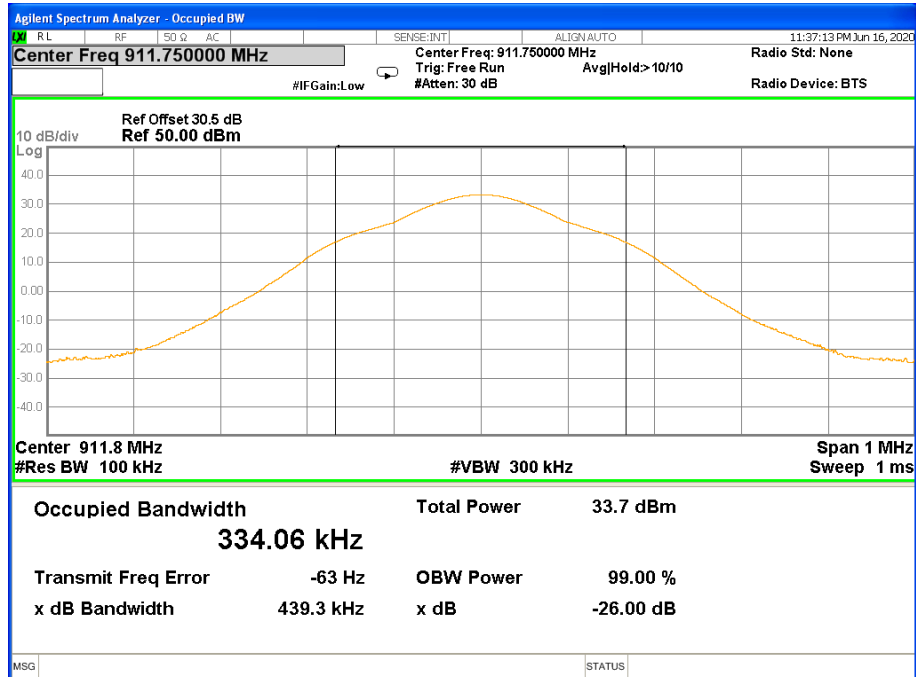
High channel(920.25MHz)



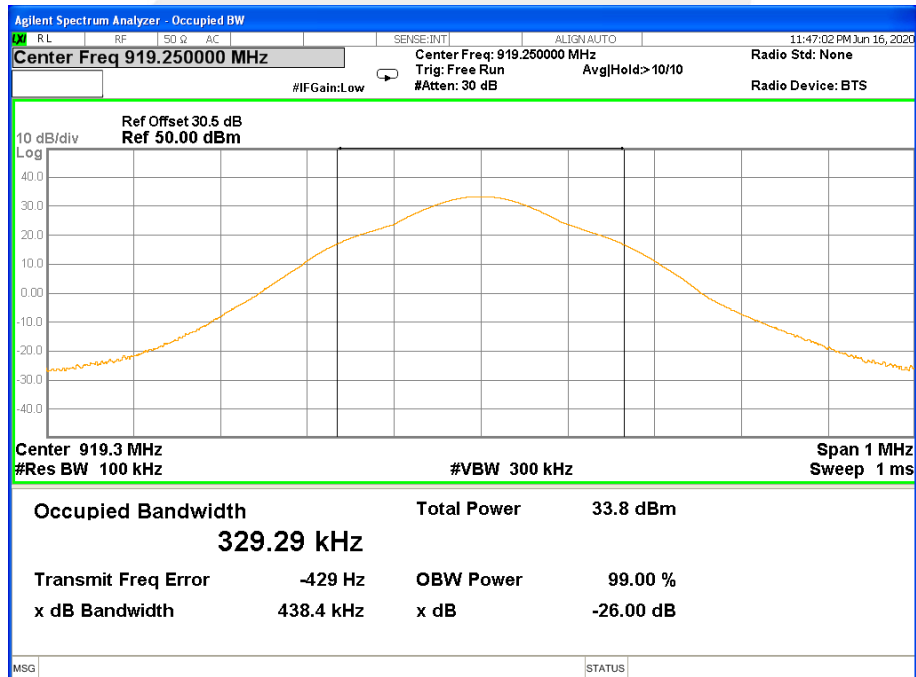


Single reader mode ISO-18000-63

Low channel(911.75MHz)



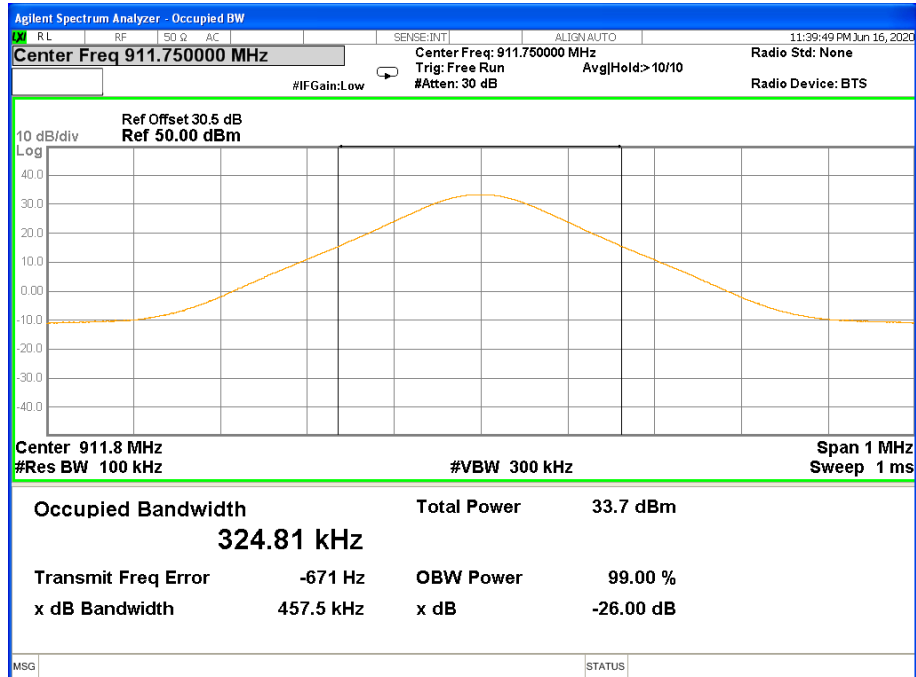
High channel(919.25MHz)



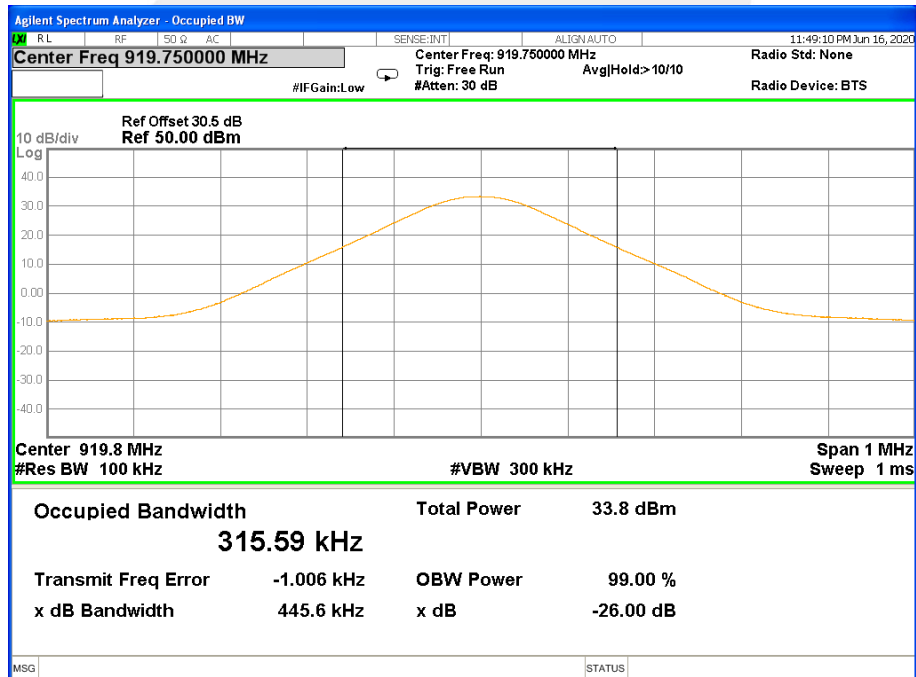


Low data rate ISO-18000-62(40kbps)

Low channel(911.75MHz)



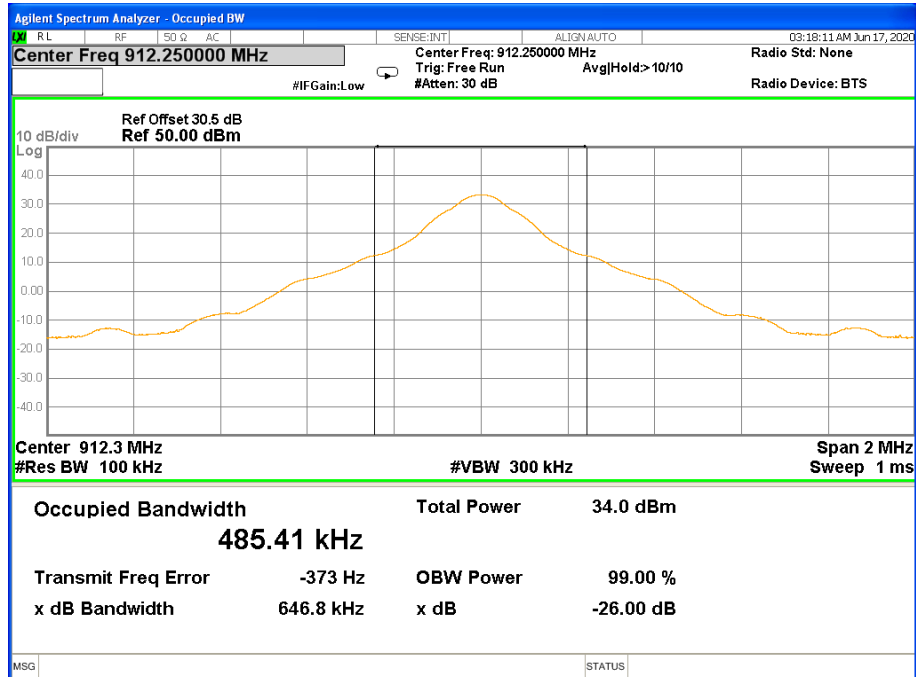
High channel(919.75MHz)



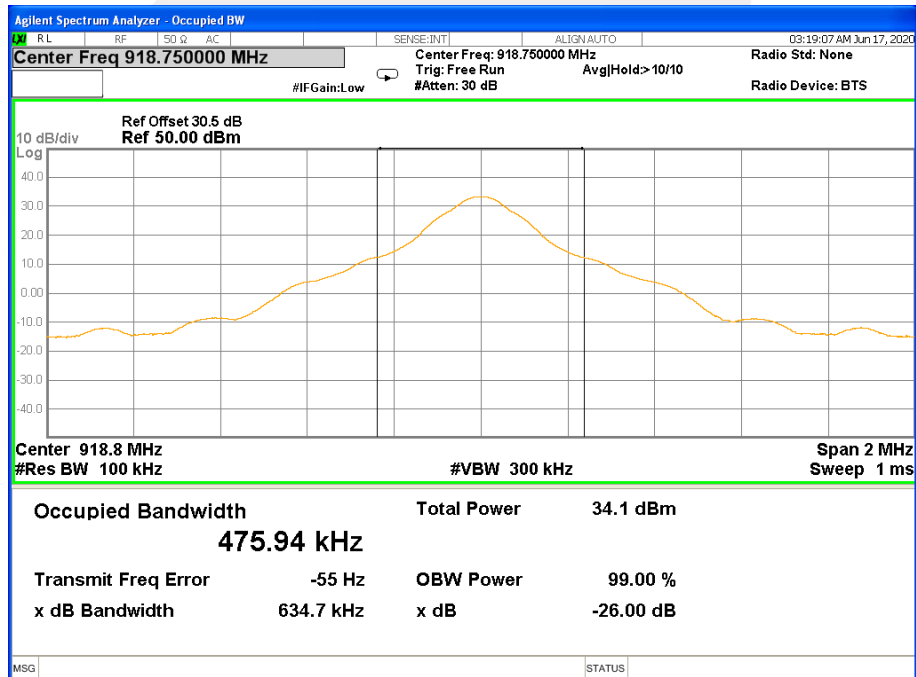


High data rate ISO-18000-62(80kbps)

Low channel(912.25MHz)

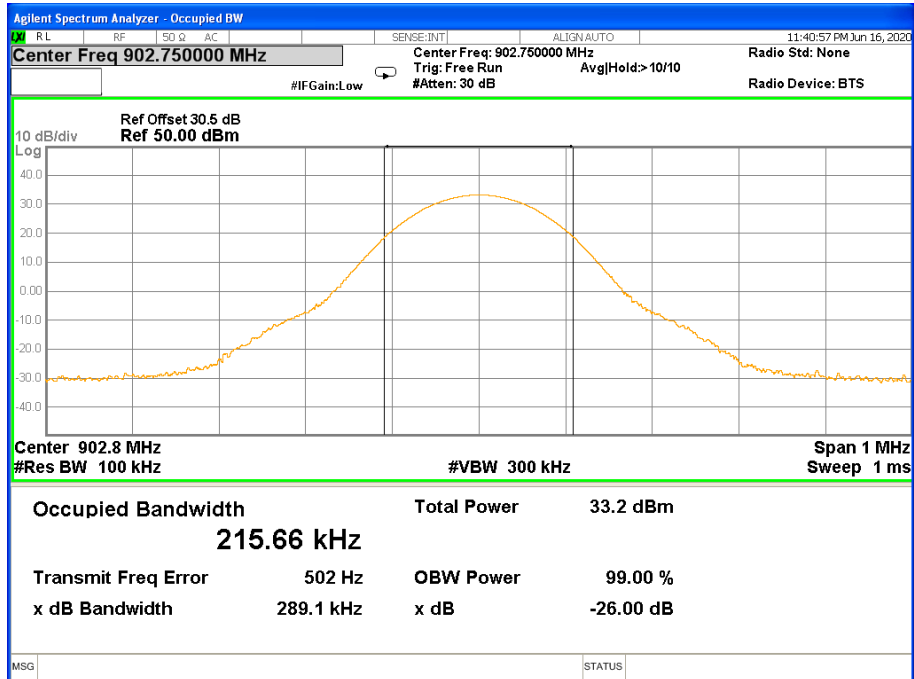


High channel(918.75MHz)

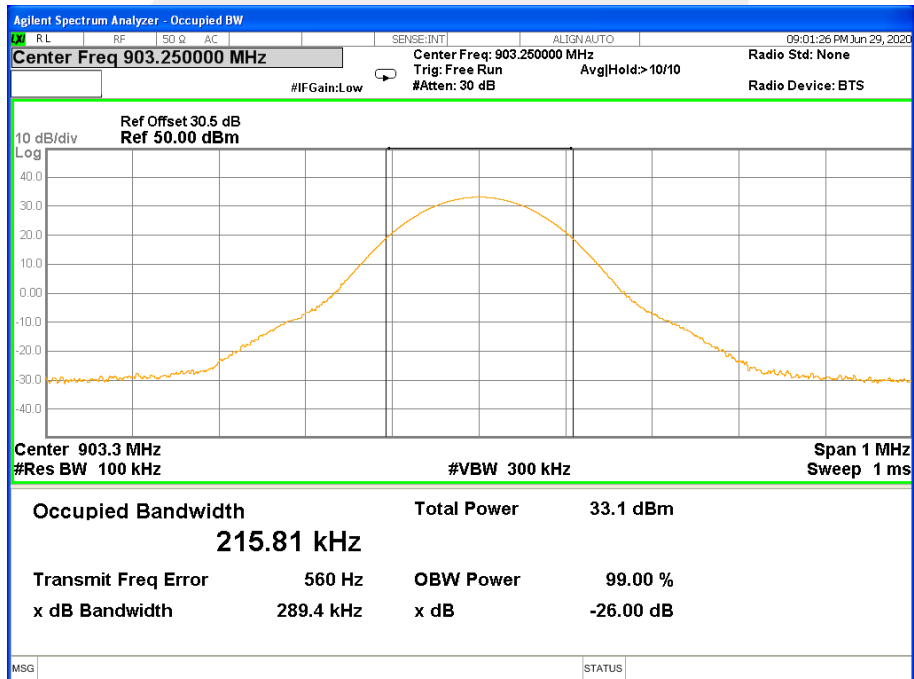




Unmodulated ISO-10374
Low channel(902.75MHz)

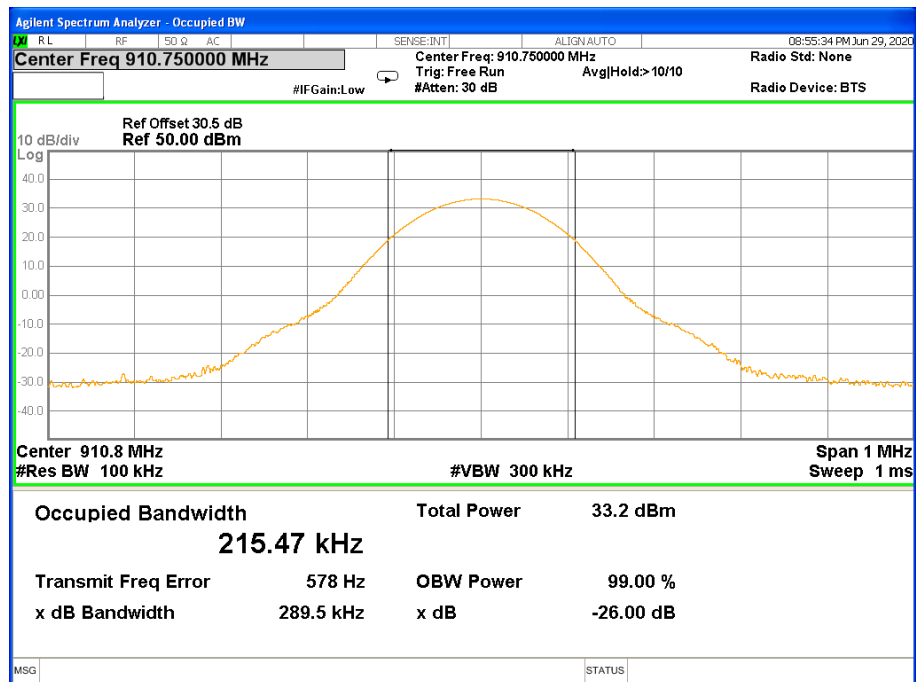


High channel(903.25MHz)

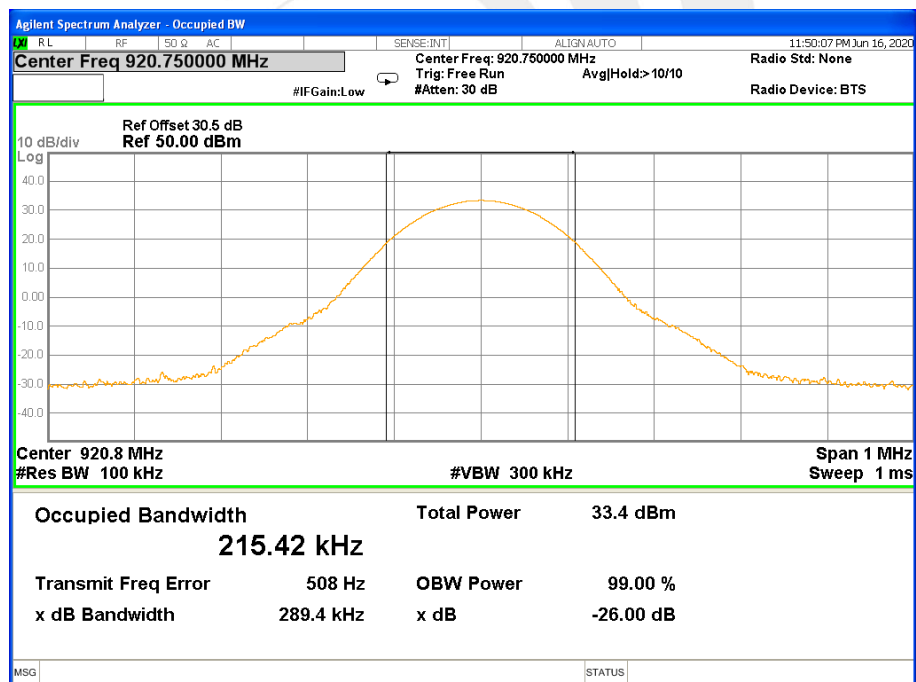




Low channel(910.75MHz)

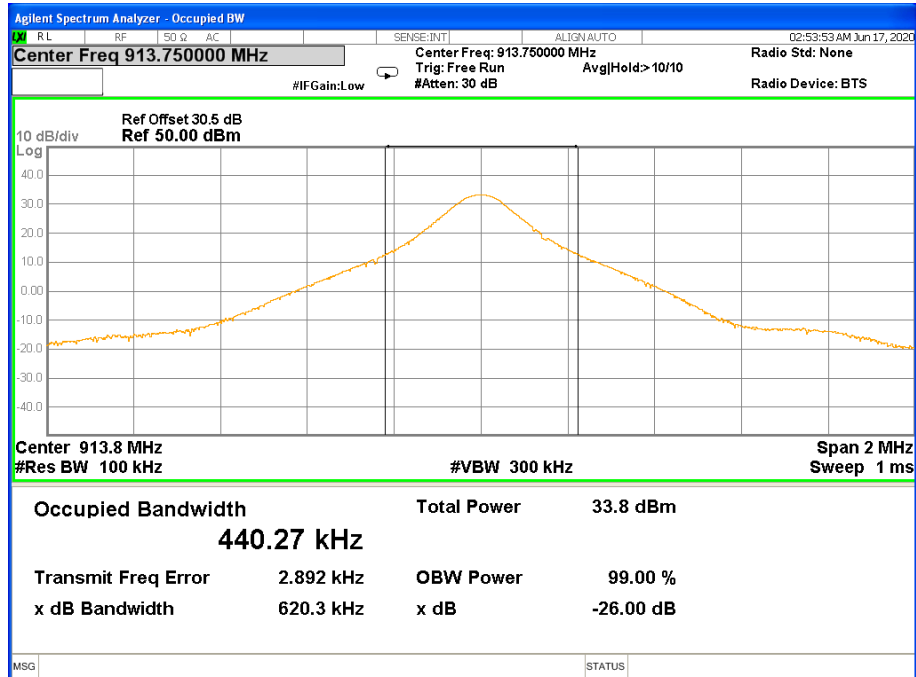


High channel(920.75MHz)

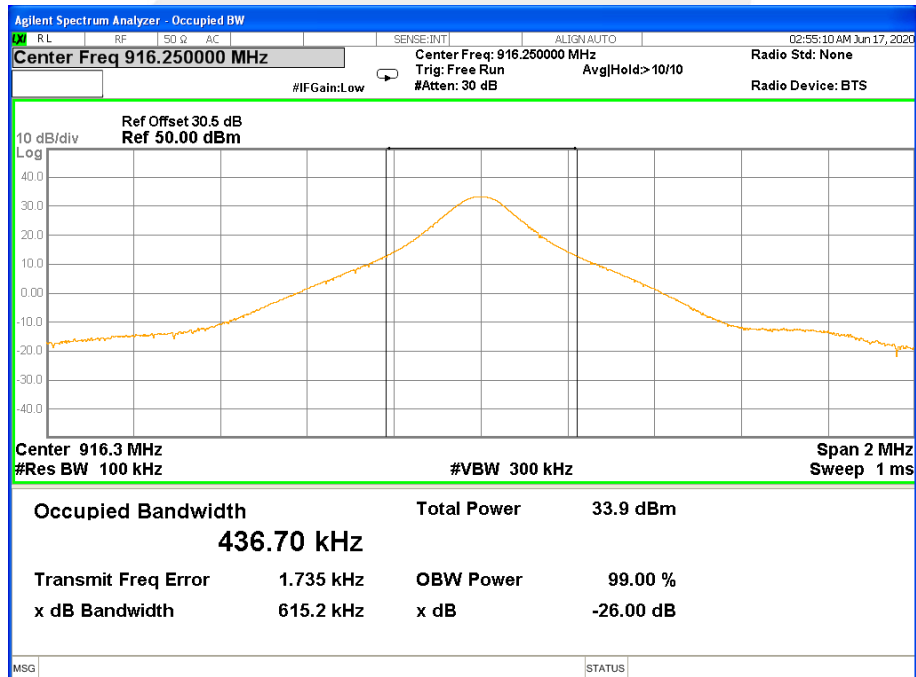




TDM
Low channel(913.75MHz)

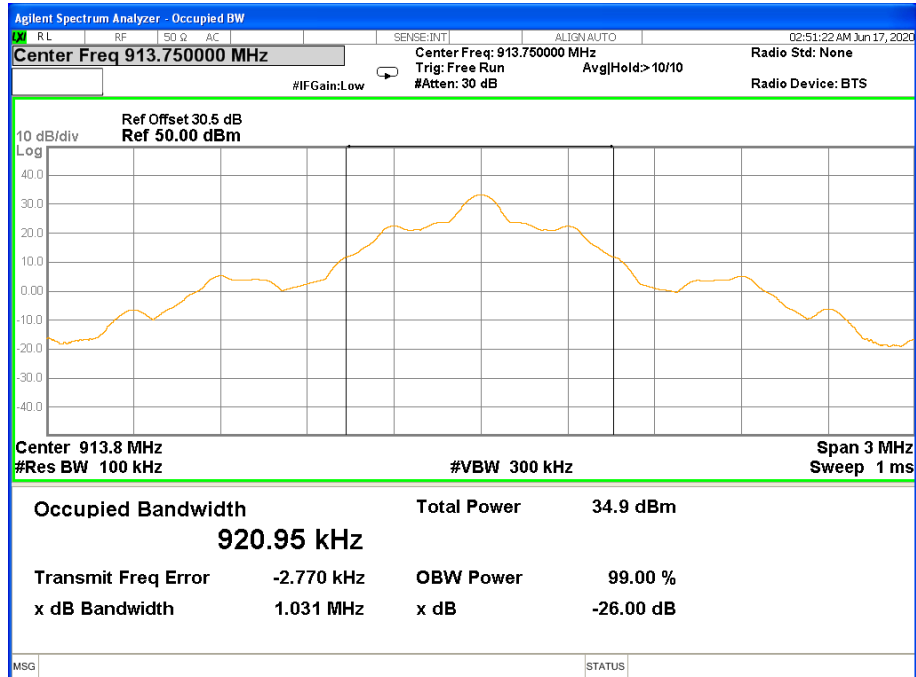


High channel(916.25MHz)

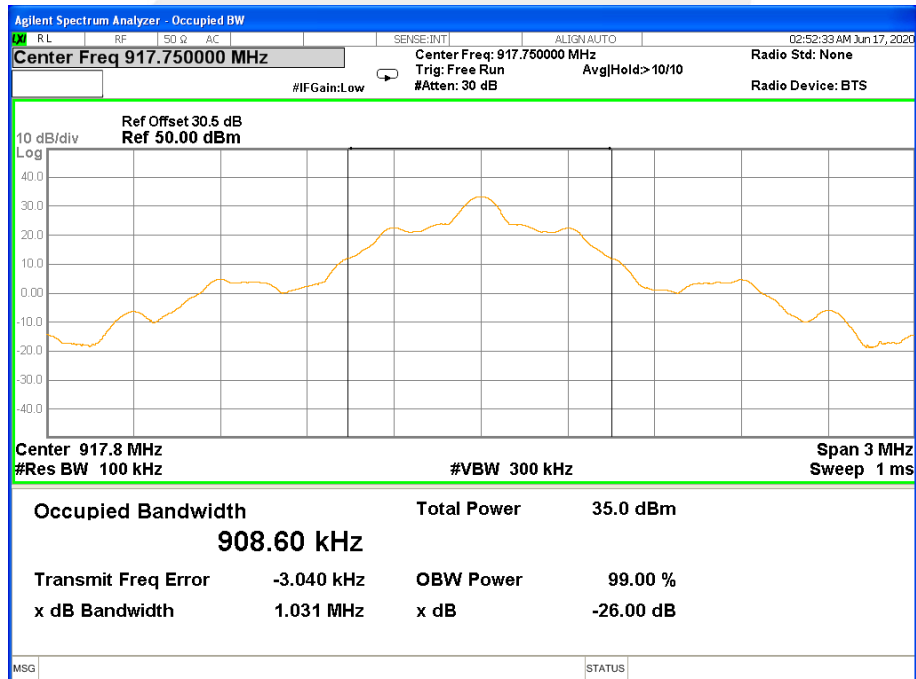




Title 21
Low channel(913.75MHz)



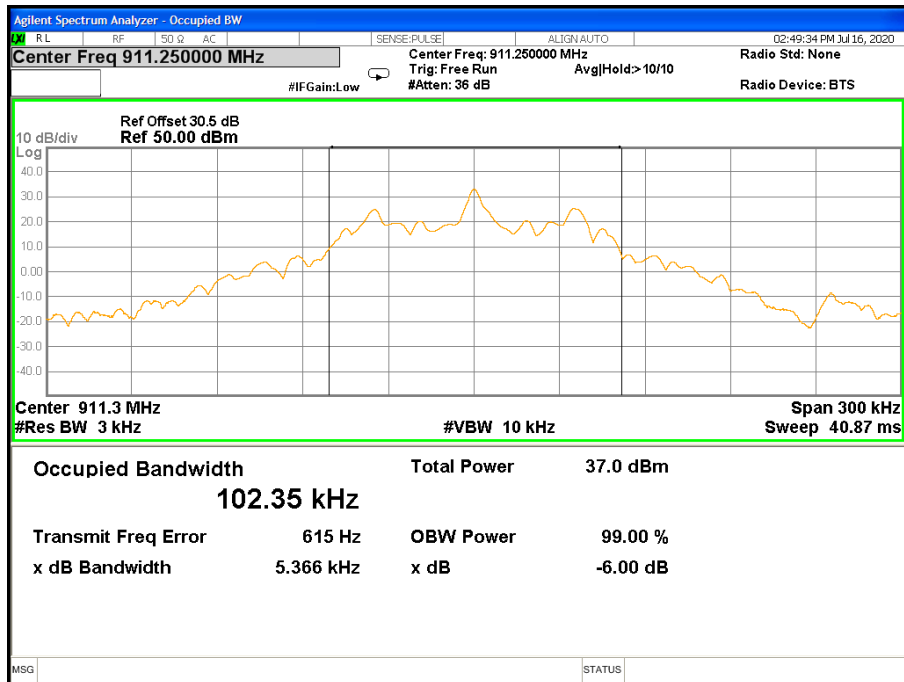
High channel(917.75MHz)



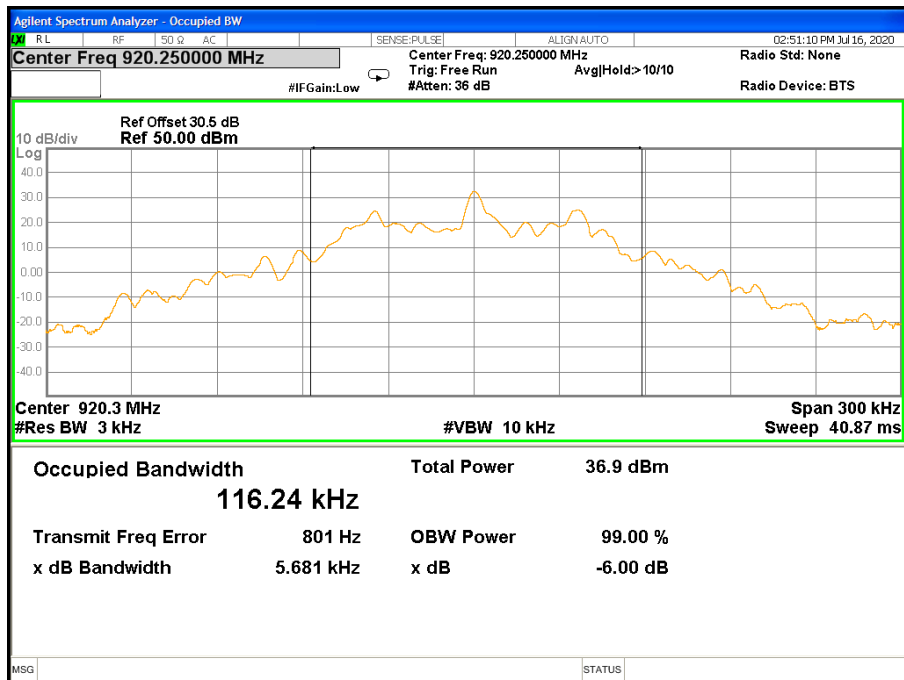
**99% Bandwidth**

Dense reader mode ISO-18000-63

Low channel(911.25MHz)



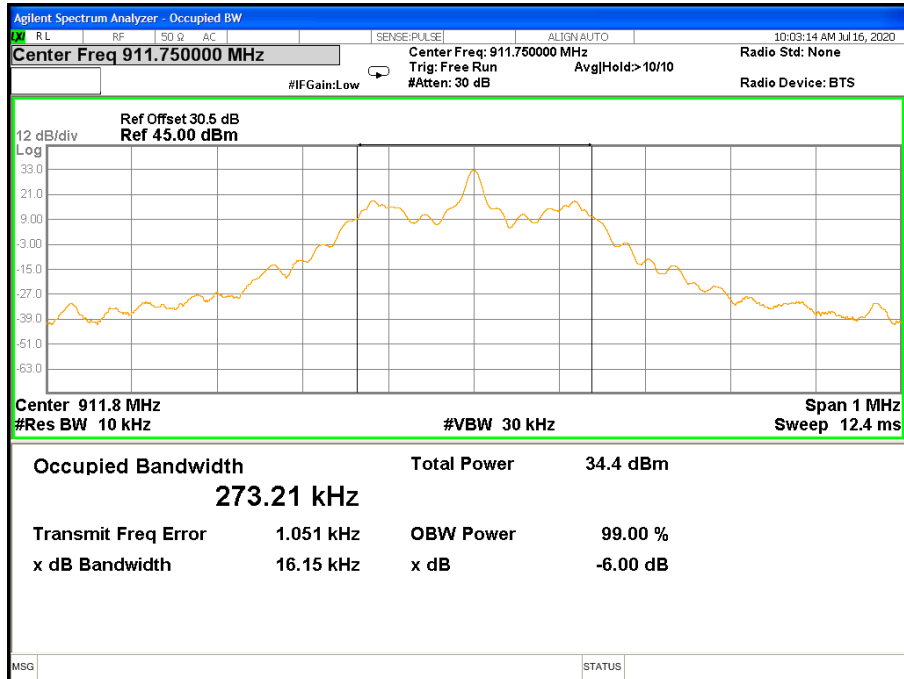
High channel(920.25MHz)



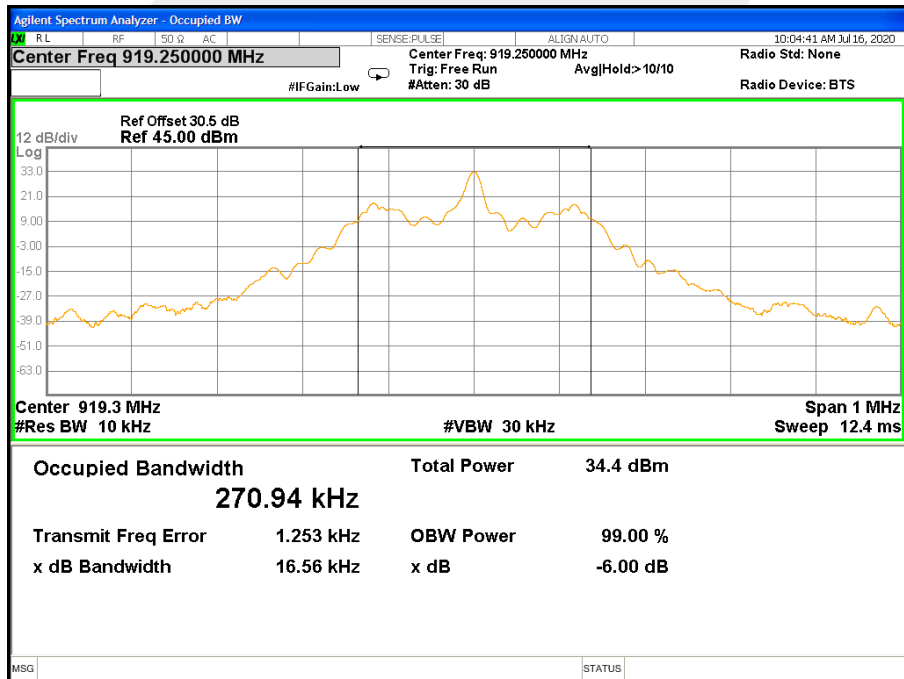


Single reader mode ISO-18000-63

Low channel(911.75MHz)



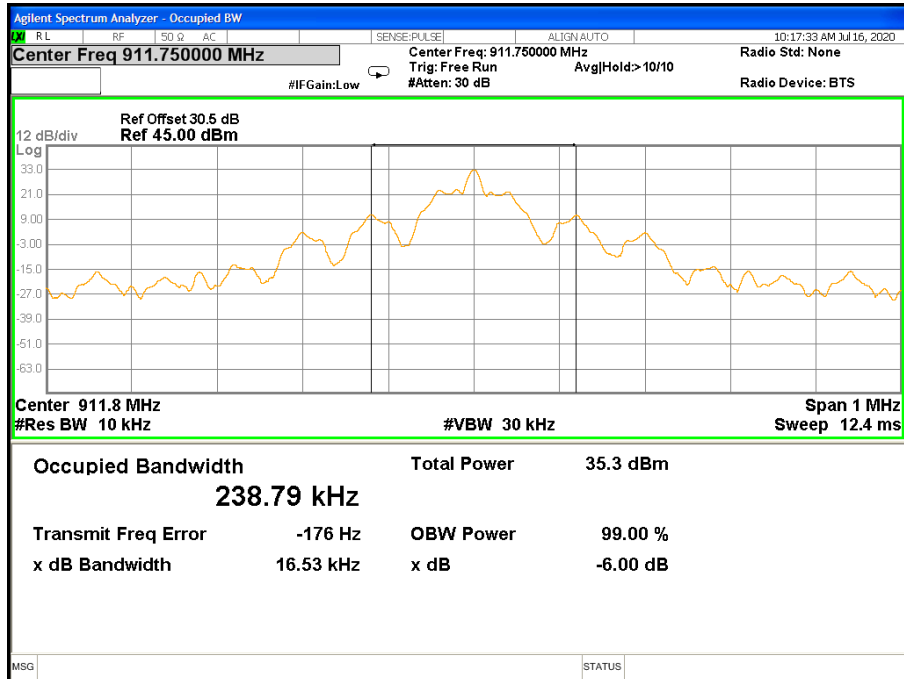
High channel(919.25MHz)



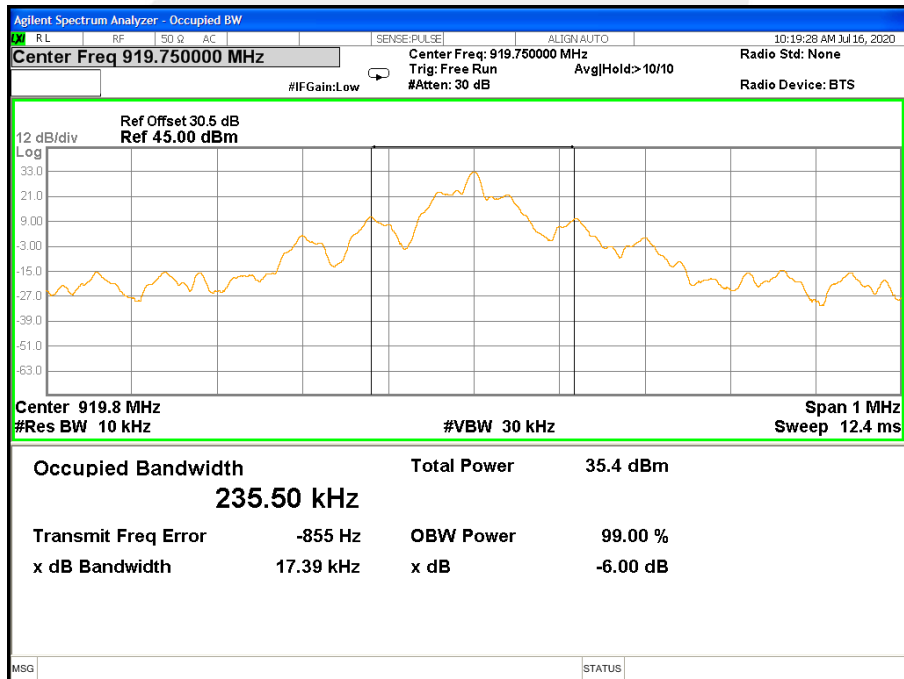


Low data rate ISO-18000-62(40kbps)

Low channel(911.75MHz)



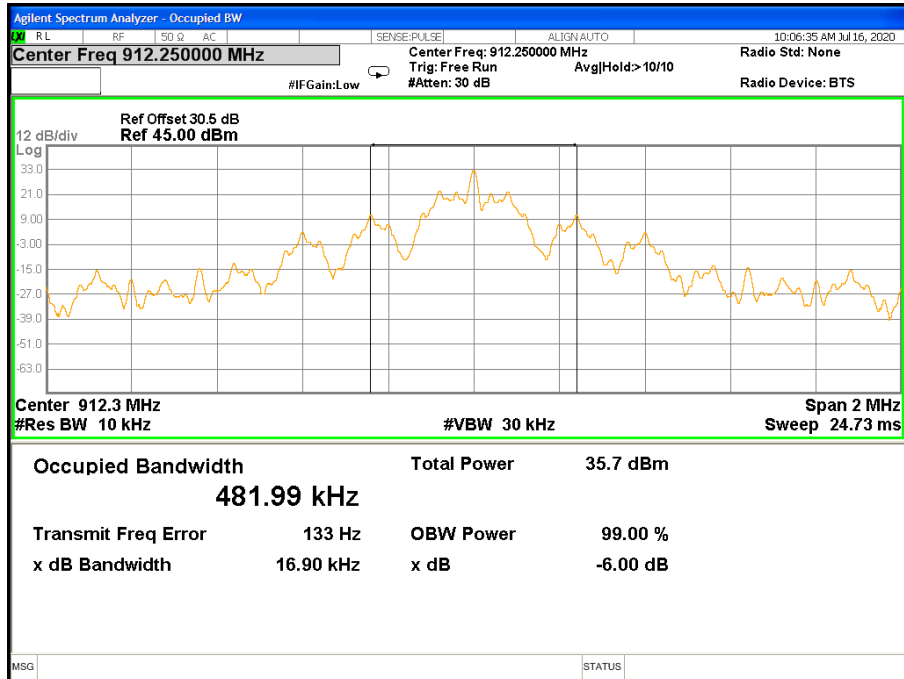
High channel(919.75MHz)



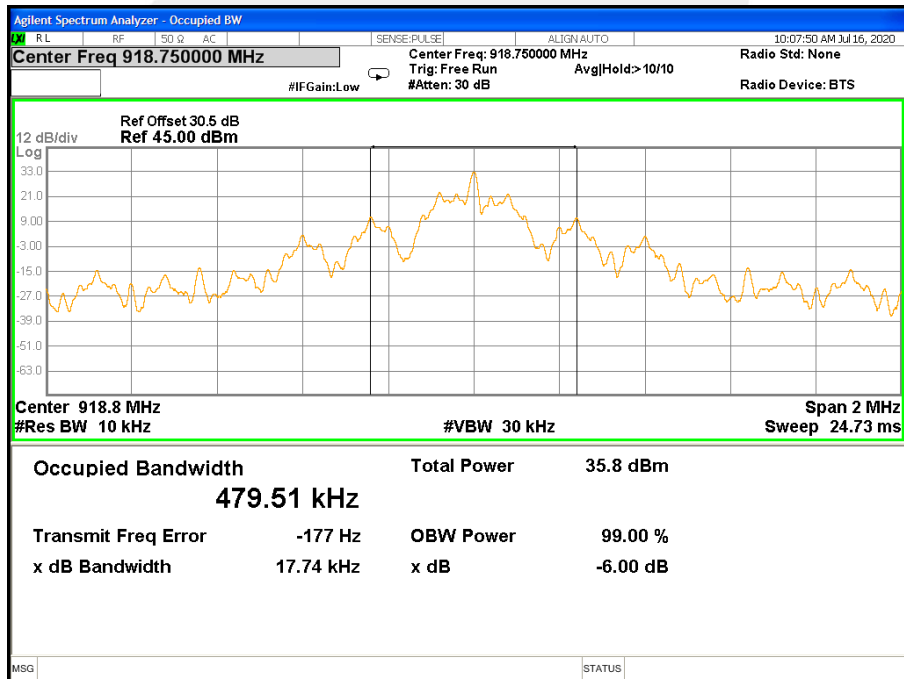


High data rate ISO-18000-62(80kbps)

Low channel(912.25MHz)

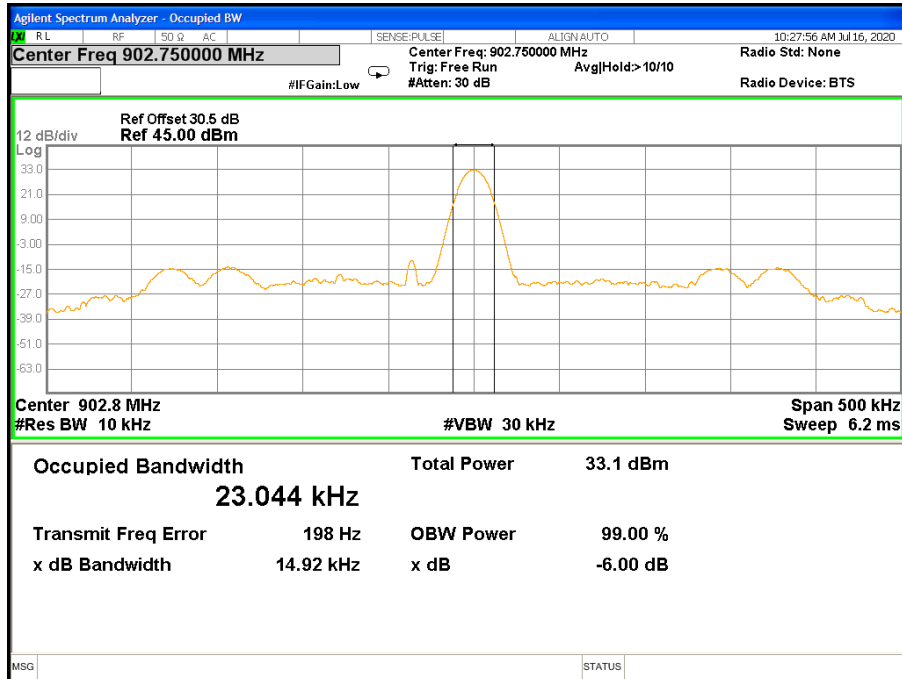


High channel(918.75MHz)

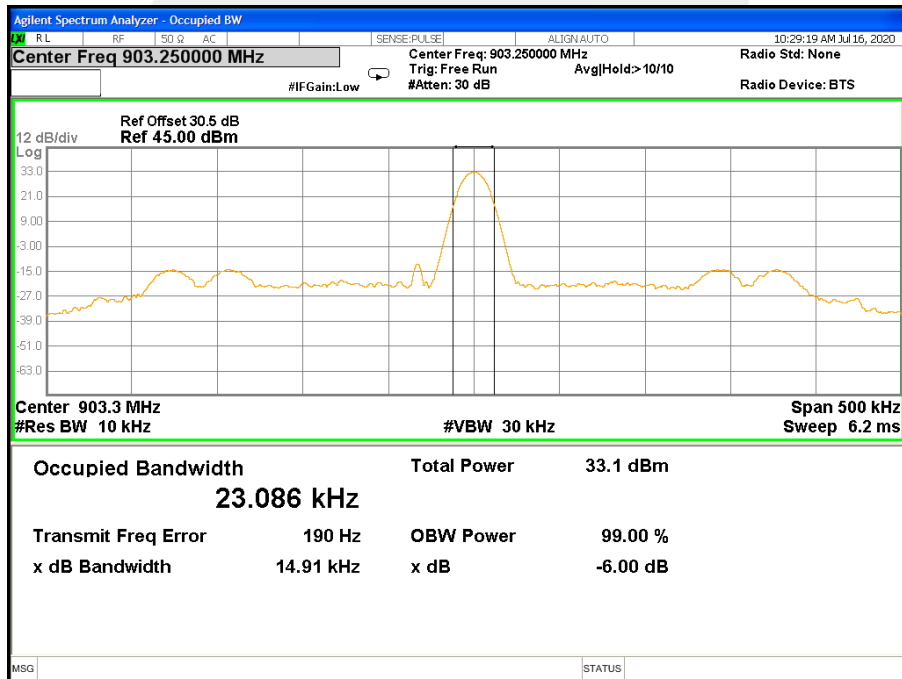




Unmodulated ISO-10374
Low channel(902.75MHz)

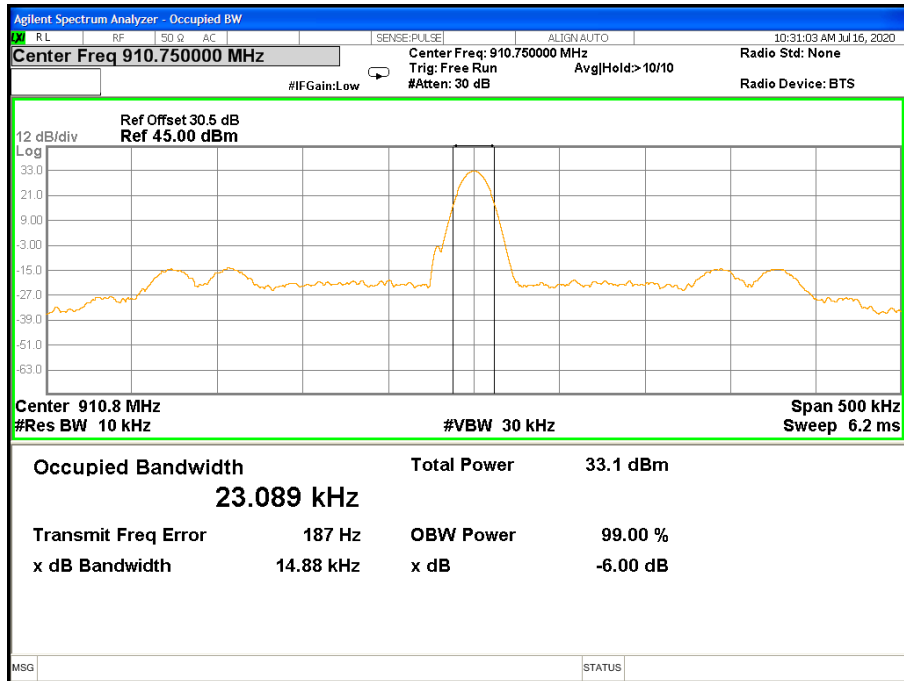


High channel(903.25MHz)

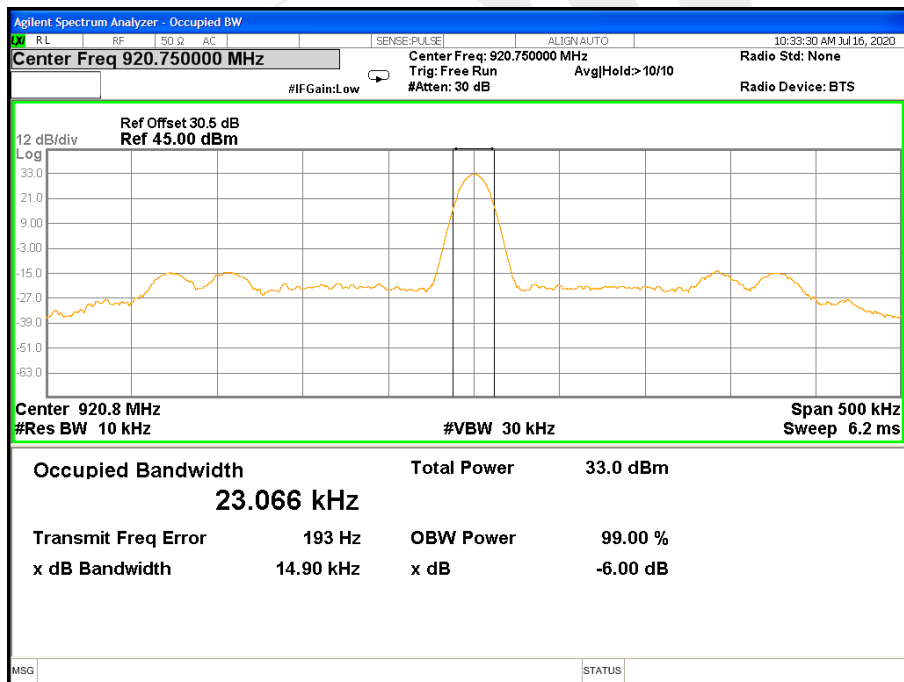




Low channel(910.75MHz)

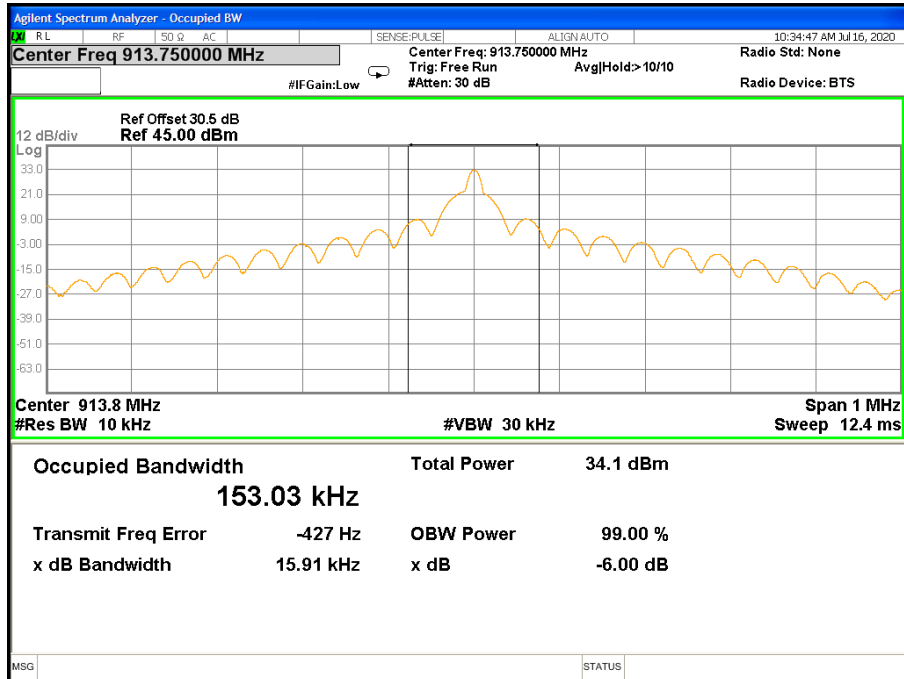


High channel(920.75MHz)

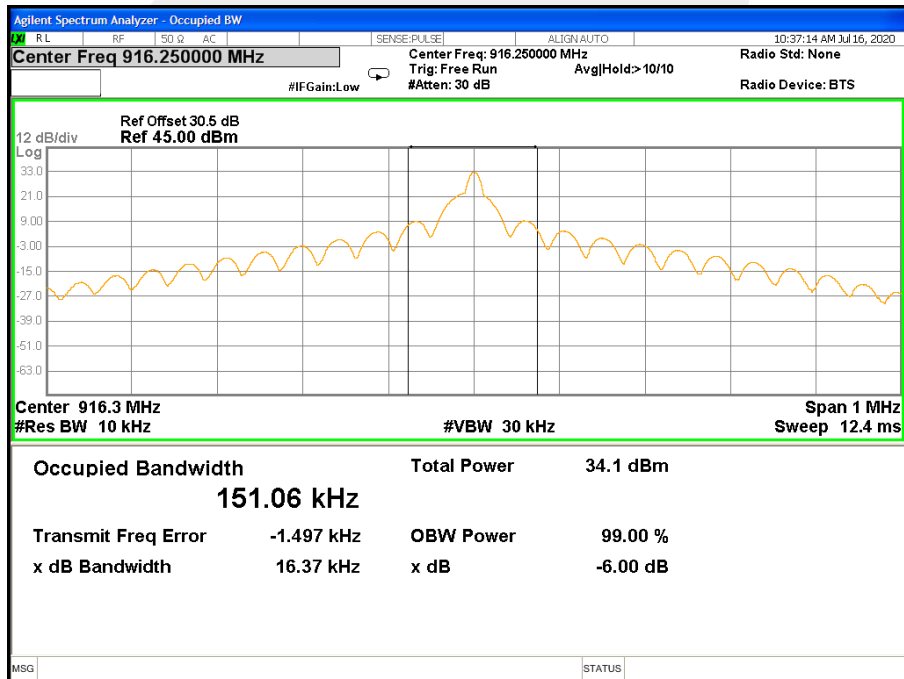




TDM
Low channel(913.75MHz)

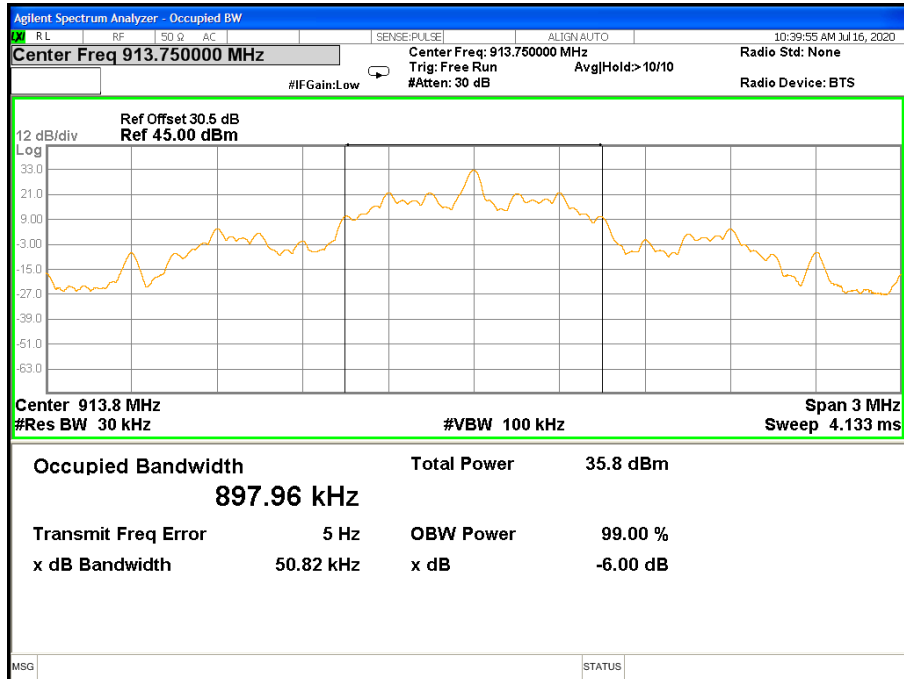


High channel(916.25MHz)

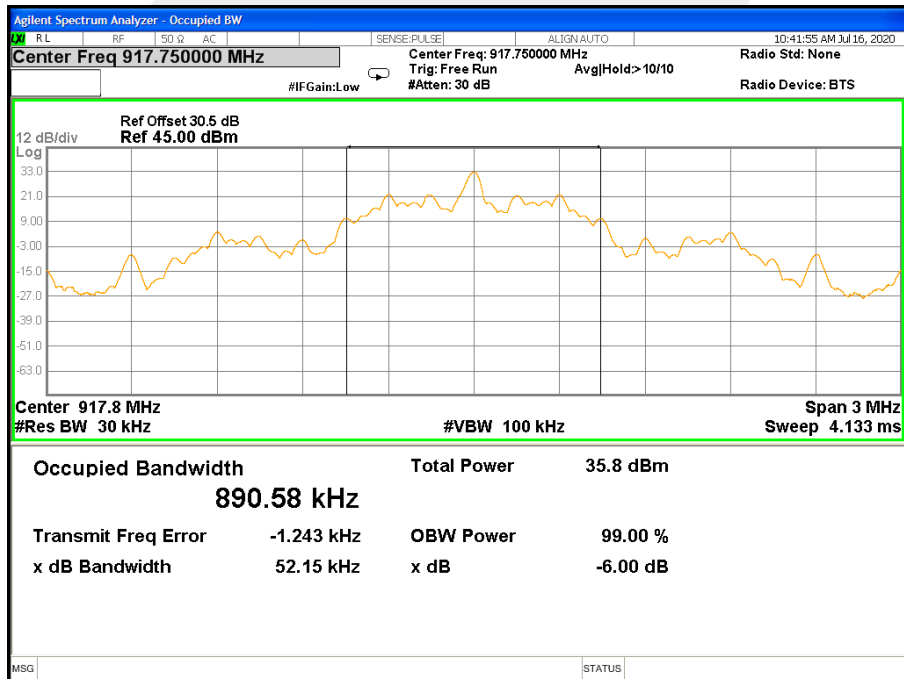




Title 21
Low channel(913.75MHz)



High channel(917.75MHz)



5. FREQUENCY STABILITY

5.1 LIMIT

However, the device meets the following condition:

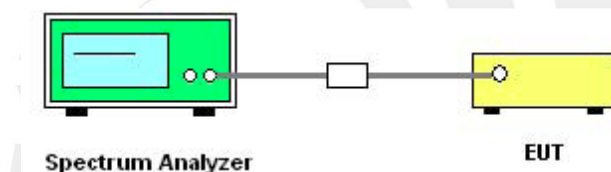
Fixed non-multilateration transmitters with an authorized bandwidth that is more than 40 kHz from the band edge, intermittently operated hand-held readers, and mobile transponders are not subject to frequency tolerance restrictions.

Frequency tolerances measurements are taken for information purpose. Frequency must be maintained from -30°C to +50°C. The EUT is monitored at each 10 °C increment. At each temperature, the device is checked after a stabilization period required for the device to reach the temperature.

5.2 TEST PROCEDURE

1. Set analyzer center frequency to channel center frequency.
2. Set the RBW to: 30KHz= RBW
3. Set the VBW $\geq 3 \times$ RBW.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level.

5.3 TEST SETUP BLOCK DIAGRAM



5.4 MEASUREMENT RESULT

The worst case results are presented, with the frequency shown. The device was checked at each 10 °C increment of temperature.

Dense reader mode ISO-18000-63					
Channel	Test Condition	Nominal Frequency (MHz)	Measured Frequency (MHz)	Result (ppm)	Limit (ppm)
911.25MHz	+22°C, Nominal	911.25	911.24998	-0.022	±2.5
	-30°C, Nominal	911.25	911.24996	-0.044	
	+50°C, Nominal	911.25	911.24999	-0.011	
920.25MHz	+22°C, Nominal	920.25	920.24998	-0.022	
	-30°C, Nominal	920.25	920.24995	-0.054	
	+50°C, Nominal	920.25	920.24999	-0.011	



Single reader mode ISO-18000-63					
Channel	Test Condition	Nominal Frequency (MHz)	Measured Frequency (MHz)	Result (ppm)	Limit (ppm)
911.75MHz	+22℃, Nominal	911.75	911.75000	0.000	±2.5
	-30℃, Nominal	911.75	911.74997	-0.033	
	+50℃, Nominal	911.75	911.75000	0.000	
919.25MHz	+22℃, Nominal	919.25	919.25000	0.000	
	-30℃, Nominal	919.25	919.24999	-0.011	
	+50℃, Nominal	919.25	919.25003	0.033	

Low data rate ISO-18000-62 (40kbps)					
Channel	Test Condition	Nominal Frequency (MHz)	Measured Frequency (MHz)	Result (ppm)	Limit (ppm)
911.75MHz	+22℃, Nominal	911.75	911.74998	-0.022	±2.5
	-30℃, Nominal	911.75	911.74997	-0.033	
	+50℃, Nominal	911.75	911.74998	-0.022	
919.75MHz	+22℃, Nominal	919.75	919.74998	-0.022	
	-30℃, Nominal	919.75	919.74996	-0.043	
	+50℃, Nominal	919.75	919.74996	-0.043	

High data rate ISO-18000-62 (80kbps)					
Channel	Test Condition	Nominal Frequency (MHz)	Measured Frequency (MHz)	Result (ppm)	Limit (ppm)
912.75MHz	+22℃, Nominal	912.25	912.24998	-0.022	±2.5
	-30℃, Nominal	912.25	912.24993	-0.077	
	+50℃, Nominal	912.25	912.24996	-0.044	
918.75MHz	+22℃, Nominal	918.75	918.74998	-0.022	
	-30℃, Nominal	918.75	918.74996	-0.044	
	+50℃, Nominal	918.75	918.74998	-0.022	



Unmodulated ISO-10374					
Channel	Test Condition	Nominal Frequency (MHz)	Measured Frequency (MHz)	Result (ppm)	Limit (ppm)
902.75MHz	+22℃, Nominal	902.75	902.74996	-0.0443	±2.5
	-30℃, Nominal	902.75	902.74995	-0.0554	
	+50℃, Nominal	902.75	902.74997	-0.0332	
903.25MHz	+22℃, Nominal	903.25	903.24996	-0.0443	
	-30℃, Nominal	903.25	903.24994	-0.0664	
	+50℃, Nominal	903.25	903.24999	-0.0111	
910.75MHz	+22℃, Nominal	910.75	910.74996	-0.0439	
	-30℃, Nominal	910.75	910.74994	-0.0659	
	+50℃, Nominal	910.75	910.74999	-0.0110	
920.75MHz	+22℃, Nominal	920.75	920.74998	-0.0217	
	-30℃, Nominal	920.75	920.74994	-0.0652	
	+50℃, Nominal	920.75	920.74999	-0.0109	

TDM					
Channel	Test Condition	Nominal Frequency (MHz)	Measured Frequency (MHz)	Result (ppm)	Limit (ppm)
913.75MHz	+22℃, Nominal	913.75	913.75000	0.000	±2.5
	-30℃, Nominal	913.75	913.74997	-0.033	
	+50℃, Nominal	913.75	913.75001	0.011	
916.25MHz	+22℃, Nominal	916.25	916.24996	-0.044	
	-30℃, Nominal	916.25	916.24994	-0.065	
	+50℃, Nominal	916.25	916.24995	-0.055	

Title 21					
Channel	Test Condition	Nominal Frequency (MHz)	Measured Frequency (MHz)	Result (ppm)	Limit (ppm)
913.75MHz	+22℃, Nominal	913.75	913.74996	-0.044	±2.5
	-30℃, Nominal	913.75	913.74994	-0.066	
	+50℃, Nominal	913.75	913.74995	-0.055	
917.75MHz	+22℃, Nominal	917.75	917.74996	-0.044	
	-30℃, Nominal	917.75	917.74993	-0.076	
	+50℃, Nominal	917.75	917.74994	-0.065	



6. FIELD STRENGTH OF SPURIOUS EMISSIONS

6.1 LIMIT

For all other transmitters authorized under subpart M that operate in the 902-928 MHz band, the peak power of any emission shall be attenuated below the power of the highest emission contained within the licensee's sub-band in accordance with the following schedule:

- (i) On any frequency within the authorized bandwidth: Zero dB.
- (ii) On any frequency outside the licensee's sub-band edges: $55 + 10 \log(P)$ dB, where (P) is the highest emission (watts) of the transmitter inside the licensee's sub-band.

6.2 TEST PROCEDURE

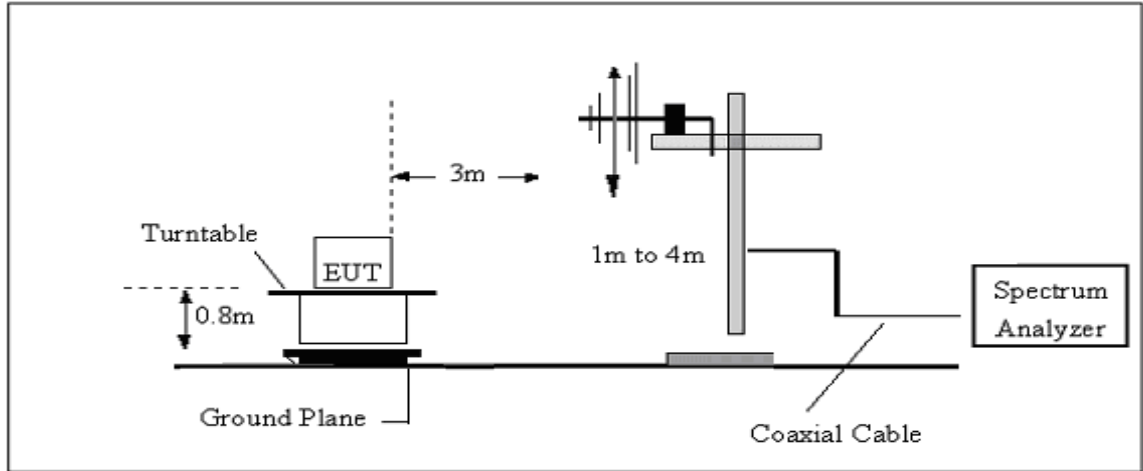
- a. The measuring distance at 3 m shall be used for measurements at frequency 30MHz up to 1GHz, and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber. The table was rotated 360 degree to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarization of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and Quasi Peak detector mode will be re-measured.
- e. If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

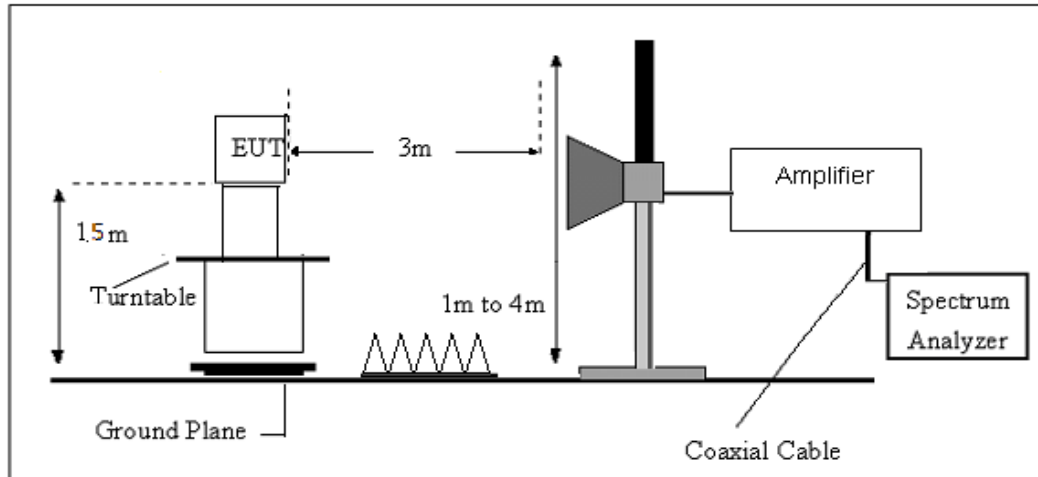
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

6.3 TEST SETUP

(A) Radiated Emission Test-Up Frequency 30MHz~1GHz



(B) Radiated Emission Test-Up Frequency Above 1GHz



6.4 EUT OPERATION CONDITIONS

Please refer to section 2.4 of this report.

6.5 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency (MHz)	FS (dBμV/m)	RA (dBμV/m)	AF (dB)	CL (dB)	AG (dB)	Factor (dB)
300	40	58.1	12.2	1.6	31.9	-18.1

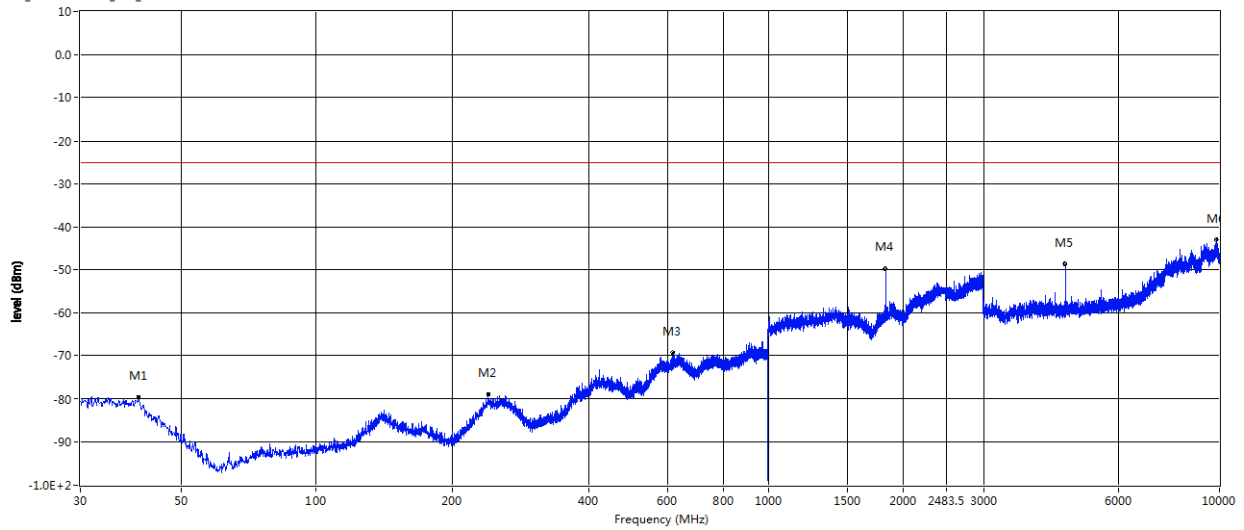
$$\text{Factor} = \text{AF} + \text{CL} - \text{AG}$$



6.6 TEST RESULT

Dense reader mode ISO-18000-63
Low channel
Horizontal

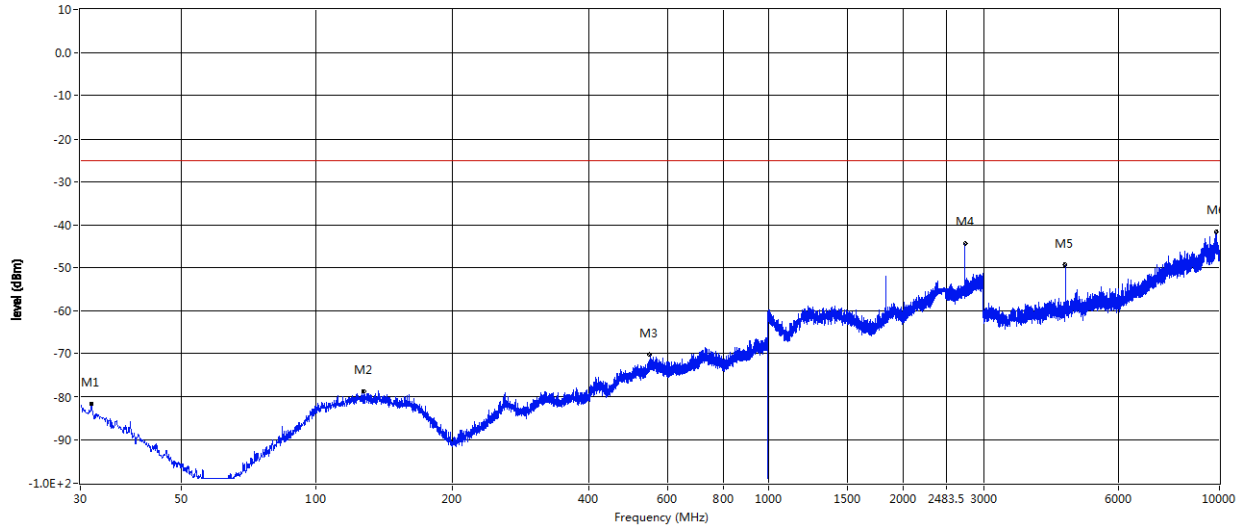
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
40.306	-79.63	-25.0	-54.63	Horizontal	Pass
240.126	-79.00	-25.0	-54.00	Horizontal	Pass
616.122	-69.28	-25.0	-44.28	Horizontal	Pass
1822.250	-49.62	-25.0	-24.62	Horizontal	Pass
4555.750	-48.69	-25.0	-23.69	Horizontal	Pass
9847.750	-42.99	-25.0	-17.99	Horizontal	Pass

Vertical

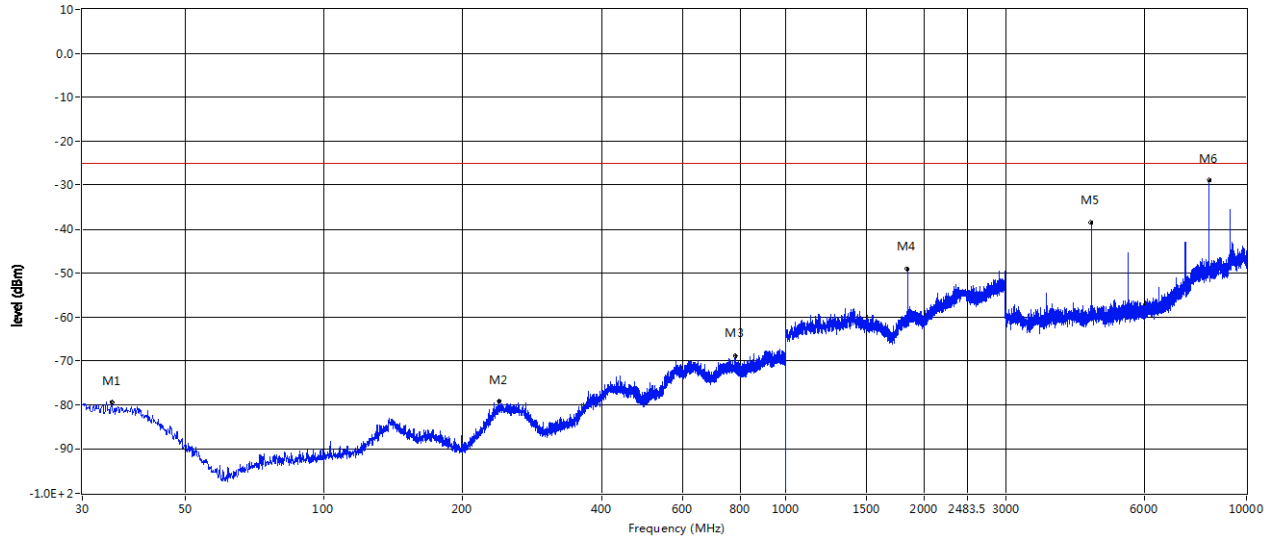
RSE_FCC Test Case_RSE_PART90 V 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
31.698	-81.59	-25.0	-56.59	Vertical	Pass
127.364	-78.67	-25.0	-53.67	Vertical	Pass
547.374	-70.23	-25.0	-45.23	Vertical	Pass
2734.000	-44.27	-25.0	-19.27	Vertical	Pass
4555.750	-49.35	-25.0	-24.35	Vertical	Pass
9829.375	-41.53	-25.0	-16.53	Vertical	Pass

High channel
Horizontal

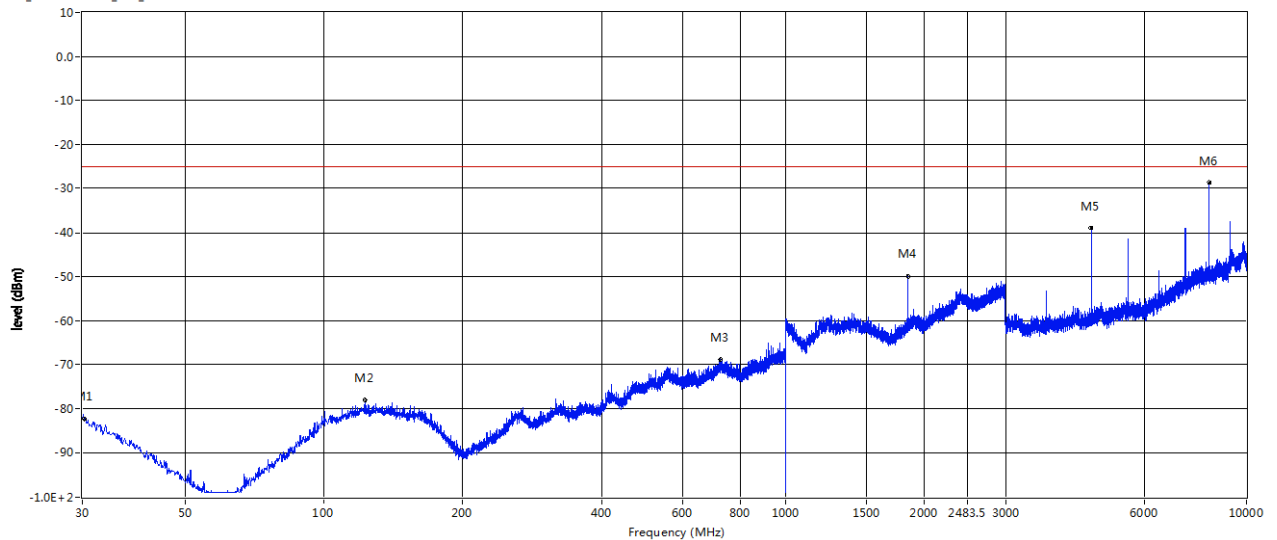
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
34.729	-79.39	-25.0	-54.39	Horizontal	Pass
239.520	-79.11	-25.0	-54.11	Horizontal	Pass
778.719	-68.69	-25.0	-43.69	Horizontal	Pass
1840.500	-48.93	-25.0	-23.93	Horizontal	Pass
4601.250	-38.40	-25.0	-13.40	Horizontal	Pass
8282.375	-28.81	-25.0	-3.81	Horizontal	Pass

Vertical

RSE_FCC Test Case_RSE_PART90 V 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
30.364	-82.20	-25.0	-57.20	Vertical	Pass
122.878	-78.06	-25.0	-53.06	Vertical	Pass
722.216	-68.77	-25.0	-43.77	Vertical	Pass
1840.750	-50.01	-25.0	-25.01	Vertical	Pass
4601.250	-38.91	-25.0	-13.91	Vertical	Pass
8282.375	-28.69	-25.0	-3.69	Vertical	Pass

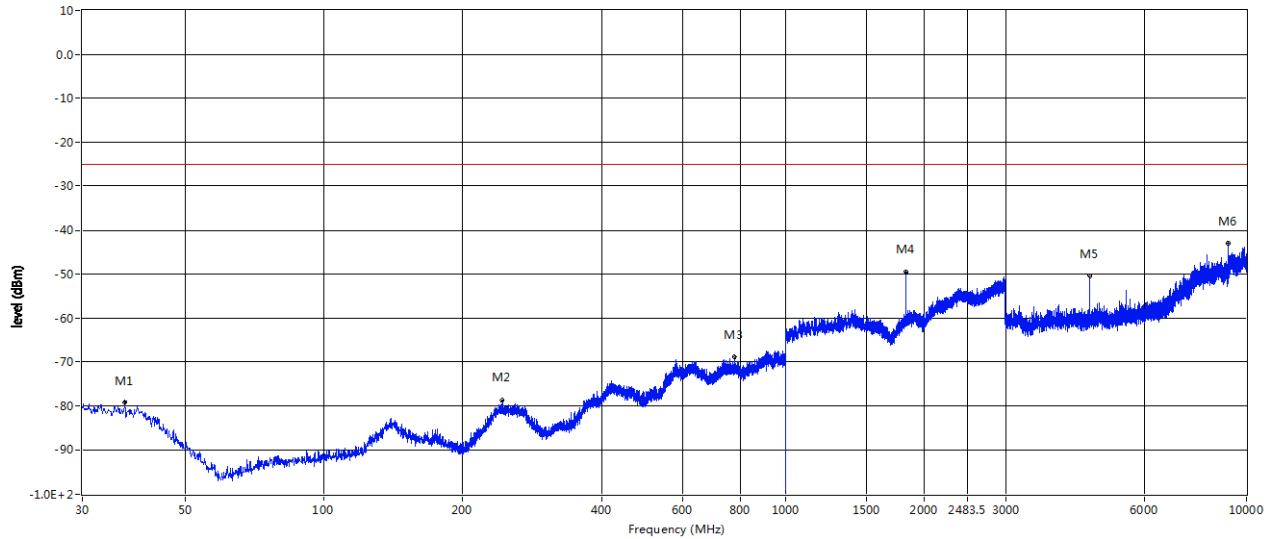


Single reader mode ISO-18000-63

Low channel

Horizontal

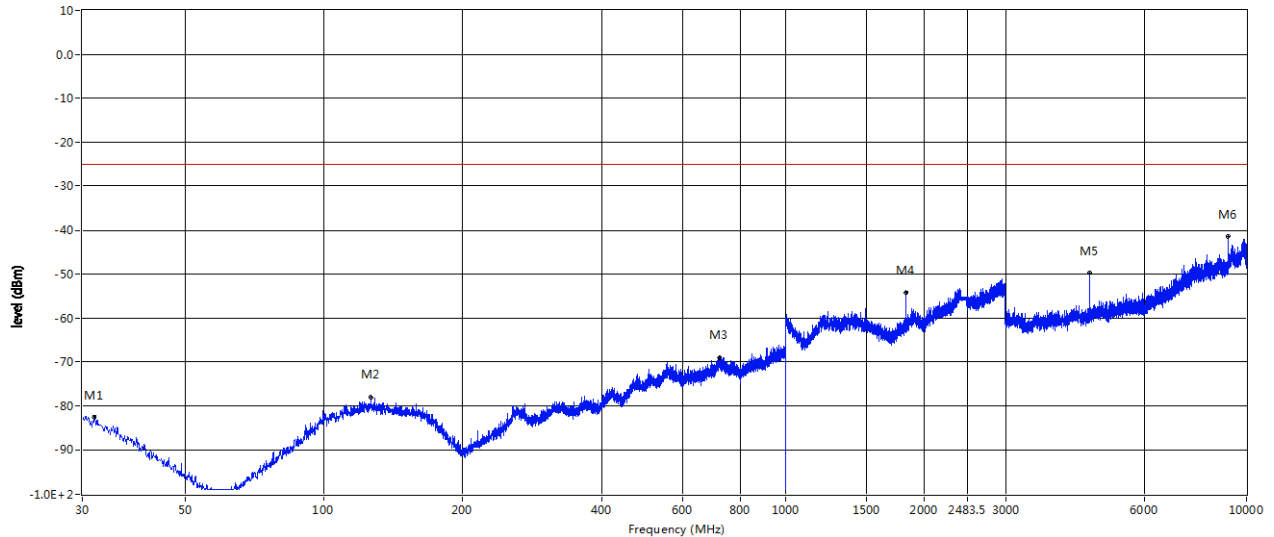
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
37.032	-79.10	-25.0	-54.10	Horizontal	Pass
243.764	-78.60	-25.0	-53.60	Horizontal	Pass
775.566	-68.85	-25.0	-43.85	Horizontal	Pass
1823.500	-49.39	-25.0	-24.39	Horizontal	Pass
4558.375	-50.50	-25.0	-25.50	Horizontal	Pass
9118.000	-43.02	-25.0	-18.02	Horizontal	Pass

Vertical

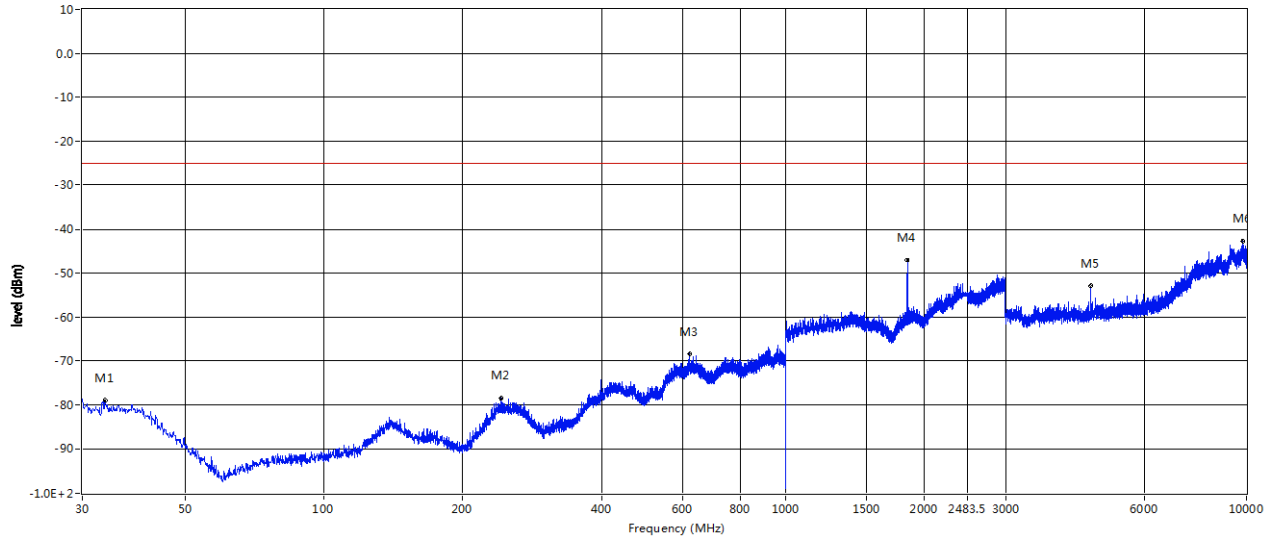
RSE_FCC Test Case_RSE_PART90 V 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
31.819	-82.54	-25.0	-57.54	Vertical	Pass
126.757	-77.92	-25.0	-52.92	Vertical	Pass
720.155	-68.92	-25.0	-43.92	Vertical	Pass
1823.500	-54.11	-25.0	-29.11	Vertical	Pass
4558.375	-49.61	-25.0	-24.61	Vertical	Pass
9118.000	-41.36	-25.0	-16.36	Vertical	Pass

High channel
Horizontal

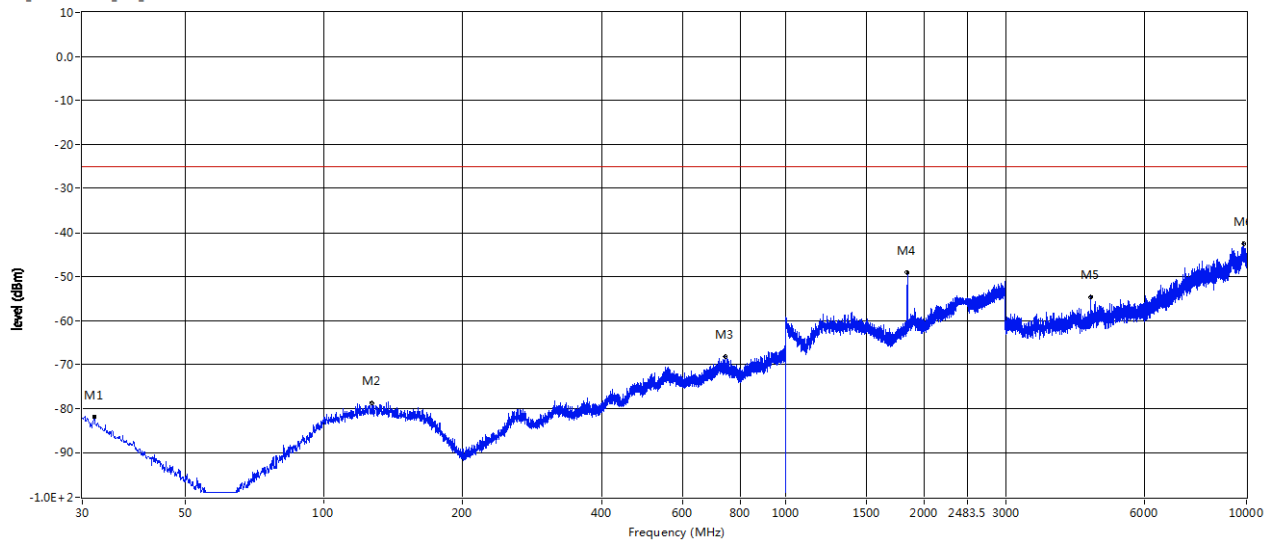
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
33.638	-78.86	-25.0	-53.86	Horizontal	Pass
242.430	-78.39	-25.0	-53.39	Horizontal	Pass
620.124	-68.29	-25.0	-43.29	Horizontal	Pass
1838.500	-46.96	-25.0	-21.96	Horizontal	Pass
4596.000	-52.88	-25.0	-27.88	Horizontal	Pass
9796.125	-42.66	-25.0	-17.66	Horizontal	Pass

Vertical

RSE_FCC Test Case_RSE_PART90 V 30M-10G

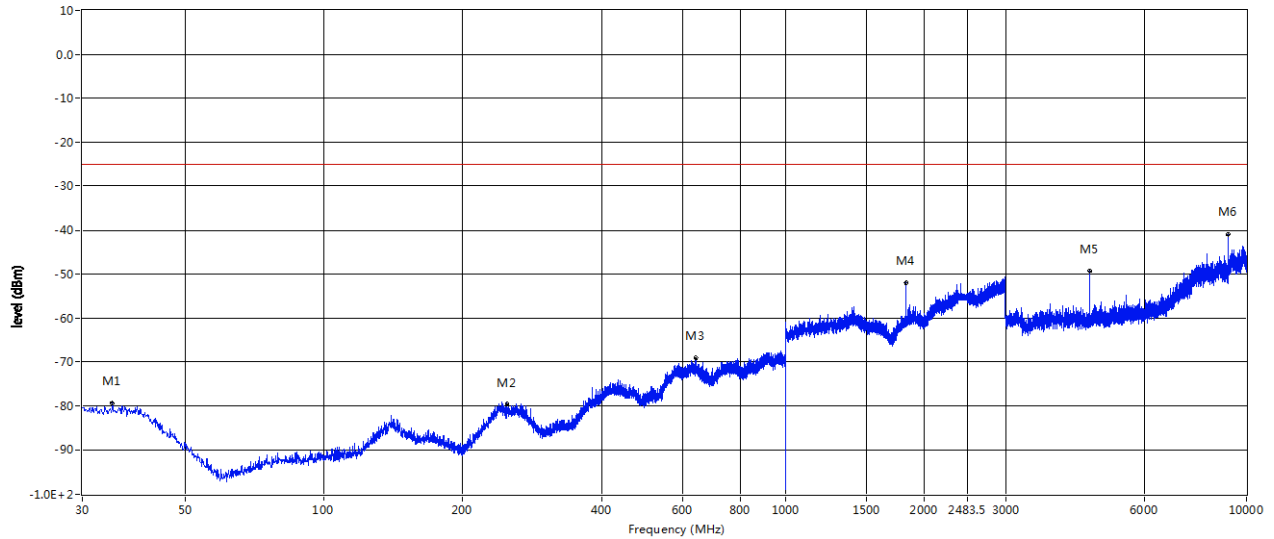


Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
31.819	-81.81	-25.0	-56.81	Vertical	Pass
127.364	-78.71	-25.0	-53.71	Vertical	Pass
740.040	-68.13	-25.0	-43.13	Vertical	Pass
1838.500	-48.99	-25.0	-23.99	Vertical	Pass
4596.000	-54.54	-25.0	-29.54	Vertical	Pass
9833.750	-42.50	-25.0	-17.50	Vertical	Pass



Low data rate ISO-18000-62 (40kbps)
Low channel
Horizontal

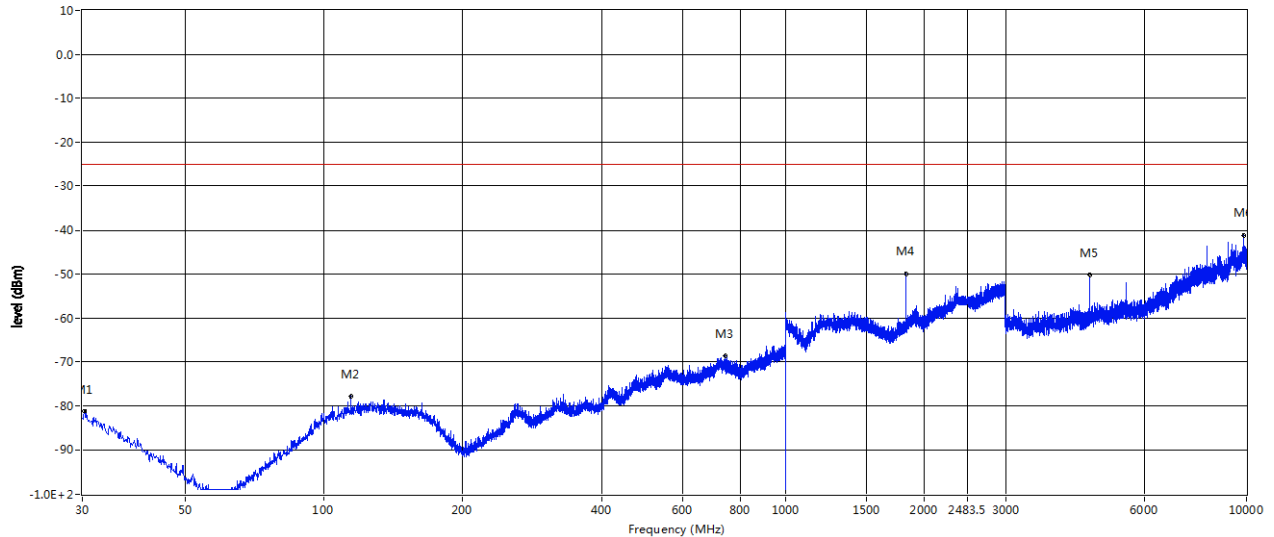
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
34.850	-79.29	-25.0	-54.29	Horizontal	Pass
249.220	-79.63	-25.0	-54.63	Horizontal	Pass
639.160	-69.04	-25.0	-44.04	Horizontal	Pass
1823.500	-51.95	-25.0	-26.95	Horizontal	Pass
4558.375	-49.31	-25.0	-24.31	Horizontal	Pass
9118.000	-40.91	-25.0	-15.91	Horizontal	Pass

Vertical

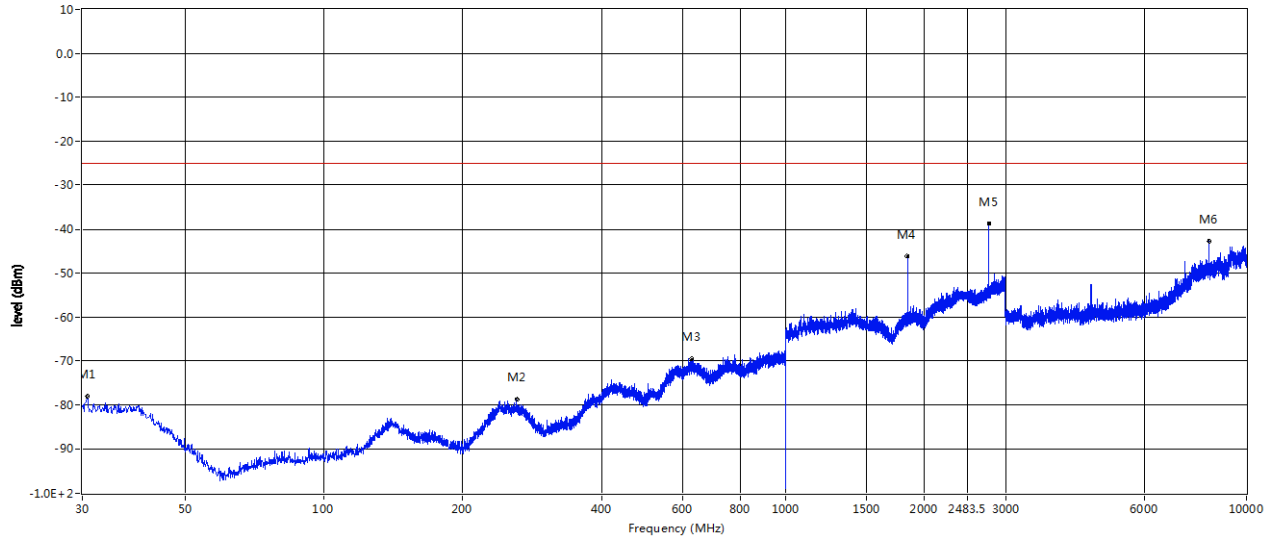
RSE_FCC Test Case_RSE_PART90 V 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
30.364	-81.21	-25.0	-56.21	Vertical	Pass
114.390	-77.78	-25.0	-52.78	Vertical	Pass
740.161	-68.64	-25.0	-43.64	Vertical	Pass
1823.500	-49.87	-25.0	-24.87	Vertical	Pass
4558.375	-50.26	-25.0	-25.26	Vertical	Pass
9839.875	-41.13	-25.0	-16.13	Vertical	Pass

High channel
Horizontal

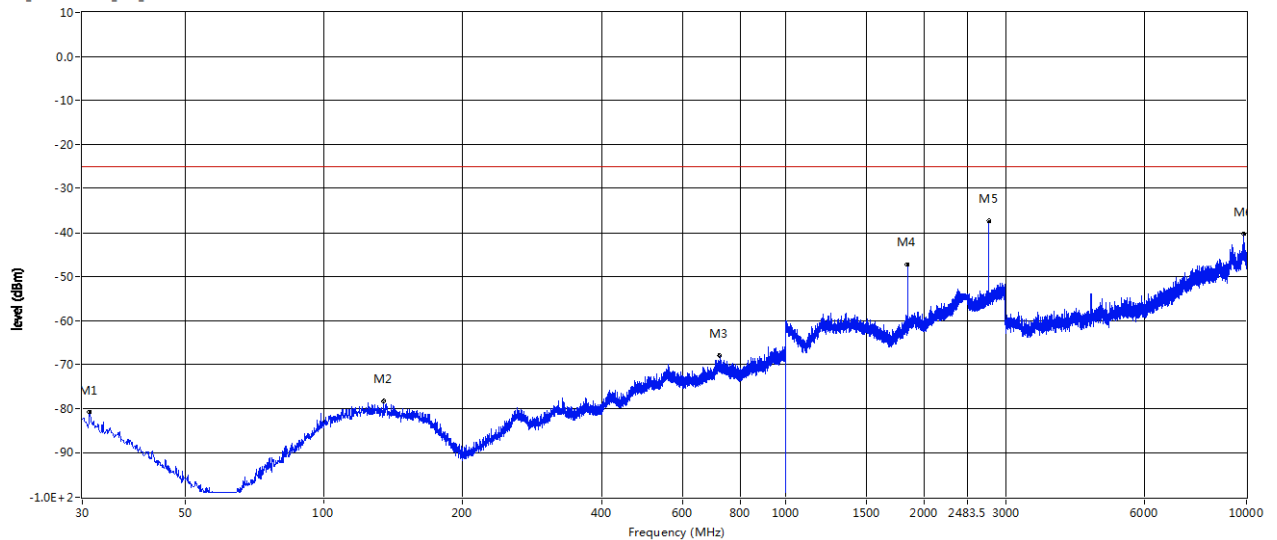
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
30.727	-78.07	-25.0	-53.07	Horizontal	Pass
261.587	-78.71	-25.0	-53.71	Horizontal	Pass
627.278	-69.52	-25.0	-44.52	Horizontal	Pass
1839.500	-46.03	-25.0	-21.03	Horizontal	Pass
2759.500	-38.61	-25.0	-13.61	Horizontal	Pass
8278.000	-42.76	-25.0	-17.76	Horizontal	Pass

Vertical

RSE_FCC Test Case_RSE_PART90 V 30M-10G

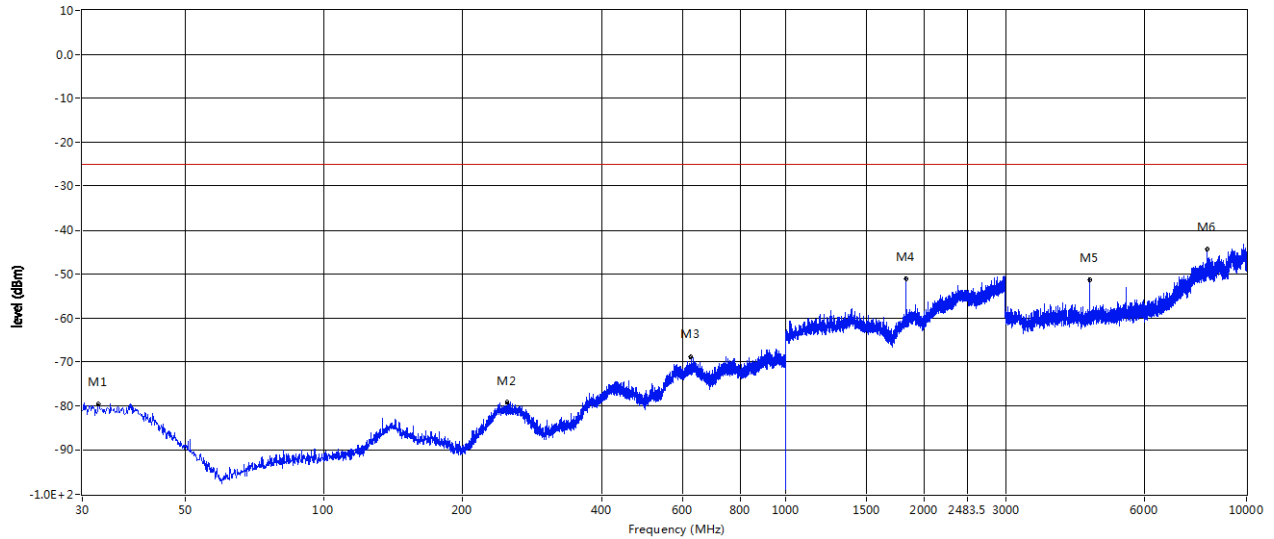


Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
31.091	-80.77	-25.0	-55.77	Vertical	Pass
134.518	-78.24	-25.0	-53.24	Vertical	Pass
721.731	-68.00	-25.0	-43.00	Vertical	Pass
1839.500	-47.17	-25.0	-22.17	Vertical	Pass
2759.500	-37.26	-25.0	-12.26	Vertical	Pass
9847.750	-40.30	-25.0	-15.30	Vertical	Pass



High data rate ISO-18000-62 (80kbps)
Low channel
Horizontal

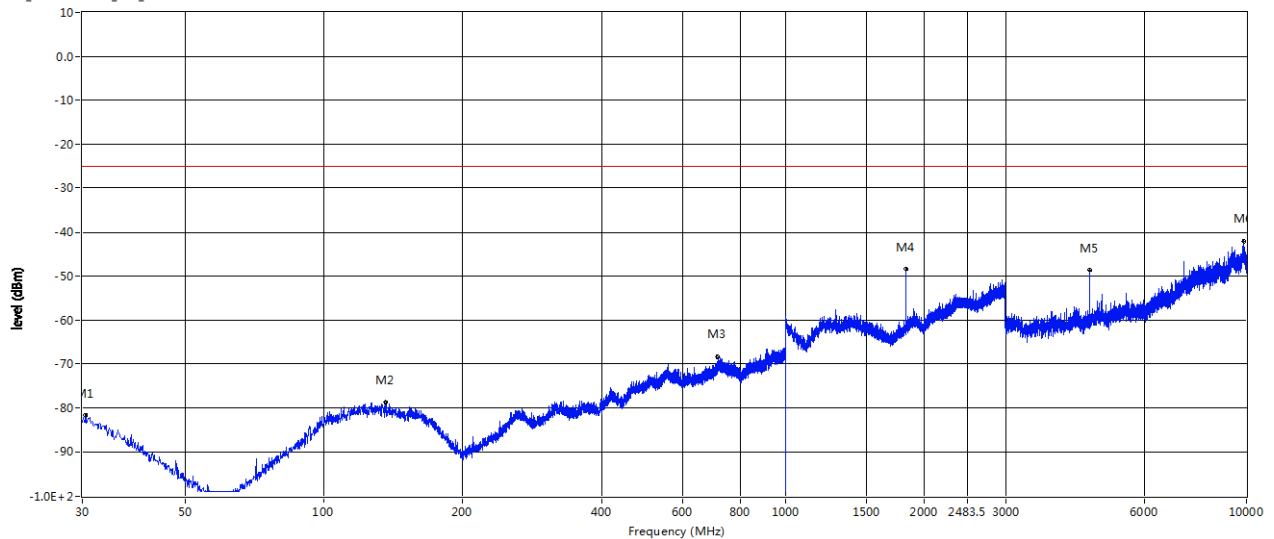
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
32.425	-79.50	-25.0	-54.50	Horizontal	Pass
250.069	-79.23	-25.0	-54.23	Horizontal	Pass
624.731	-68.72	-25.0	-43.72	Horizontal	Pass
1824.500	-51.12	-25.0	-26.12	Horizontal	Pass
4561.000	-51.36	-25.0	-26.36	Horizontal	Pass
8210.625	-44.35	-25.0	-19.35	Horizontal	Pass

Vertical

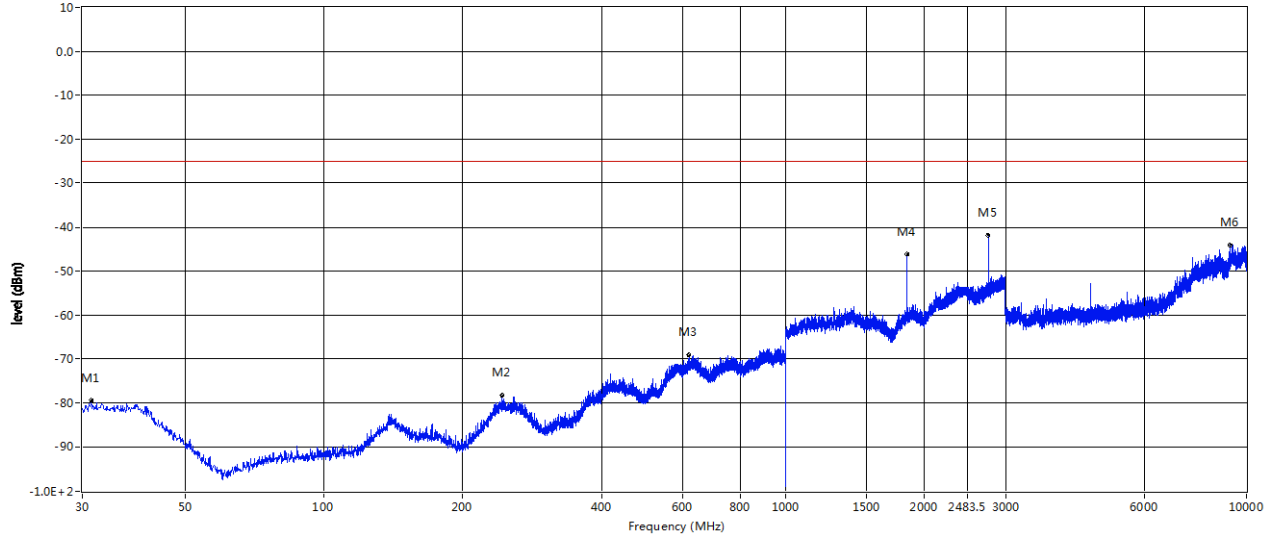
RSE_FCC Test Case_RSE_PART90 V 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
30.242	-82.86	-25.0	-57.86	Vertical	Pass
136.458	-78.78	-25.0	-53.78	Vertical	Pass
714.578	-68.27	-25.0	-43.27	Vertical	Pass
1824.500	-48.41	-25.0	-23.41	Vertical	Pass
4561.000	-48.54	-25.0	-23.54	Vertical	Pass
9859.125	-42.11	-25.0	-17.11	Vertical	Pass

High channel
Horizontal

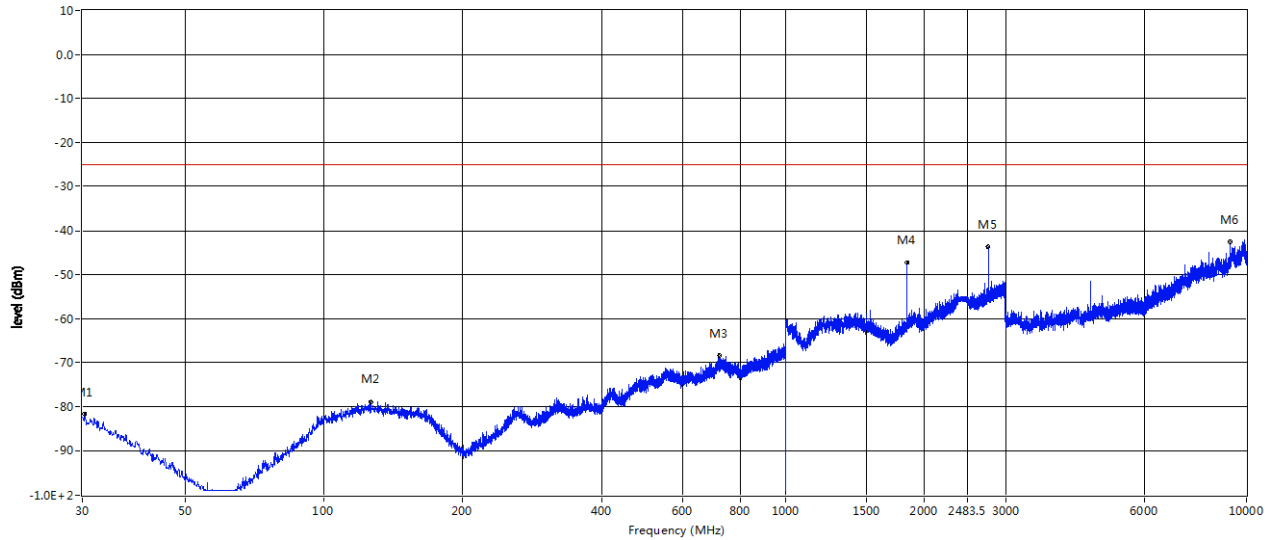
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
31.334	-79.41	-25.0	-54.41	Horizontal	Pass
243.400	-78.29	-25.0	-53.29	Horizontal	Pass
619.154	-68.93	-25.0	-43.93	Horizontal	Pass
1837.500	-46.02	-25.0	-21.02	Horizontal	Pass
2756.500	-41.77	-25.0	-16.77	Horizontal	Pass
9188.000	-44.05	-25.0	-19.05	Horizontal	Pass

Vertical

RSE_FCC Test Case_RSE_PART90 V 30M-10G

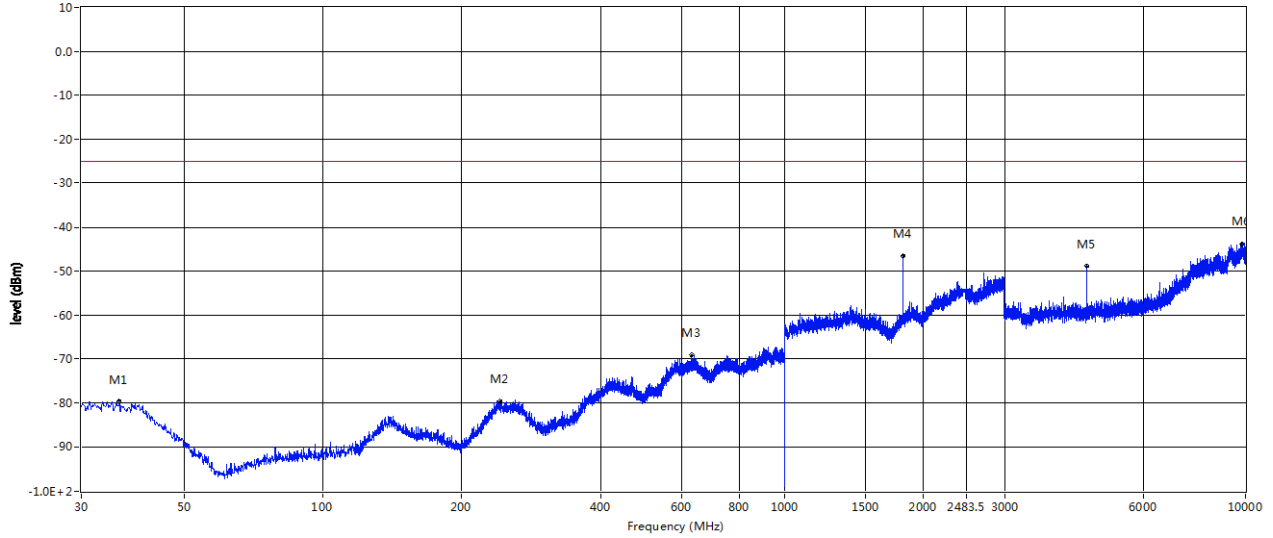


Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
30.364	-81.60	-25.0	-56.60	Vertical	Pass
126.151	-78.82	-25.0	-53.82	Vertical	Pass
719.791	-68.43	-25.0	-43.43	Vertical	Pass
1837.750	-47.19	-25.0	-22.19	Vertical	Pass
2756.500	-43.61	-25.0	-18.61	Vertical	Pass
9188.000	-42.61	-25.0	-17.61	Vertical	Pass



Unmodulated ISO-10374
Low channel
Horizontal

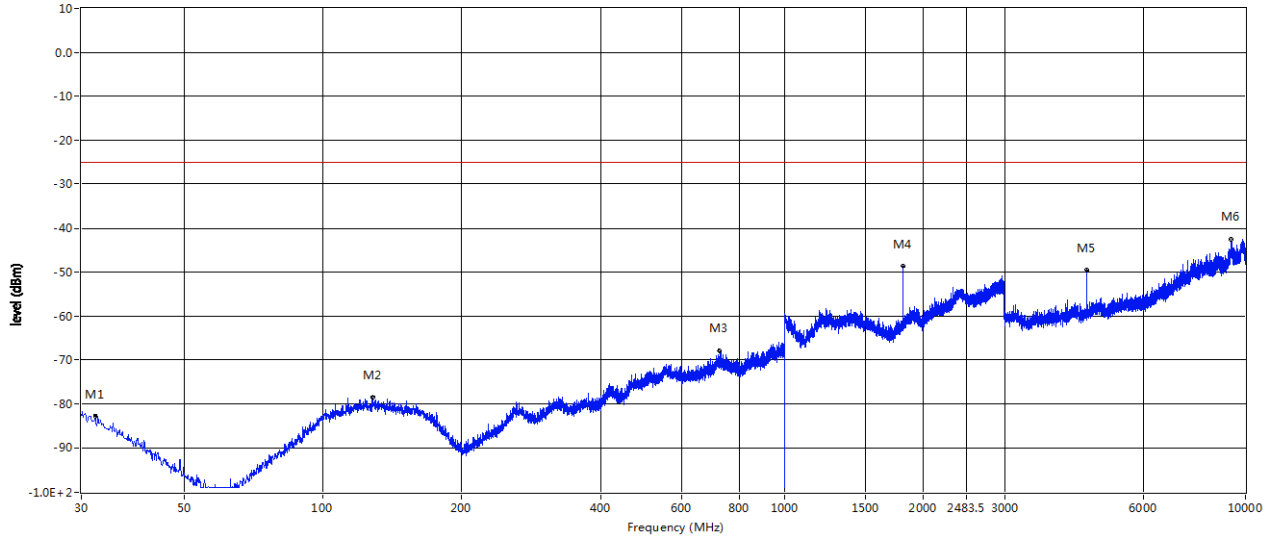
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
36.184	-79.48	-25.0	-54.48	Horizontal	Pass
242.915	-79.49	-25.0	-54.49	Horizontal	Pass
629.339	-69.13	-25.0	-44.13	Horizontal	Pass
1805.500	-46.49	-25.0	-21.49	Horizontal	Pass
4513.750	-48.77	-25.0	-23.77	Horizontal	Pass
9804.875	-43.78	-25.0	-18.78	Horizontal	Pass

Vertical

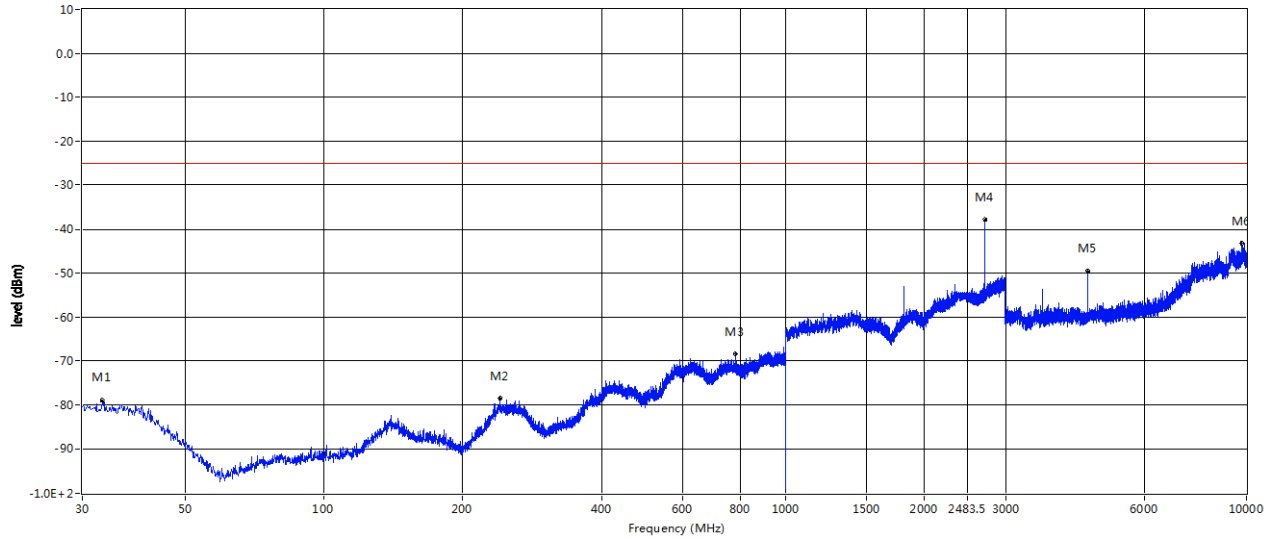
RSE_FCC Test Case_RSE_PART90 V 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
32.182	-82.67	-25.0	-57.67	Vertical	Pass
128.091	-78.45	-25.0	-53.45	Vertical	Pass
724.641	-67.97	-25.0	-42.97	Vertical	Pass
1805.750	-48.70	-25.0	-23.70	Vertical	Pass
4513.750	-49.56	-25.0	-24.56	Vertical	Pass
9290.375	-42.64	-25.0	-17.64	Vertical	Pass

High channel
Horizontal

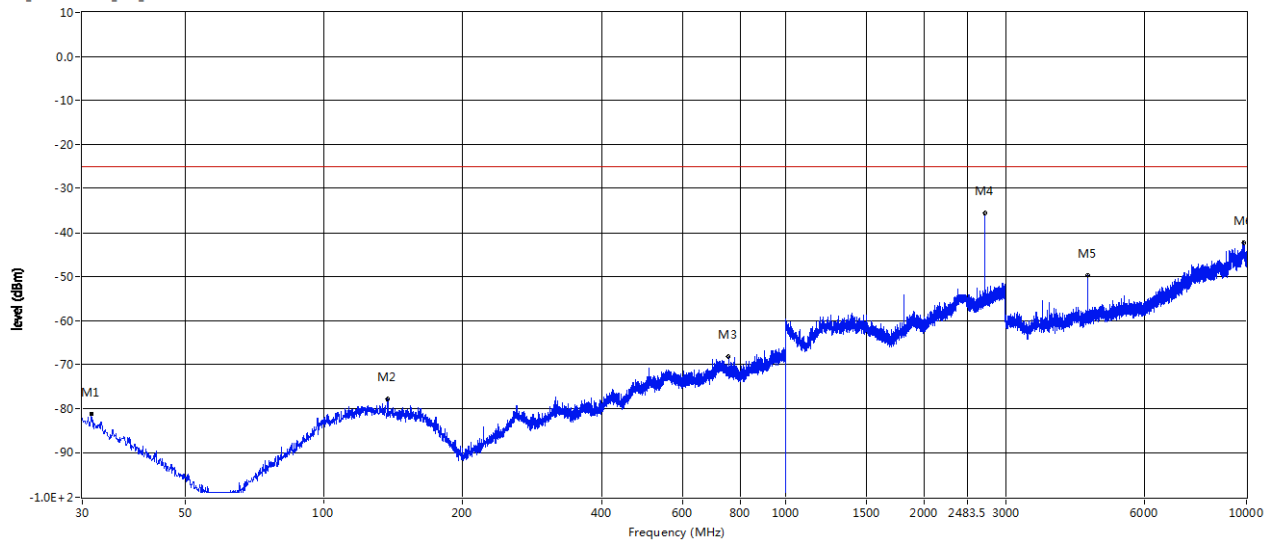
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
33.153	-78.83	-25.0	-53.83	Horizontal	Pass
240.611	-78.43	-25.0	-53.43	Horizontal	Pass
780.174	-68.33	-25.0	-43.33	Horizontal	Pass
2710.000	-37.74	-25.0	-12.74	Horizontal	Pass
4516.375	-49.38	-25.0	-24.38	Horizontal	Pass
9767.250	-43.16	-25.0	-18.16	Horizontal	Pass

Vertical

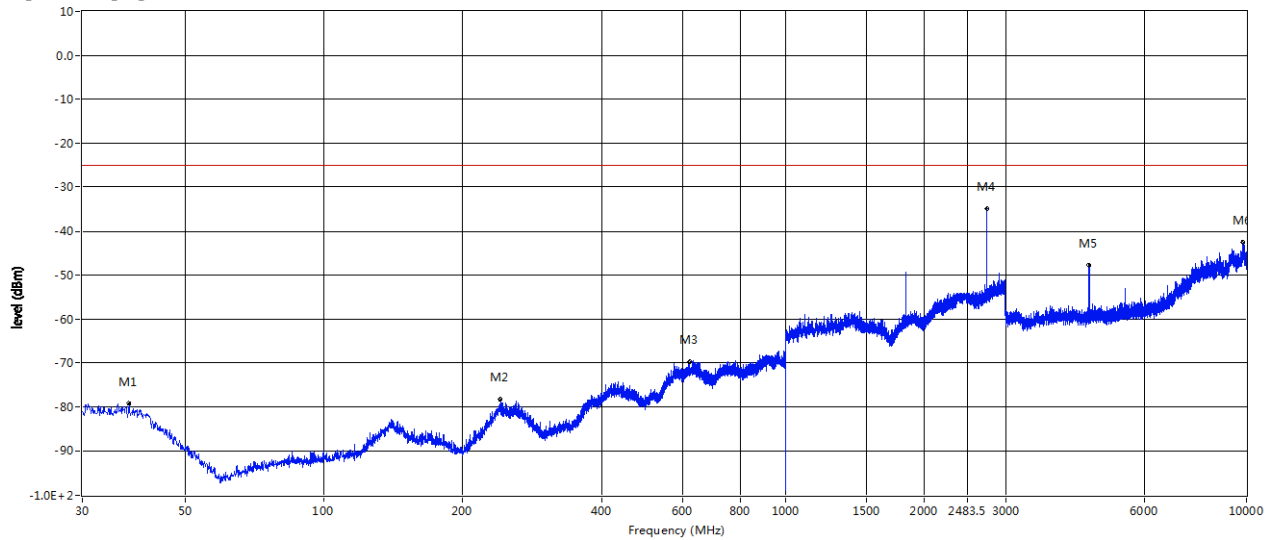
RSE_FCC Test Case_RSE_PART90 V 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
31.334	-81.04	-25.0	-56.04	Vertical	Pass
137.670	-77.75	-25.0	-52.75	Vertical	Pass
754.226	-68.21	-25.0	-43.21	Vertical	Pass
2710.000	-35.66	-25.0	-10.66	Vertical	Pass
4516.375	-49.72	-25.0	-24.72	Vertical	Pass
9843.375	-42.41	-25.0	-17.41	Vertical	Pass

Low channel
Horizontal

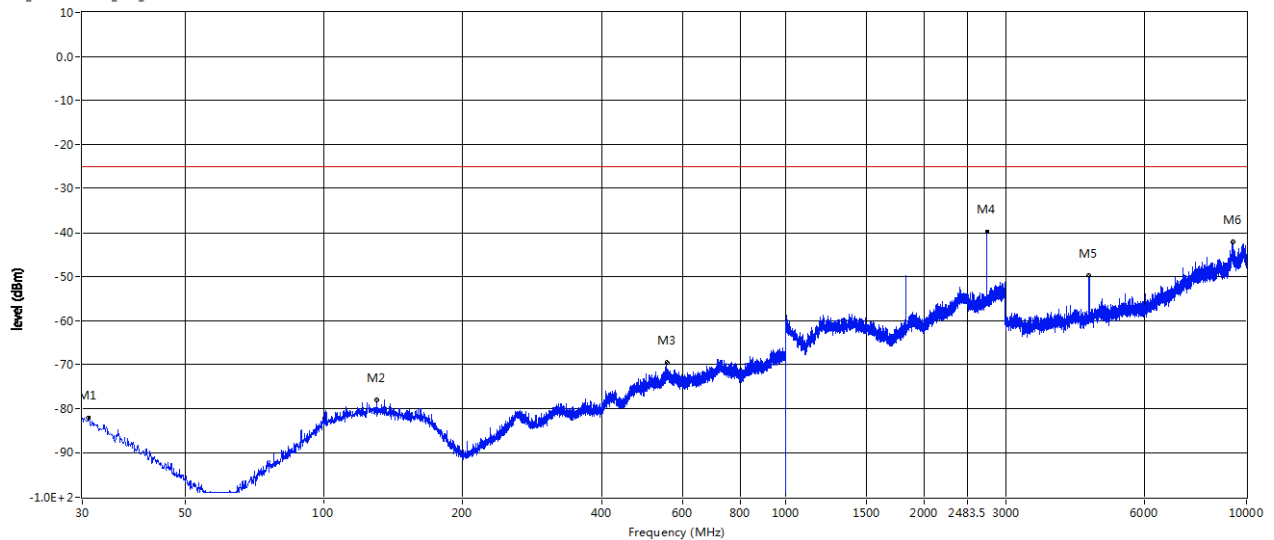
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
37.881	-79.14	-25.0	-54.14	Horizontal	Pass
241.702	-78.19	-25.0	-53.19	Horizontal	Pass
620.124	-69.79	-25.0	-44.79	Horizontal	Pass
2732.500	-34.92	-25.0	-9.92	Horizontal	Pass
4554.000	-47.66	-25.0	-22.66	Horizontal	Pass
9828.500	-42.48	-25.0	-17.48	Horizontal	Pass

Vertical

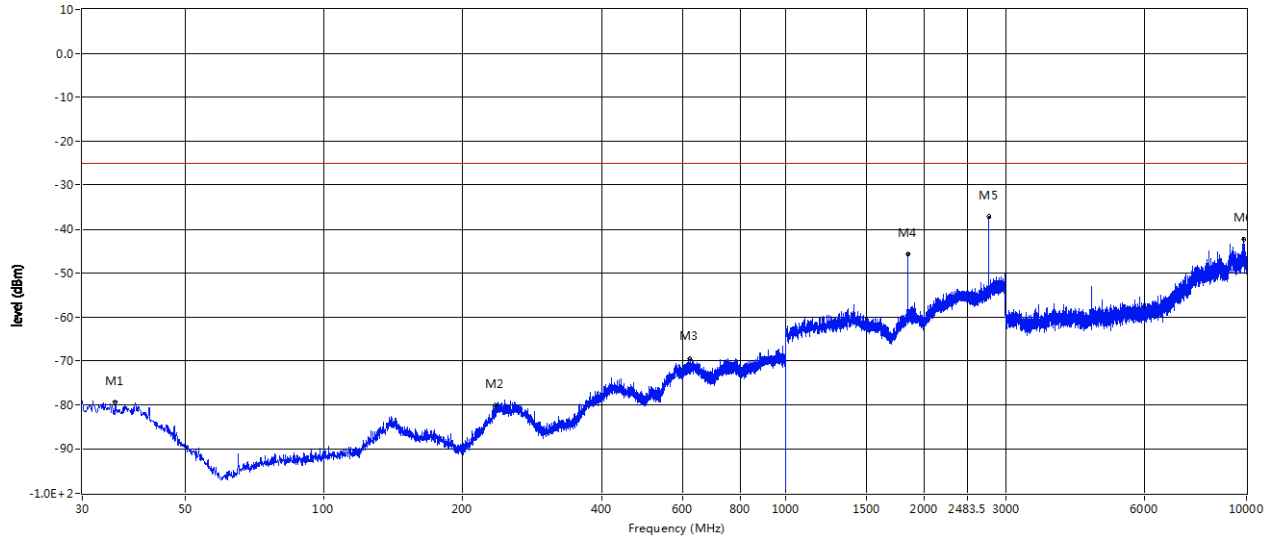
RSE_FCC Test Case_RSE_PART90 V 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
30.970	-81.94	-25.0	-56.94	Vertical	Pass
130.274	-78.10	-25.0	-53.10	Vertical	Pass
553.679	-69.42	-25.0	-44.42	Vertical	Pass
2732.500	-39.82	-25.0	-14.82	Vertical	Pass
4554.000	-49.70	-25.0	-24.70	Vertical	Pass
9314.000	-42.12	-25.0	-17.12	Vertical	Pass

High channel
Horizontal

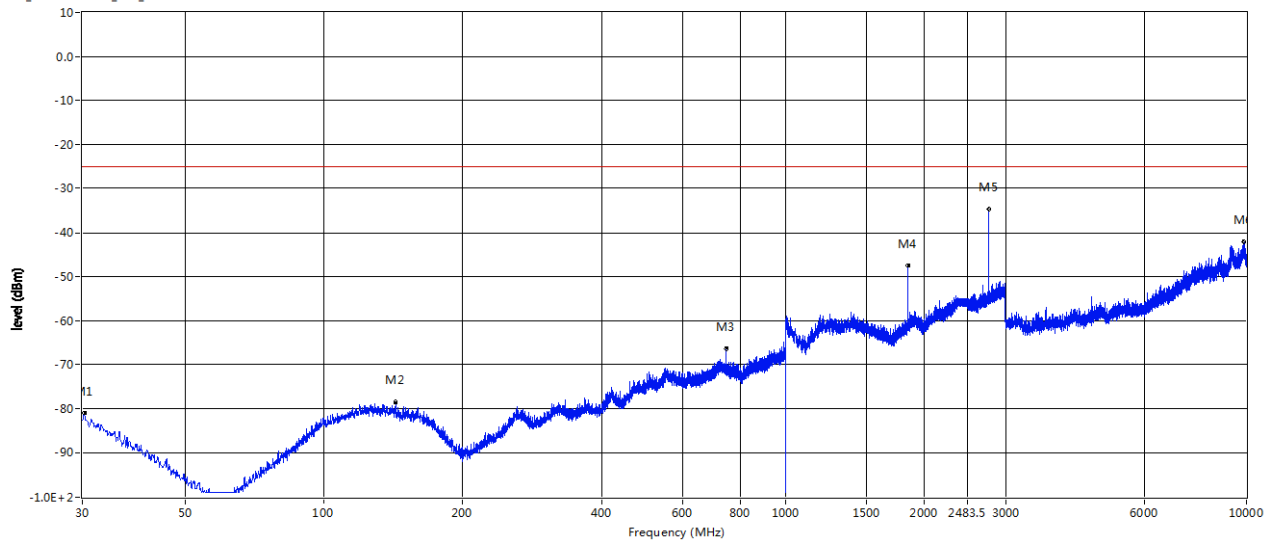
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
35.335	-79.42	-25.0	-54.42	Horizontal	Pass
235.761	-80.00	-25.0	-55.00	Horizontal	Pass
622.306	-69.37	-25.0	-44.37	Horizontal	Pass
1841.500	-45.69	-25.0	-20.69	Horizontal	Pass
2762.500	-37.19	-25.0	-12.19	Horizontal	Pass
9836.375	-42.27	-25.0	-17.27	Horizontal	Pass

Vertical

RSE_FCC Test Case_RSE_PART90 V 30M-10G

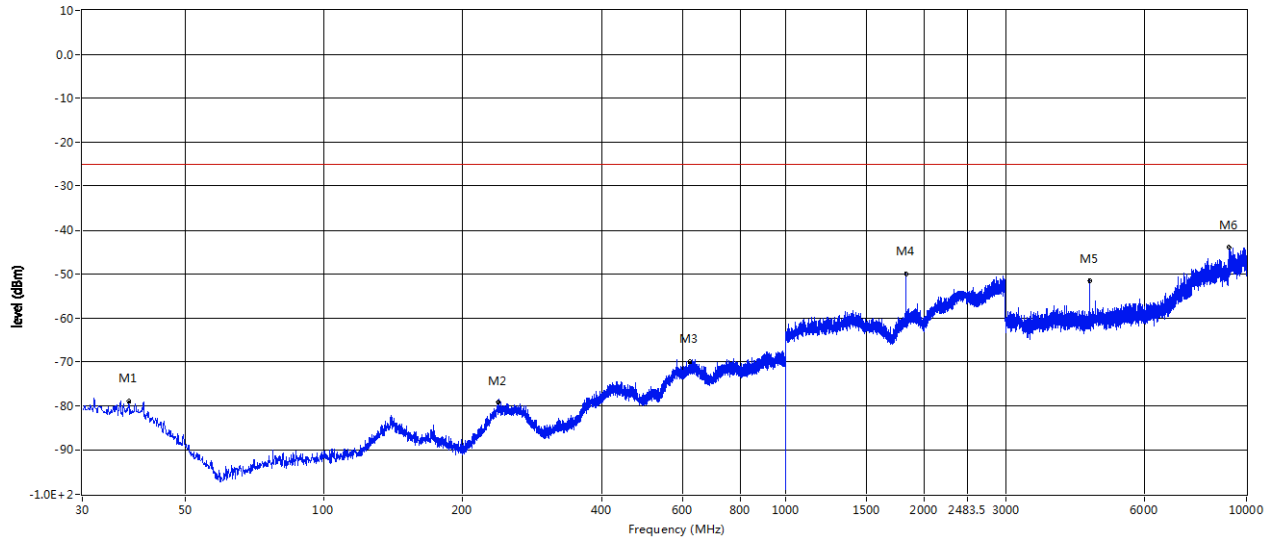


Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
30.000	-82.65	-25.0	-57.65	Vertical	Pass
143.369	-78.53	-25.0	-53.53	Vertical	Pass
744.041	-66.41	-25.0	-41.41	Vertical	Pass
1841.500	-47.45	-25.0	-22.45	Vertical	Pass
2762.500	-34.71	-25.0	-9.71	Vertical	Pass
9867.000	-42.17	-25.0	-17.17	Vertical	Pass



TDM
Low channel
Horizontal

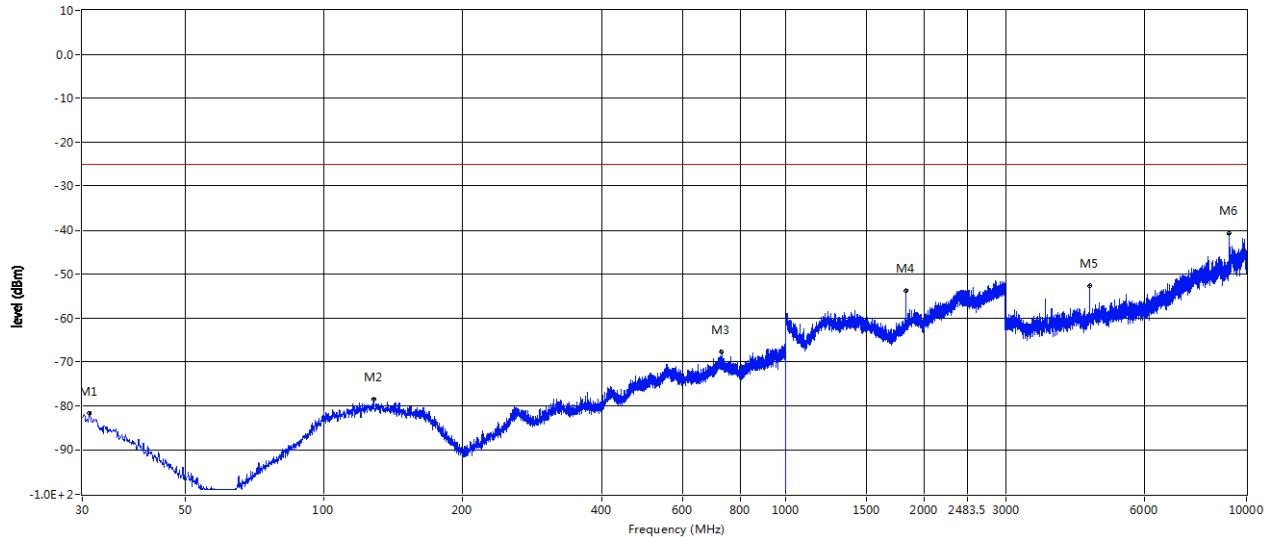
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
37.760	-78.81	-25.0	-53.81	Horizontal	Pass
239.035	-79.15	-25.0	-54.15	Horizontal	Pass
621.579	-69.86	-25.0	-44.86	Horizontal	Pass
1827.500	-49.83	-25.0	-24.83	Horizontal	Pass
4568.875	-51.49	-25.0	-26.49	Horizontal	Pass
9138.125	-43.99	-25.0	-18.99	Horizontal	Pass

Vertical

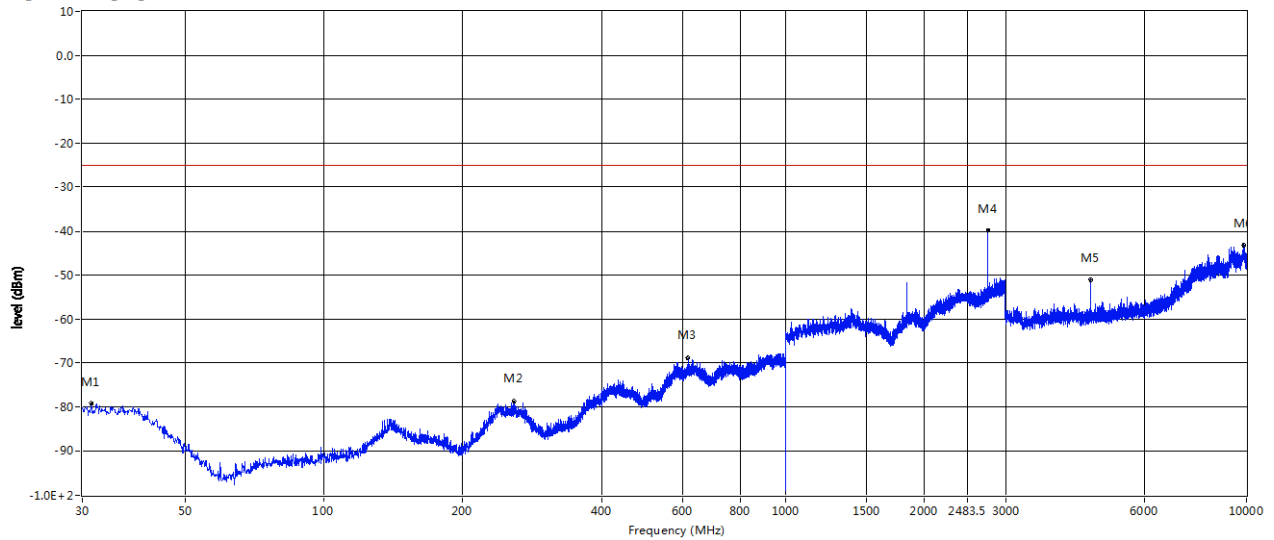
RSE_FCC Test Case_RSE_PART90 V 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
31.091	-81.54	-25.0	-56.54	Vertical	Pass
128.334	-78.41	-25.0	-53.41	Vertical	Pass
728.642	-67.76	-25.0	-42.76	Vertical	Pass
1827.500	-53.78	-25.0	-28.78	Vertical	Pass
4568.875	-52.62	-25.0	-27.62	Vertical	Pass
9138.125	-40.63	-25.0	-15.63	Vertical	Pass

High channel
Horizontal

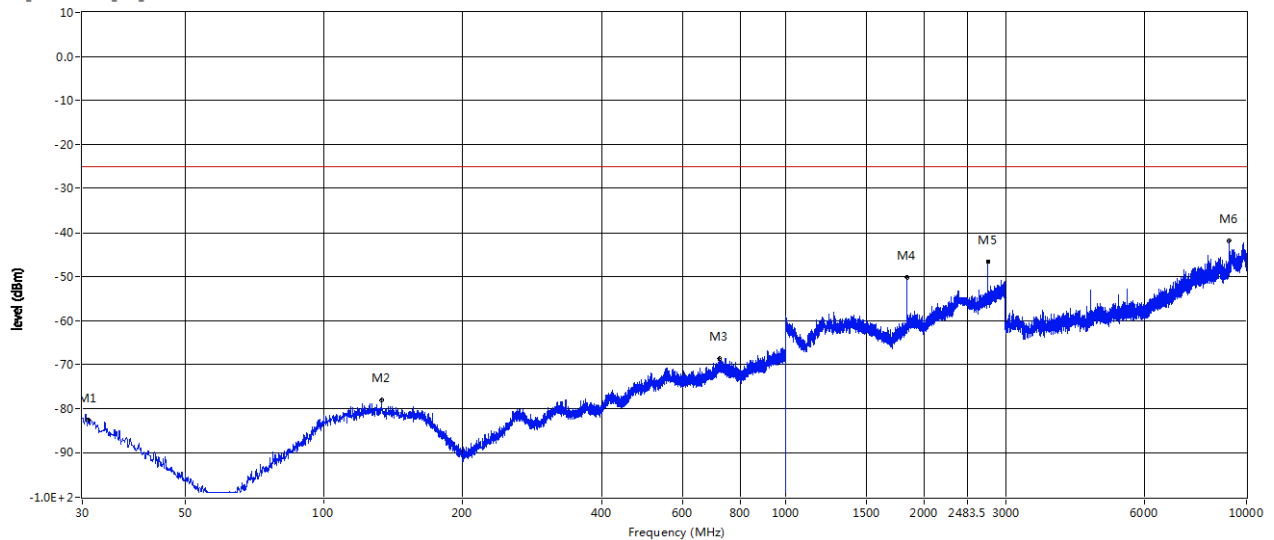
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
31.334	-79.16	-25.0	-54.16	Horizontal	Pass
257.950	-78.57	-25.0	-53.57	Horizontal	Pass
616.244	-68.73	-25.0	-43.73	Horizontal	Pass
2749.000	-39.89	-25.0	-14.89	Horizontal	Pass
4581.125	-51.03	-25.0	-26.03	Horizontal	Pass
9840.750	-43.21	-25.0	-18.21	Horizontal	Pass

Vertical

RSE_FCC Test Case_RSE_PART90 V 30M-10G

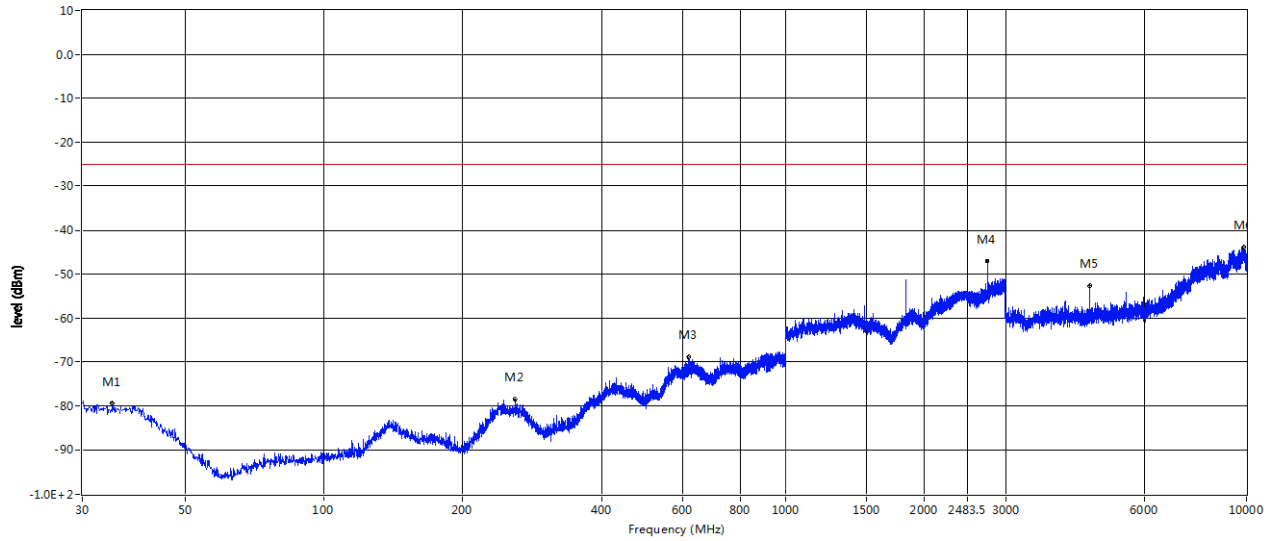


Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
30.849	-82.49	-25.0	-57.49	Vertical	Pass
133.305	-78.02	-25.0	-53.02	Vertical	Pass
719.670	-68.52	-25.0	-43.52	Vertical	Pass
1832.500	-50.13	-25.0	-25.13	Vertical	Pass
2749.000	-46.51	-25.0	-21.51	Vertical	Pass
9162.625	-41.90	-25.0	-16.90	Vertical	Pass



Title 21
Low channel
Horizontal

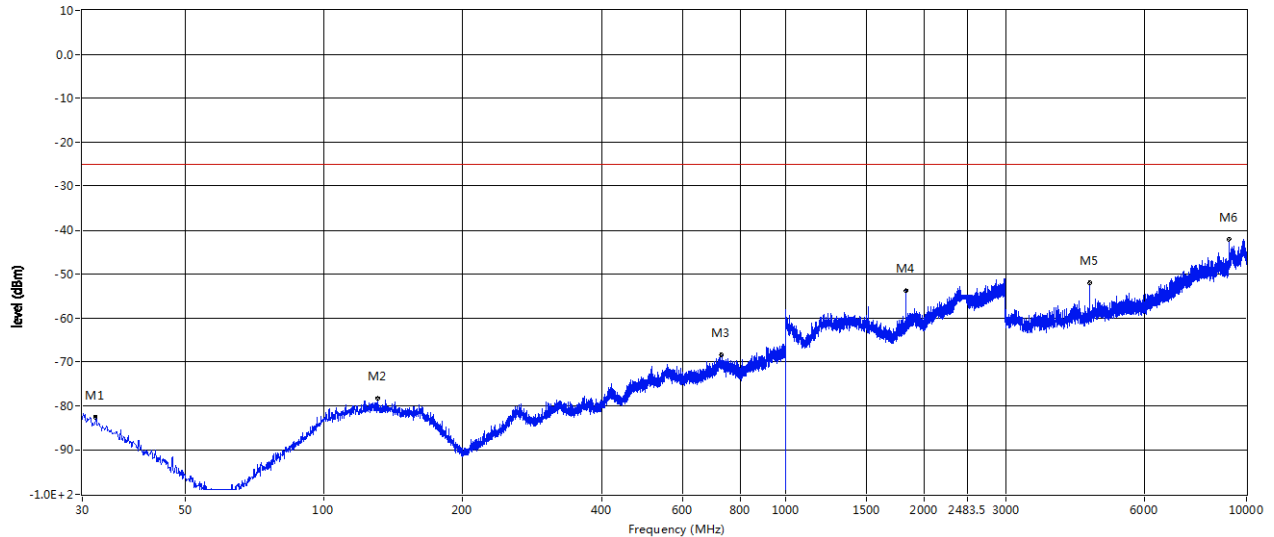
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
34.850	-79.41	-25.0	-54.41	Horizontal	Pass
259.769	-78.50	-25.0	-53.50	Horizontal	Pass
618.305	-68.90	-25.0	-43.90	Horizontal	Pass
2741.500	-47.06	-25.0	-22.06	Horizontal	Pass
4568.875	-52.54	-25.0	-27.54	Horizontal	Pass
9849.500	-43.96	-25.0	-18.96	Horizontal	Pass

Vertical

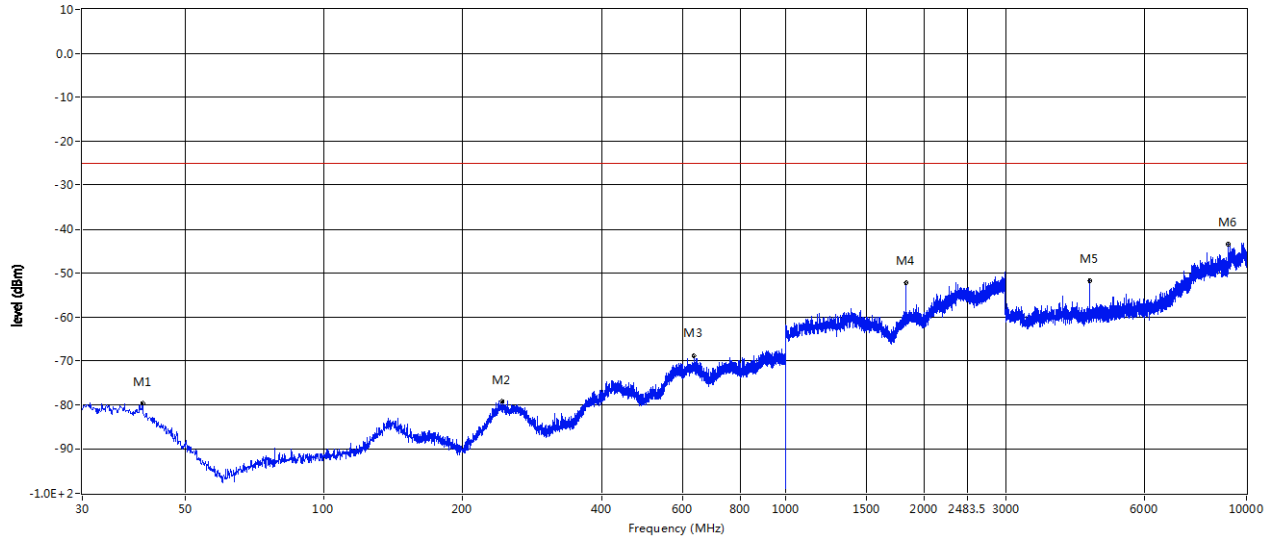
RSE_FCC Test Case_RSE_PART90 V 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
32.061	-82.45	-25.0	-57.45	Vertical	Pass
130.637	-78.28	-25.0	-53.28	Vertical	Pass
728.400	-68.44	-25.0	-43.44	Vertical	Pass
1827.500	-54.19	-25.0	-29.19	Vertical	Pass
4568.875	-52.04	-25.0	-27.04	Vertical	Pass
9138.125	-42.16	-25.0	-17.16	Vertical	Pass

High channel
Horizontal

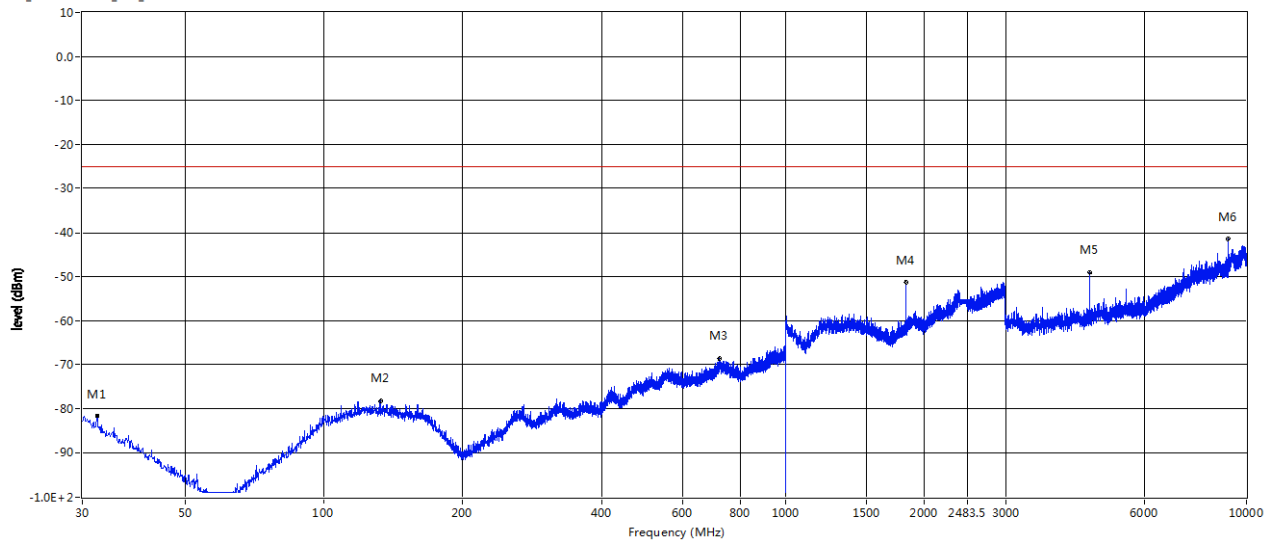
RSE_FCC Test Case_RSE_PART90 H 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
40.549	-79.66	-25.0	-54.66	Horizontal	Pass
244.128	-79.23	-25.0	-54.23	Horizontal	Pass
634.795	-68.87	-25.0	-43.87	Horizontal	Pass
1823.500	-52.27	-25.0	-27.27	Horizontal	Pass
4558.375	-51.76	-25.0	-26.76	Horizontal	Pass
9118.000	-43.43	-25.0	-18.43	Horizontal	Pass

Vertical

RSE_FCC Test Case_RSE_PART90 V 30M-10G



Frequency (MHz)	Result (dBm)	Limit (dBm)	Over Limit (dB)	ANT	Verdict
32.304	-81.64	-25.0	-56.64	Vertical	Pass
132.577	-78.13	-25.0	-53.13	Vertical	Pass
718.215	-68.50	-25.0	-43.50	Vertical	Pass
1823.500	-51.38	-25.0	-26.38	Vertical	Pass
4558.375	-48.94	-25.0	-23.94	Vertical	Pass
9118.000	-41.42	-25.0	-16.42	Vertical	Pass

7. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

7.1 REQUIREMENT

On any frequency outside the licensee's sub-band edges: $55 + 10 \log(P)$ dB, where (P) is the highest emission (watts) of the transmitter inside the licensee's sub-band.

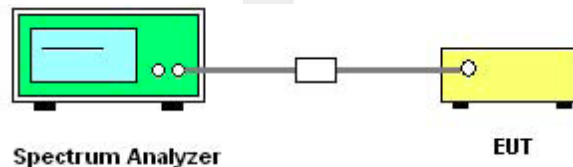
7.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Band edge

Spectrum Parameter	Setting
Detector	Peak
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

7.3 TEST SETUP



The EUT which is powered by the adapter and coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50 Ohm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, the span is set to be greater than RBW.

7.4 EUT OPERATION CONDITIONS

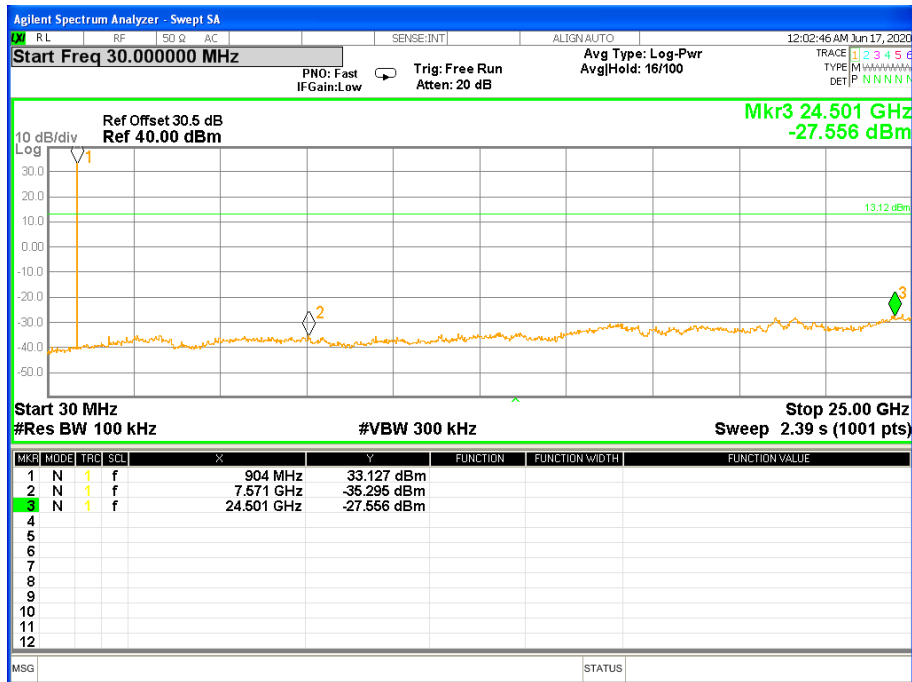
Please refer to section 2.4 of this report.



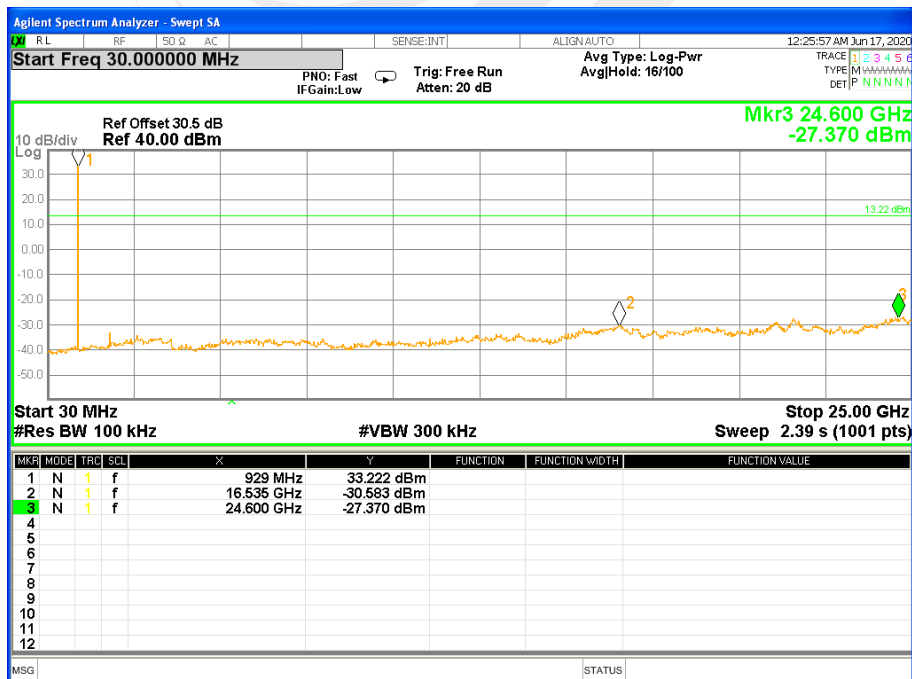
7.5 TEST RESULT

Temperature :	25 °C	Relative Humidity :	50%
Test Mode :	Dense reader mode ISO-18000-63	Test Voltage :	DC 24V

911.25MHz



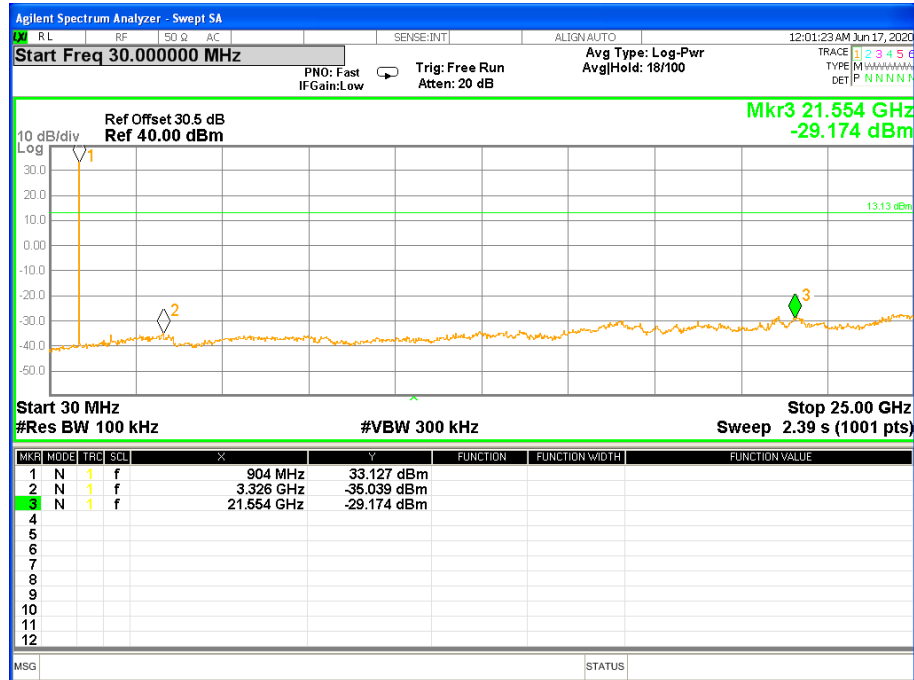
920.25



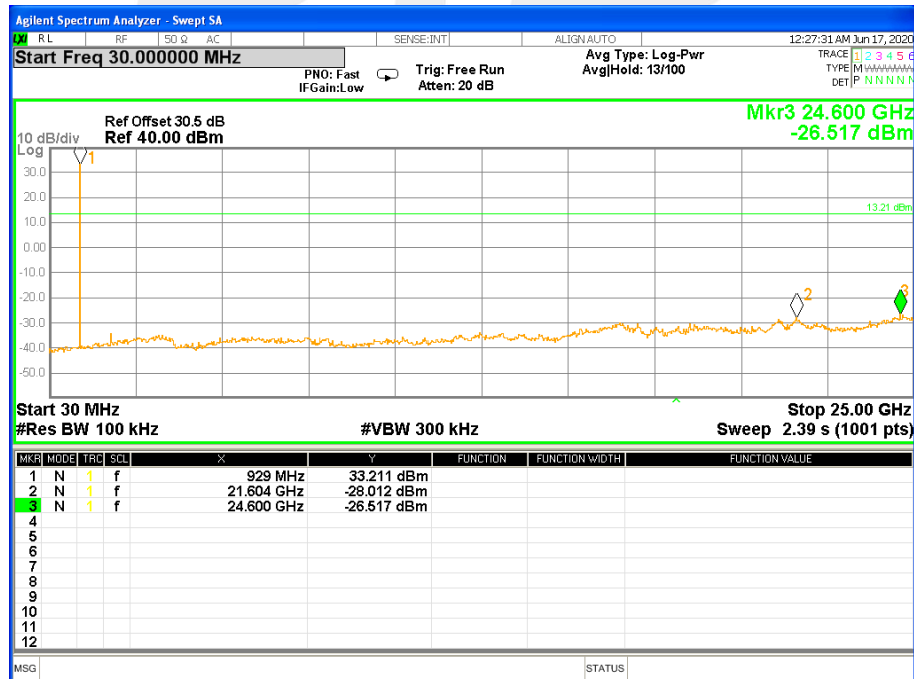


Temperature :	25 °C	Relative Humidity :	50%
Test Mode :	Single reader mode ISO-18000-63	Test Voltage :	DC 24V

911.75MHz



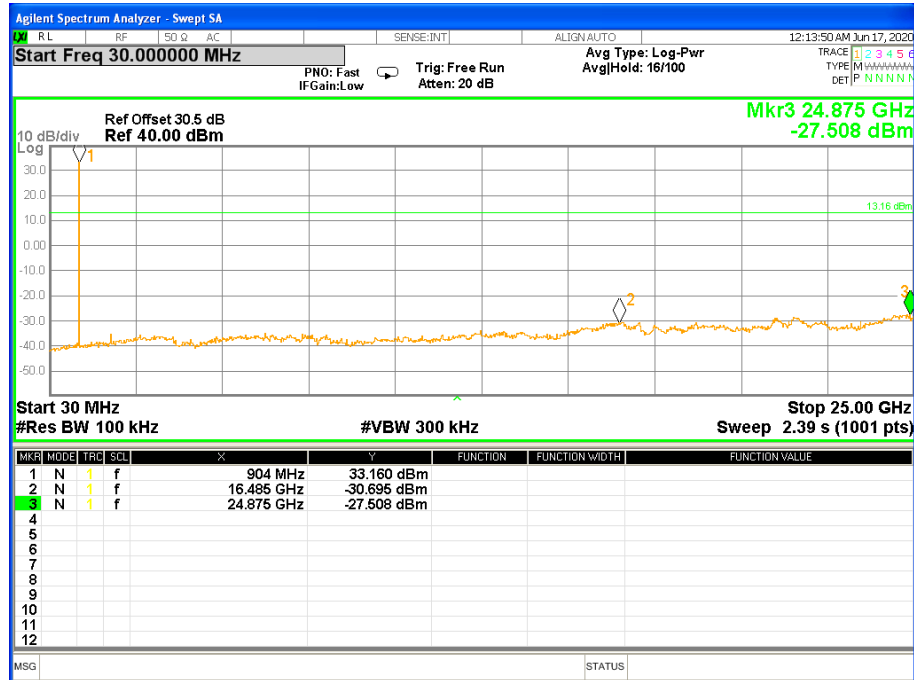
919.25MHz



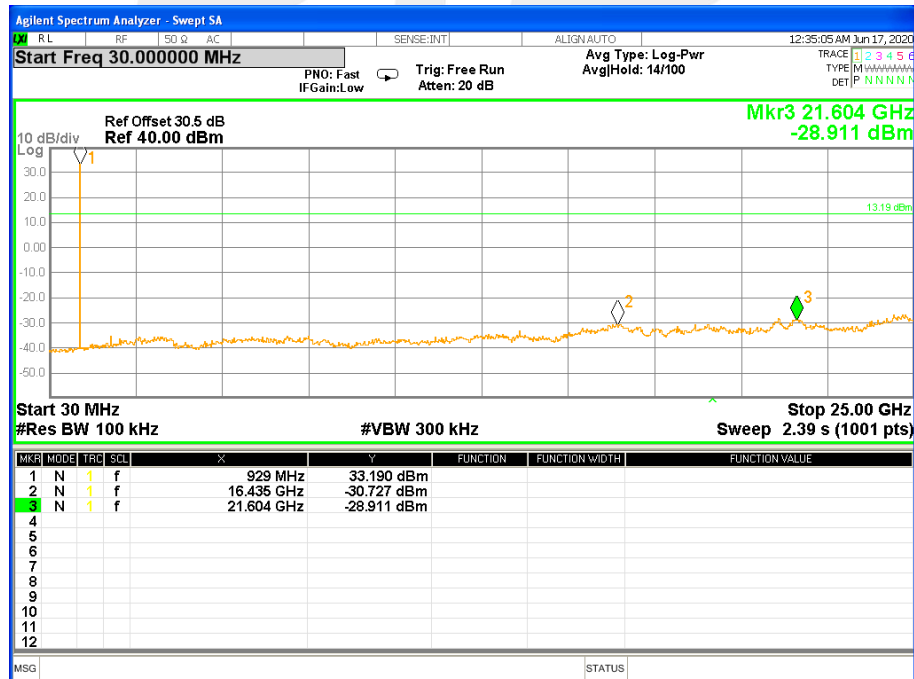


Temperature :	25 °C	Relative Humidity :	50%
Test Mode :	Low data rate ISO-18000-62(40kbps)	Test Voltage :	DC 24V

911.75MHz



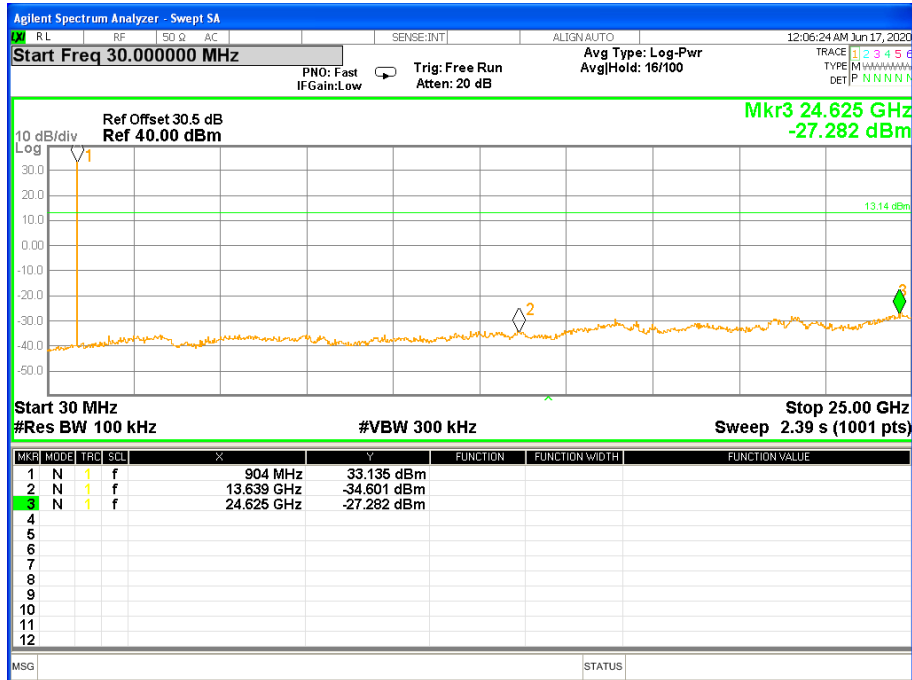
919.75MHz



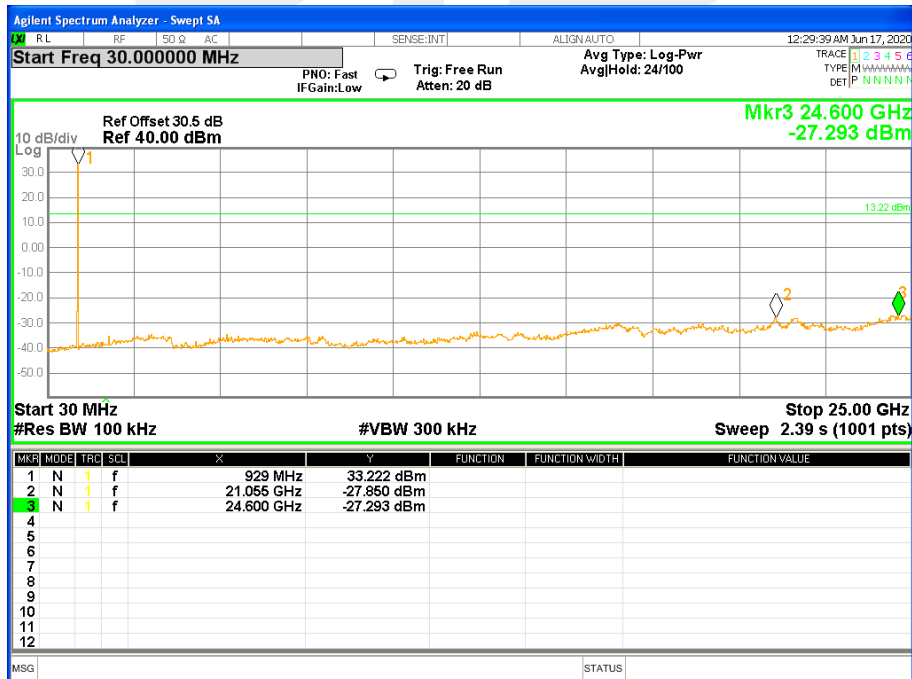


Temperature :	25 °C	Relative Humidity :	50%
Test Mode :	High data rate ISO-18000-62(80kbps)	Test Voltage :	DC 24V

912.75MHz



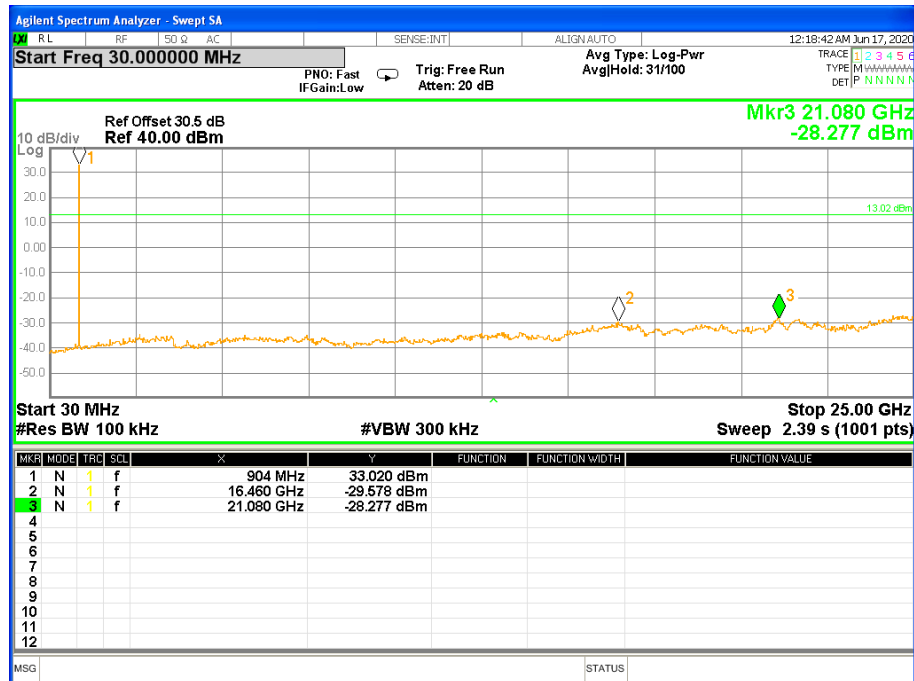
918.75MHz



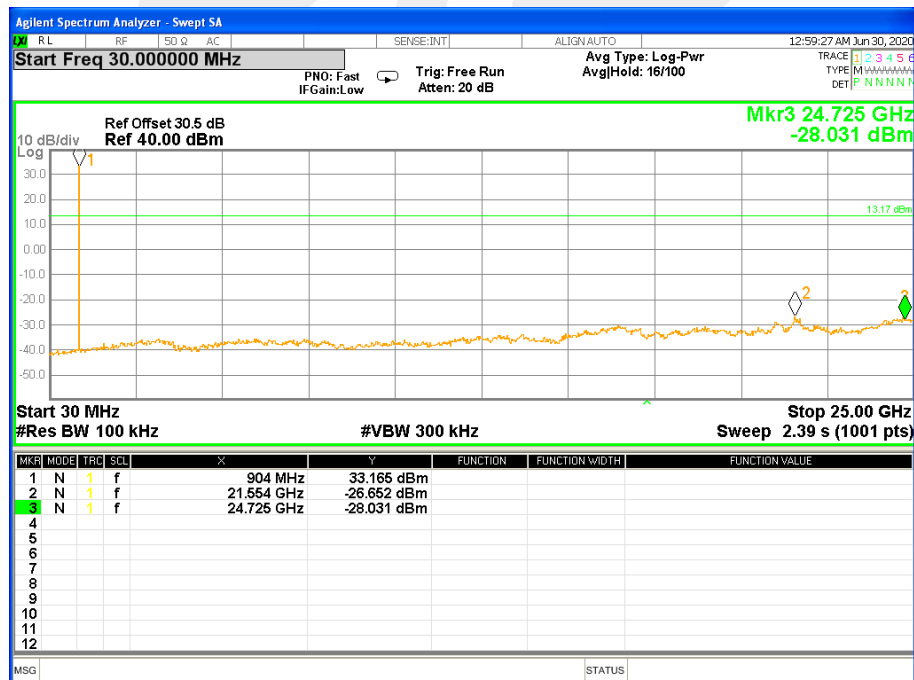


Temperature :	25 °C	Relative Humidity :	50%
Test Mode :	Unmodulated ISO-10374	Test Voltage :	DC 24V

902.75MHz

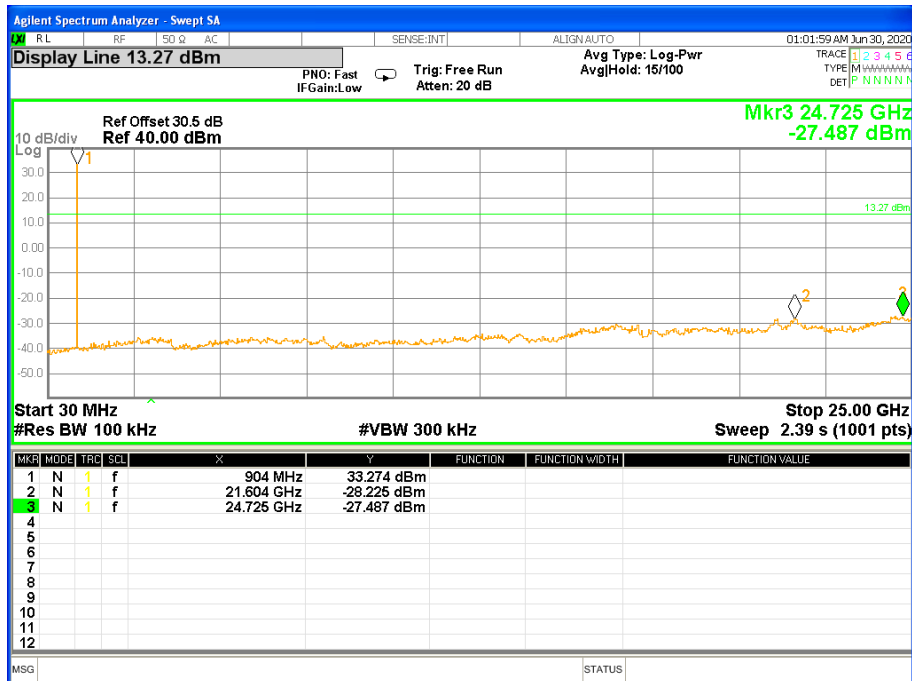


903.25MHz

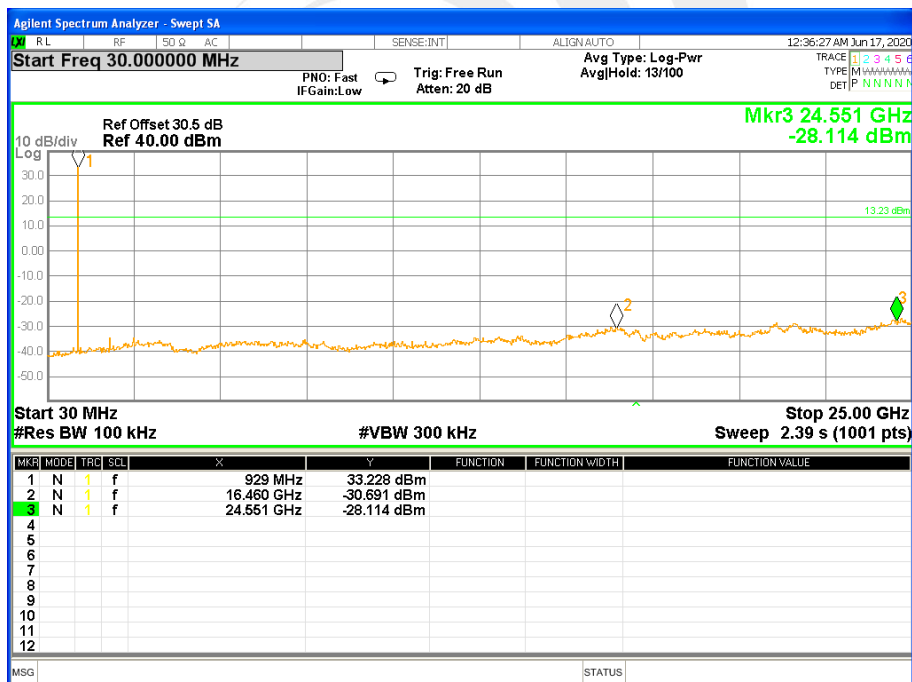




910.75MHz



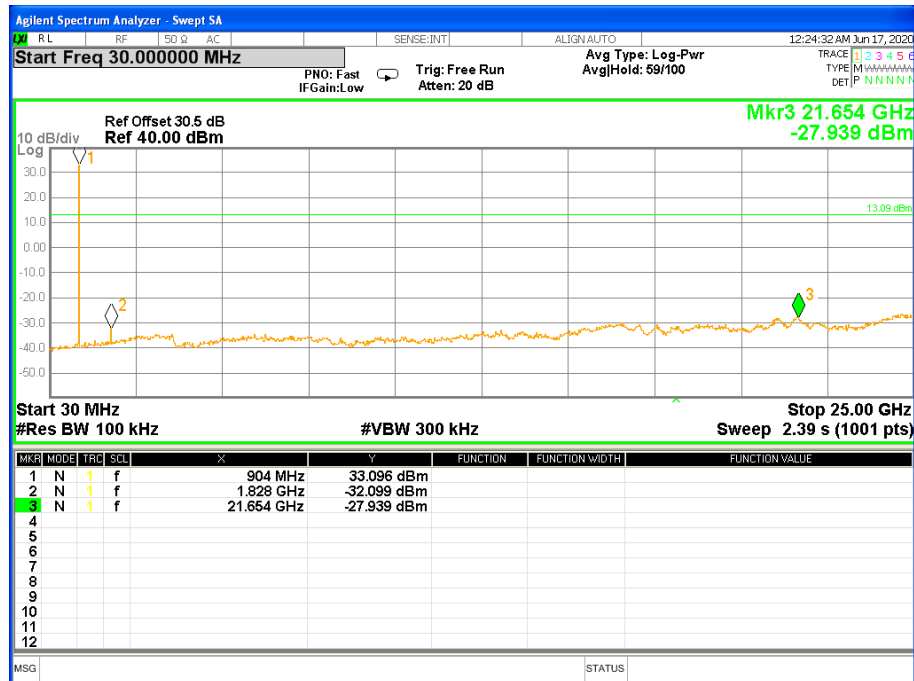
920.75MHz



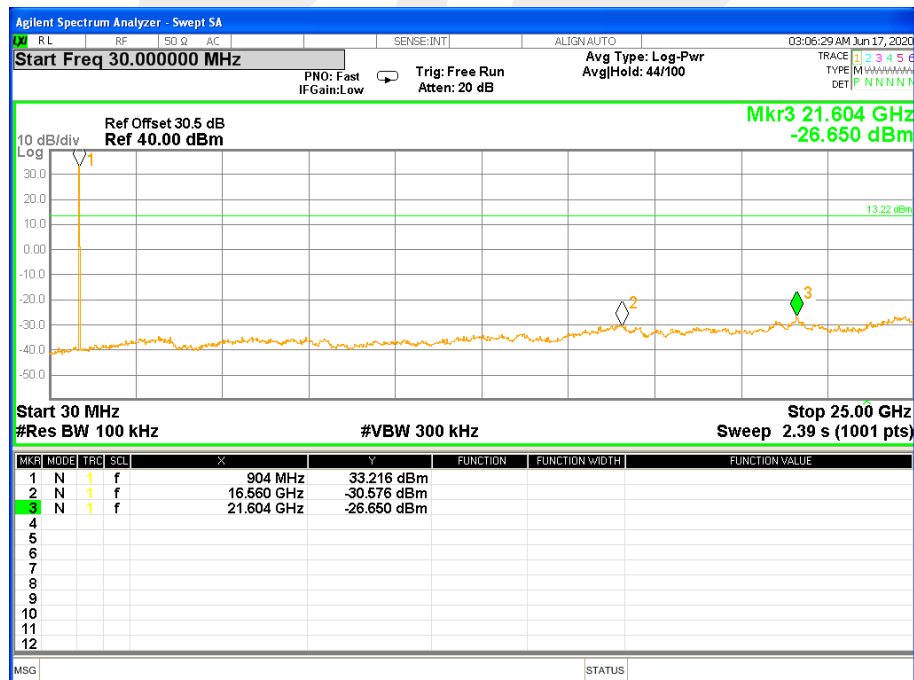


Temperature :	25 °C	Relative Humidity :	50%
Test Mode :	TDM	Test Voltage :	DC 24V

913.75MHz



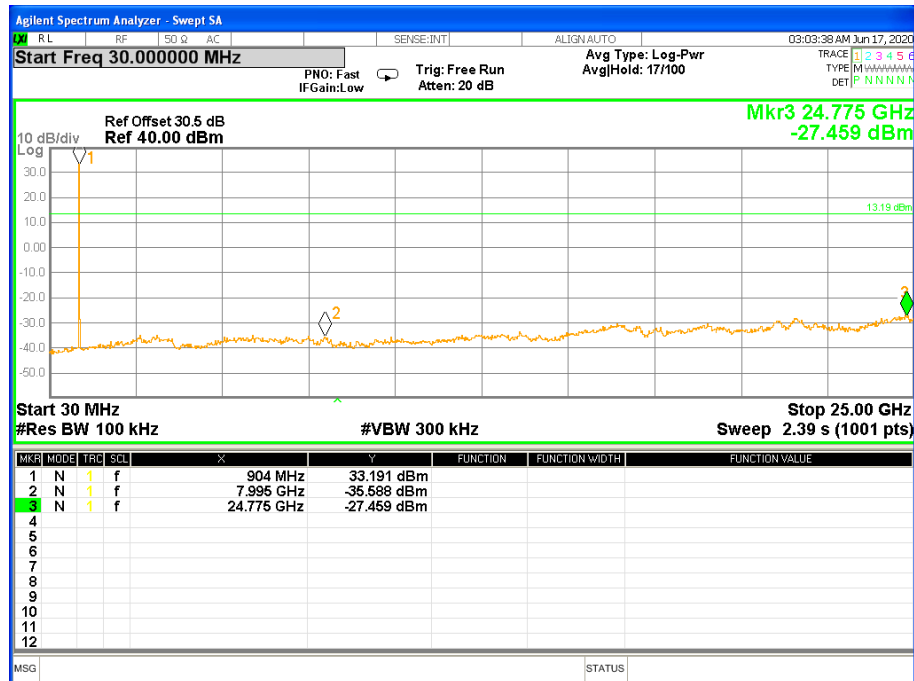
916.25MHz



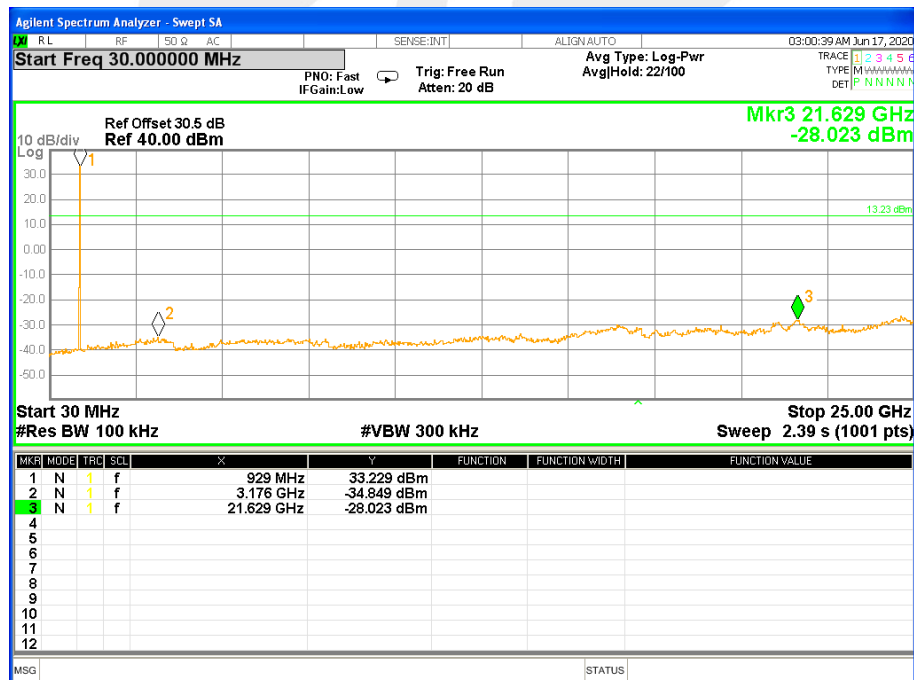


Temperature :	25 °C	Relative Humidity :	50%
Test Mode :	Title 21	Test Voltage :	DC 24V

913.75MHz



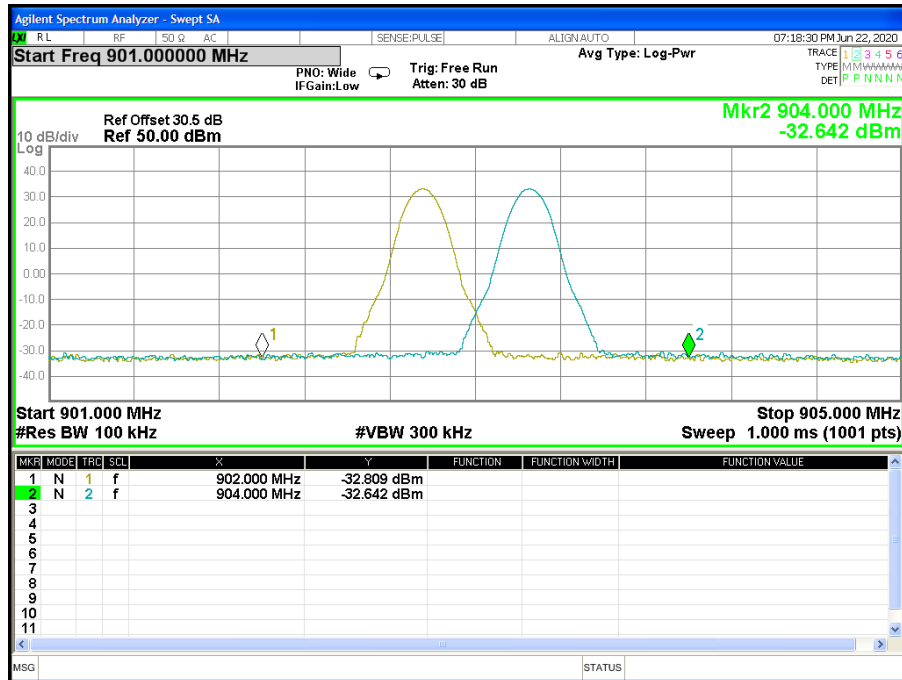
917.75MHz



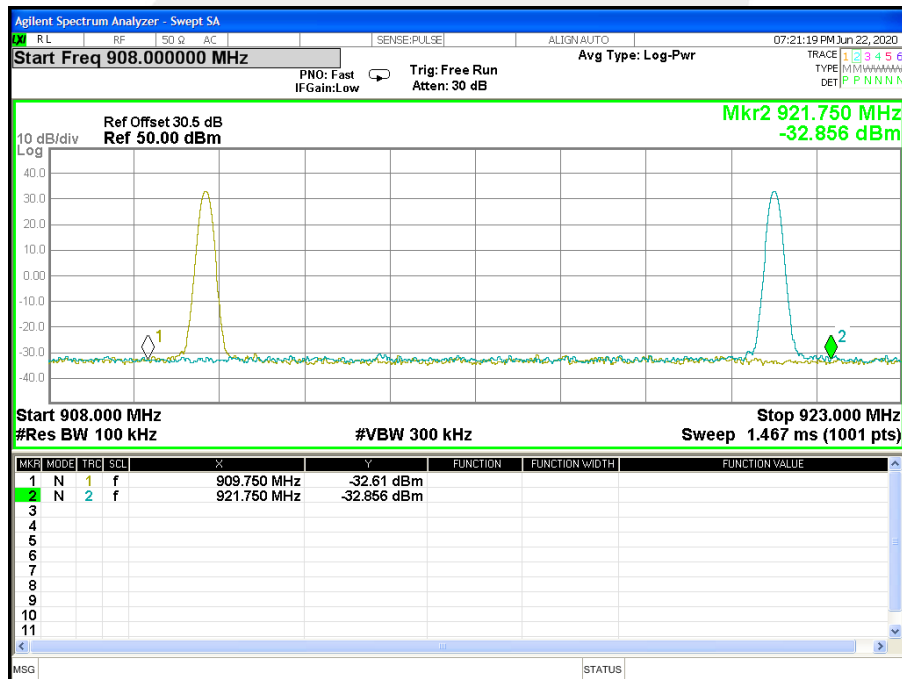


For band edge

Lower and Upper Band Edge-Low band- Unmodulated ISO-10374



Lower and Upper Band Edge-910.75~920.75- Unmodulated ISO-10374





8. RF EXPOSURE COMPLIANCE

8.1 LIMIT

The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of the human exposure to radio-frequency (RF) radiation as specified in 1.1307 (b).

Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)
Limits for Occupational / controlled Exposures			
300 - 1500	--	--	F/300
1500 – 100000	--	--	5.0
Limits for General population / Uncontrolled Exposure			
300 - 1500	--	--	F/1500
1500 – 100000	--	--	1.0

For the purpose of this standard, Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline.

Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10 ²¹	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> ^{0.5}	-	-	6**
10-20	27.46	0.0728	-2	6
20-48	58.07/ <i>f</i> ^{0.25}	0.1540/ <i>f</i> ^{0.25}	8.944/ <i>f</i> ^{0.5}	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> ^{0.3417}	0.008335 <i>f</i> ^{0.3417}	0.02619 <i>f</i> ^{0.6834}	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{1.2}

Note: *f* is frequency in MHz.

* Based on nerve stimulation (NS).

** Based on specific absorption rate (SAR).



8.2 TEST RESULT

Friss Transmission Formula: $P_d = (P_{out} * G) / (4 * \pi * r^2)$

Where

P_d = power density in mW/cm²

P_{out} = antenna power in mW

G = gain of antenna in linear scale

π = 3.1416

R = Distance between observation point and the center of radiator in cm, $R=100\text{cm}$

ANT Gain (G)

Combination gain: 11dBi (gain of antenna in linear scale=12.59)

FCC:

Protocol	MAX Power (dBm)	MAX Power (mW)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
LMS	33.695	2341.53	0.2346	0.6135	Pass

IC:

Protocol	MAX Power (dBm)	MAX Power (mW)	Power Density (mW/cm ²)	Limit (mW/cm ²)	Result
LMS	33.695	2341.53	0.2346	0.2778	Pass



9. PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

*****END OF THE REPORT*****

