

RADIO TEST REPORT

S T S

Report No: STS1710201W03

Issued for

Star Systems International Limited

Unit 04, 12/F Vanta Industrial Centre, 21-33 Tai Lin Pai Road, Kwai Chung, HK

Product Name:	RFID READER
Brand Name:	TITAN
Model Name:	HRD22000
Series Model:	N/A
FCC ID:	2AA7KTITAN-22000
Test Standard:	FCC Part 90.353

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Report No.: STS1710201W03



TEST RESULT CERTIFICATION

Applicant's name:	Star Systems International Limited
Address:	Unit 04, 12/F Vanta Industrial Centre, 21-33 Tai Lin Pai Road, Kwai Chung, HK
	Star Systems International Limited
Address:	Unit 04, 12/F Vanta Industrial Centre, 21-33 Tai Lin Pai Road, Kwai Chung, HK
Product description	
Product Name:	RFID READER
Brand Name:	TITAN
Model Name:	HRD22000
Series Model:	N/A
Test Standards	FCC Part 90.353
Test procedure	. TIA TIA-603-D
	is been tested by STS, the test results show that the equipment under the FCC. And it is applicable only to the tested sample identified in the
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Date of Test	

Date (s) of performance of tests: Date of Issue:	
Test Result	Pass

:

Testing Engineer

Sean She

(Sean she)

Technical Manager :

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(Hakim.hou)

rati



Authorized Signatory :

(Vita Li)

Shenzhen STS Test Services Co., Ltd.

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	20 Nov. 2017	STS1710201W03	ALL	Initial Issue



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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part 90					
Standard Section	Test Item	Judgment	Remark		
Part 90.205	Conducted Output Power	PASS			
Part 90.210	Occupied Bandwidth	PASS			
Part 90.210	Spurious Emissions at Antenna terminals	PASS			
Part 90.210	Radiated Spurious emissions	PASS			
Part 90.213	Frequency Stability	PASS			

NOTE:

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



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1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd. Add. : 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China CNAS Registration No.: L7649; FCC Registration No.: 625569 IC Registration No.: 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 % $^\circ$

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No.	Item	Uncertainty
1	Conducted Emission (9KHz-150KHz)	±2.88dB
2	Conducted Emission (150KHz-30MHz)	±2.67dB
3	RF power, conducted	±0.71dB
4	Spurious emissions, conducted	±0.63dB
5	All emissions, radiated (9KHz-30MHz)	±3.02dB
6	All emissions, radiated (30MHz-200MHz)	±3.80dB
7	All emissions, radiated (200MHz-1000MHz)	±3.97dB
8	All emissions, radiated (>1G)	±3.03dB

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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

OLINEIRAE DEGORII TIO	
Product Name	RFID READER
Trade Name	TITAN
Model Name	HRD22000
Series Model	N/A
Model Difference	N/A
Modulation	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	Power supply and ADP(rating): Input: AC 100V-240V, 50/60Hz, 800mA Output: DC 24V, 1.25A
Hardware version number	R5
Software version number	0.7.2.9319_rr
Connecting I/O Port(s)	Please refer to the User's Manual
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)	912.75MHz -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: This device only supports SISO mode, just one of the four RF ports will be actived during normal operating. Meanwhile, the four RF ports are identical in RF characterics.



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

2.

Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE	
1	TITAN	HRD22000	Avior Antenna	N/A	15dBi	ANT	



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2.2 DESCRIPTION OF SUPPORT UNITS

The EUT has been 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
	PC	4CV428DQXR	500-320cx	N/A	N/A
	POE	Phihong	PSAC30U-240L6	N/A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
	Ethernet cable	NO	7m	N/A
	Power cord	NO	3m	N/A

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in $\[$ Length $\]$ column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".



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2.3 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Tradiation Test equipi	nont				
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESW	101535	2017.06.01	2018.05.31
Bilog Antenna	TESEQ	CBL6111D	34678	2017.03.24	2018.03.23
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1343	2017.03.06	2018.03.05
SHF-EHF Horn Antenna (15G-40GHz)	BBHA 9170	SCHWARZBECK	BBHA9170367	2017.05.02	2018.05.01
Temperature & Humitidy	HH660	Mieo	N/A	2017.10.15	2018.10.14
Temperature & Humitidy	HH660	Mieo	N/A	2017.10.15	2018.10.14
Pre-mplifier (0.1M-3GHz)	EM	EM330	60538	2017.03.12	2018.03.11
PreAmplifier (1G-26.5GHz)	Agilent	8449B	60538	2017.10.15	2018.10.14
Pre-mplifier (18G-40G)	MINI-CIRCUITS	AP-040G	1382501	2017.05.15	2018.05.14
Operational Manual Passive Loop (9K30MHz)	ETS	6512	00165355	2017.03.06	2018.03.05
Low frequency cable	EM	R01	N/A	2017.03.12	2018.03.11
Low frequency cable	EM	R06	N/A	2017.03.12	2018.03.11
High frequency cable	SCHWARZBECK	R04	N/A	2017.03.12	2018.03.11
High frequency cable	SCHWARZBECK	R02	N/A	2017.03/12	2018.03.11
Semi-anechoic chamber	Changling	966	N/A	2017.10.15	2018.10.14
trun table	EM	SC100_1	60531	N/A	N/A
Antnna mast	EM	SC100	N/A	N/A	N/A
Max-full Antenna Corp	MF	MFA-440H	N/A	N/A	N/A
	•		•	•	

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2017.10.15	2018.10.14
LISN	R&S	ENV216	101242	2017.10.15	2018.10.14
conduction Cable	EM	C01	N/A	2017.03.12	2018.03.11
Temperature & Humitidy	Mieo	HH660	N/A	2017.10.15	2018.10.14



RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	RPR3006W 15100041SNO03		2018.10.14
Power Meter	R&S	NRP	100510	2017.10.15	2018.10.14
Spectrum Analyzer	Agilent	E4407B	MY50140340	2017.03.11	2018.03.10
Signal Analyzer	Agilent	N9020A	MY49100060	2017.03.11	2018.03.10

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3. CONDUCTED OUTPUT POWER

3.1 APPLIED PROCEDURES / LIMIT

902-928 MHz. 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 §90.353(h).

3.2 TEST PROCEDURE

- 1. Set analyzer center frequency to channel center frequency.
- 2. Set the RBW to: $1MHz \ge RBW$
- 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



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4.4 TEST RESULTS

Temperature :	25 ℃	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 24V From POE

	Dense reader mode ISO-18000-63							
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)			
Low	911.25	32.821	4	15	43.821			
High	920.25	32.725	4	15	43.725			
		Single reade	r mode ISO-18	000-63				
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)			
Low	911.75	32.649	4	15	43.649			
High	919.25	32.656	4	15	43.656			
		Low data rate	ISO-18000-62((40kbps)				
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)			
Low	911.75	32.451	4	15	43.451			
High	919.75	32.474	4	15	43.474			
		High data rate	ISO-18000-62	(80kbps)				
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)			
Low	912.75	32.025	4	15	43.025			
High	918.75	32.120	4	15	43.120			
		Unmodu	ulated ISO-1037	74				
Channel	Frequency (MHz)	Conducted Power (dBm)	Cable loss (dB)	Antenna gain (dBi)	EIRP (dBm)			
Low	902.75	32.223	4	15	43.223			
High	903.25	32.194	4	15	43.194			
Low	910.75	32.131	4	15	43.131			
High	920.75	32.111	4	15	43.111			

=#



TDM							
	Frequency	Conducted	Cable loss	Antenna gain	EIRP		
Channel	(MHz)	Power (dBm)	(dB)	(dBi)	(dBm)		
Low	913.75	32.634	4	15	43.634		
High	916.25	32.469	4	15	43.469		
		Title 2	1				
	Frequency	Conducted	Cable loss	Antenna gain	EIRP		
Channel	(MHz)	Power (dBm)	(dB)	(dBi)	(dBm)		
Low	913.75	32.205	4	15	43.205		
High	917.75	32.206	4	15	43.206		

Note:

1. The EUT is transmitting through a long enough antenna cable with a stated loss of 4dB into the antenna with typy N connector 15dBi gain.

2. EIRP=conducted power + antenna gain-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.



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4. OCCUPIED BANDWIDTH

4.1 APPLIED PROCEDURES / 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 harrowband forward link; and 8.00 MHz if the 919.75-921.75 MHz narrowband forward link; and 927.50-927.75 MHz harrowband forward links are aggregated.

4.2 TEST PROCEDURE

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to -26 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW \geqslant RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be \gtrsim dB.

4.3 TEST RESULTS

Temperature :	25 ℃	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 24V From POE

	Dense reader mode ISO	-18000-63
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)
Low	911.25	361.8
High	920.25	369.3
	Single reader mode ISO	-18000-63
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)
Low	911.75	647.9
High	919.25	663.8
	Low data rate ISO-18000-	
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)
Low	911.75	451.4
High	919.75	454.8
ŀ	-ligh data rate ISO-18000-	62 (80kbps)
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)
Low	912.75	652.4
High	918.75	650.9
	Unmodulated ISO-1	0374
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)
Low	902.75	284.3
High	903.25	284.2
Low	910.75	284.4
High	920.75	284.6
	TDM	
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)
Low	913.75	611.1
High	916.25	615.3
	Title 21	
Channel	Frequency (MHz)	-26 dB Bandwidth(KHz)
Low	913.75	1030
High	917.75	1034

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Dense reader mode ISO-18000-63

Low channel(911.25MHz)

Agilent Spectrum Analyzer - Occupie					
Center Freq 911.25000		ENSE:PULSE Freg: 911.250000 MHz	ALIGNAUTO	09:25:32 AMNov 15, 2017 Radio Std: None	Frequency
Conter Tree ST1.20000	Trig:	Free Run Avg Holo n: 40 dB	d:>10/10	Radio Device: BTS	
	#IFGain:Low #Atte	n: 40 dB		Radio Device: B15	
D-640.00 -	-				
10 dB/div Ref 40.00 d	Bm				
30.0					Center Freq
20.0					911.250000 MHz
10.0					
0.00					
-10.0					
-20.0					
-30.0					
-40.0					
-50.0					
Center 911.3 MHz				Span 1 MHz	
#Res BW 100 kHz	#	VBW 300 kHz		Sweep 1 ms	CF Step
					100.000 kHz Auto Man
Occupied Bandwi	dth				
	271.11 kHz				Freq Offset
Transmit Freq Error	16 Hz	OBW Power	00	9.00 %	0 Hz
x dB Bandwidth	361.8 kHz	x dB	-26.	00 dB	
MSG			STATU	s	

High channel(920.25MHz)





Single reader mode ISO-18000-63

Low channel(911.75MHz)

Agilent Spectre	um Analyzer - Occupied B					
LXI L	RF 50 Ω AC		SENSE:PULSE er Freg: 911.750000 M	ALIGNAUTO	09:28:35 AMNov 1 Radio Std: None	
Center Fr	eq 911.7500001	Trig:	Free Run Avg	Hold:>10/10		
		#IFGain:Low #Atte	n:40 dB		Radio Device: B	TS
10 dB/div Log	Ref 40.00 dBn	1				
30.0						Center Freq
20.0						911.750000 MHz
10.0						
0.00						
-10.0						
-20.0						I
-30.0						I
-40.0						
-50.0						I
Center 91						Dalla
#Res BW			#VBW 300 kHz		Span 1 Sweep	1 me CF Step
		•				Auto Man
Occup	oied Bandwidt	h				Hato
	4	65.83 kHz				Freq Offset
<u>-</u>	it From Freeze	-991 Hz	OBW Powe	- 0	9.00 %	0 Hz
	nit Freq Error					
x dB B	andwidth	647.9 kHz	x dB	-26	.00 dB	
MSG				STATU	JS	

High channel(919.25MHz)



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

Low channel(911.75MHz)

Agilent Spectru	m Analyzer - Occupied BW					
Center Fre	RF 50Ω AC eq 911.750000 N	IH7 Cente	ENSE:PULSE	ALIGNAUTO	09:31:50 AMNov 15 Radio Std: None	Frequency
	-	Trig: f	FreeRun Avg H n:40 dB	old:>10/10	Radio Device: BT	s
		All-Gallicow Ander			Nadio Device. DT	<u> </u>
10 dB/div	Ref 40.00 dBm					
Log 30.0						
20.0						Center Freq 911.750000 MHz
10.0						911.750000 WHZ
0.00						
-10.0						
-20.0						
-30.0						_
-40.0						_
-50.0						_
Center 91	1 9 MH7				Span 1 M	
#Res BW		#	VBW 300 kHz		Sweep 1	
_						Auto Man
Occup	ied Bandwidth					
	32	22.77 kHz				Freq Offset
Transm	it Freq Error	-166 Hz	OBW Power	99	9.00 %	0 Hz
x dB Ba	andwidth	451.4 kHz	x dB	-26.	00 dB	
MSG				STATU	s	
		- Z				

High channel(919.75MHz)



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

Low channel(912.75MHz)

	n Analyzer - Occupied BW	1						
KIL L Center Fre	RF 50 Ω AC	147	SENSE:PULSE		SNAUTO	09:33:51 AMNo Radio Std: No		Frequency
Center Tre	-	···-	Frig: Free Run Atten: 40 dB	Avg Hold:>10	/10	Radio Device:		
		#IFGain:Low f	Atten: 40 dB			Radio Device:	1915	
	Ref 40.00 dBm							
10 dB/div Log	Ref 40.00 dBm				-			
30.0								Center Freq
20.0								912.750000 MHz
10.0								
0.00								
-10.0					-			
-20.0								
-30.0					-			
-40.0					-			
-50.0					-			
Center 912	2.8 MHz					Span	1 MHz	
#Res BW 1			#VBW 3001	kHz		Sweep		CF Step 100.000 kHz
								Auto Man
Occupi	ied Bandwidth							
	48	34.26 kHz	2					Freq Offset
Transmi	it Freq Error	242 H	z OBW P	ower	99	.00 %		0 Hz
x dB Ba	-	652.4 kH				00 dB		
хивва	nawiath	002.4 KH	2 хив		-20.0	00 GB		
NEC					STATUS			
MSG					STATUS			

High channel(918.75MHz)

L RF 50Ω AC		SENSE:PULSE	ALIGNAUTO		Engruenau
enter Freq 918.750000		enter Freq: 918.750		Radio Std: None	Frequency
		rig: Free Run Atten: 40 dB	Avg Hold:>10/10	Radio Device: BTS	
dB/div Ref 40.00 dE	۶ <u>m</u>				
9					Center Fr
0					918.750000 N
0					
0					
0					
enter 918.8 MHz les BW 100 kHz	· · ·	#VBW 300 k	Hz	Span 1 MHz Sweep 1 ms	CF St 100.000 k
Occupied Bandwic	lth				<u>Auto</u> N
	 489.38 kHz	1			Freq Offs
Transmit Freq Error	-194 Hz	OBW P	ower 9	9.00 %	. 0
x dB Bandwidth	650.9 kHz	x dB	-26	6.00 dB	

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Unmodulated ISO-10374

Low channel(902.75MHz)

Agilent Spectrum Analyzer - Occupie						
W L RF 50Ω AC Center Freq 902.75000	0 MHz Cente	ense:Pulse r Freq: 902.750000 MHz iree Run Avg Hold i: 40 dB	ALIGNAUTO d:>10/10	04:06:19 PMN Radio Std: No Radio Device	one	Trace/Detector
10 dB/div Ref 40.00 dl	Bm					
20.0						Clear Write
0.00						Average
-20.0	survey and the second sec		human			
-40.0					and the second	Max Hold
Center 902.8 MHz #Res BW 100 kHz	#	VBW 300 kHz			1 MHz 0 1 ms	Min Hold
Occupied Bandwi	^{dth} 213.08 kHz					Detector
Transmit Freq Error x dB Bandwidth	565 Hz 284.3 kHz	OBW Power x dB		.00 % 00 dB		Average▶ <u>Auto</u> Man
MSG			STATUS			

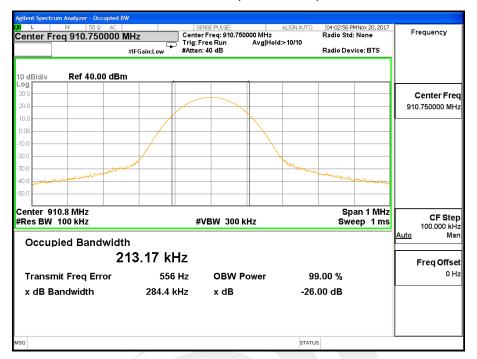
High channel(903.25MHz)

Agilent Spectrum Analyzer - Occupied BV	N					
L RF 50Ω AC		SENSE:PULSE	ALIGNAUTO	04:05:47 PMNov 20, 2017 Radio Std: None	Trace/De	tector
Center Freq 903.250000 N		nter Freq: 903.250000 M g: Free Run Avg	Hold:>10/10	Radio Std: None		
		tten: 40 dB		Radio Device: BTS		
10 dB/div Ref 40.00 dBm	I					
Log	l İ					
30.0					Clea	r Write
20.0						
10.0						
0.00						
-10.0			λ		A	verage
-20.0						
-30.0	more		man			
-40.0 compression where the			·····	mmmmm		
					Ma Ma	ax Hold
-50.0						
Center 903.3 MHz				Span 1 MHz		
#Res BW 100 kHz		#VBW 300 kHz		Sweep 1 ms	<u>امر ا</u>	in Hold
					I "	ΠΠΟΙά
Occupied Bandwidth	n					
2.	13.12 kHz					etector
_						verage ►
Transmit Freq Error	550 Hz	OBW Power	r 99	0.00 %	Auto	Man
x dB Bandwidth	284.2 kHz	x dB	-26	00 dB		
~ - -		~ ==				
WSG			STATUS	3		



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Low channel(910.75MHz)



High channel(920.75MHz)





TDM

Low channel(913.75MHz)

	m Analyzer - Occupied BV					
IXI RL	RF 50 Ω AC		r Freg: 913.750000 MHz	ALIGNAUTO	07:04:40 PM Nov 20, 2017 Radio Std: None	Frequency
	sq 913.730000 M	Trig: F	Trig: Free Run Avg Hold:>10/10			
		#IFGain:Low #Atter	: 40 dB		Radio Device: BTS	
10 dB/div Log	Ref 40.00 dBm			-		
30.0						Center Freq
20.0						913.750000 MHz
10.0						
0.00		T		And		
-10.0						
-20.0						
-30.0						
-40.0						
-50.0						
Center 91					Span 1 MHz	CF Step
#Res BW	100 kHz	#	VBW 300 kHz		Sweep 1 ms	100.000 kHz
Occup	ied Bandwidtl	`				<u>Auto</u> Man
	4,	36.54 kHz				Freq Offset
Transm	it Freq Error	-9.343 kHz	OBW Power	99	9.00 %	0 Hz
	ndwidth	611.1 kHz	x dB	-26	00 dB	
		011.1 KH2	XUD	-20.	00 08	
					-	[]
MSG				STATU	5	

High channel(916.25MHz)

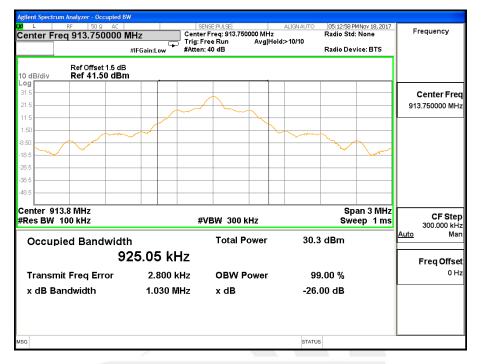


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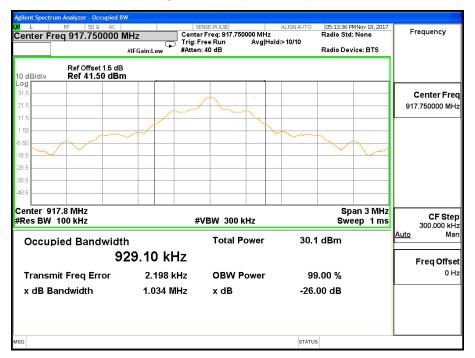


Title 21

Low channel(913.75MHz)



High channel(917.75MHz)



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5. FREQUENCY STABILITY

5.1 APPLIED PROCEDURES / LIMIT

However, the device meets the following condition:

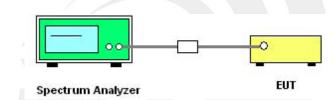
Fixed non-multilateration transmitters with an authorized bandwidth that is more than 40 kHz from the band edge, intermittently operated hand-held readers, and mobile transponders are not subject to frequency tolerance restrictions.

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 degree 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 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.

5.3 TEST SETUP



5.4 TEST RESULTS

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

Dense reader mode ISO-18000-63							
		Measured Frequency	Frequency	Limit			
channel	Test Condition	(MHz)	Drift (ppm)	(ppm)			
	+22°C, Nominal	911.2504	0.439				
911.25MHz	-30°C, Nominal	911.2509	0.988				
	+50°C, Nominal	911.2511	1.207	0.5			
	+22°C, Nominal	920.2506	0.652	±2.5			
920.25MHz	-30°C, Nominal	920.2508	0.869				
	+50°C, Nominal	920.2511	1.195				

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Report No.: STS1710201W03

Single reader mode ISO-18000-63							
		Measured Frequency	Frequency				
channel	Test Condition	(MHz)	Drift (ppm)	Limit(ppm)			
	+22°C, Nominal	911.7511	1.206				
911.75MHz	-30°C, Nominal	911.7515	1.645				
	+50°C, Nominal	911.7505	0.548				
	+22°C, Nominal	919.2512	1.305	±2.5			
919.25MHz	-30°C, Nominal	919.2508	0.870				
	+50°C, Nominal	919.2507	0.761				

Low data rate ISO-18000-62 (40kbps)							
channel	Test Condition	Measured Frequency (MHz)	Frequency Drift (ppm)	Limit(ppm)			
	+22°C, Nominal	911.7515	1.645	_			
911.75MHz	-30°C, Nominal	911.7518	1.974	-			
	+50°C, Nominal	911.7519	2.084	.0.5			
	+22°C, Nominal	919.7514	1.522	±2.5			
919.75MHz	-30°C, Nominal	919.7516	1.740	-			
	+50°C, Nominal	919.7511	1.196				

High data rate ISO-18000-62 (80kbps)							
channel	Test Condition Measured Frequency Frequency (MHz) Drift (ppm)						
	+22°C, Nominal	912.7503	0.329				
912.75MHz	-30°C, Nominal	912.7504	0.438				
	+50°C, Nominal	912.7513	1.424				
	+22°C, Nominal	918.7503	0.327	±2.5			
918.75MHz	-30°C, Nominal	918.7508	0.871				
	+50°C, Nominal	918.7517	1.850				

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Report No.: STS1710201W03

Unmodulated ISO-10374						
channel	Test Condition	Measured Frequency (MHz)	Frequency Drift (ppm)	Limit(ppm)		
	+22°C, Nominal	902.7508	0.886			
902.75MHz	-30°C, Nominal	902.7517	1.883	_		
	+50°C, Nominal	902.7516	1.772	_		
	+22°C, Nominal	903.2503	0.332	_		
903.25MHz	-30°C, Nominal	903.2511	1.218	_		
	+50°C, Nominal	903.2509	0.996			
	+22°C, Nominal	910.7505	0.549	±2.5		
910.75MHz	-30°C, Nominal	910.7512	1.318	_		
	+50°C, Nominal	910.7510	1.098	_		
	+22°C, Nominal	920.7508	0.869			
920.75MHz	-30°C, Nominal	920.7511	1.195			
	+50°C, Nominal	920.7509	0.977			

		TDM		
channel	Test Condition	Limit(ppm)		
	+22°C, Nominal	913.7511	1.204	
913.75MHz	-30°C, Nominal	913.7509	0.985	
	+50°C, Nominal	913.7506	0.657	.05
	+22°C, Nominal	916.2512	1.305	±2.5
916.25MHz	-30°C, Nominal	916.2508	0.870	
	+50°C, Nominal	916.2505	0.544	

Title 21					
	Test Canditian	Measured Frequency		Lineit(n.n.m.)	
channel	Test Condition	(MHz)	Drift (ppm)	Limit(ppm)	
	+22°C, Nominal	913.7512	1.313		
913.75MHz	-30°C, Nominal	913.7509	0.985		
	+50°C, Nominal	913.7504	0.438		
	+22°C, Nominal	913.7512	1.313	±2.5	
917.75MHz	-30°C, Nominal	913.7509	0.985		
-	+50°C, Nominal	913.7504	0.438		

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6. FIELD STRENGTH OF SPURIOUS EMISSIONS

6.1 APPLIED PROCEDURES / LIMIT

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 of at 3 m shall be used for measurements at frequency30MHz up to 1GHz, and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber. The table was rotated 360 degrees 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 polarizations 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 then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos. Note:

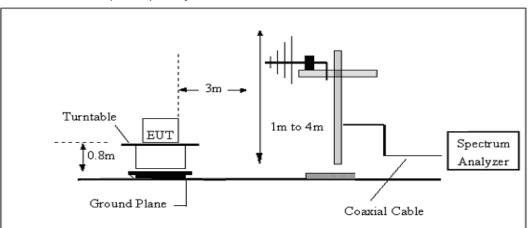
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.



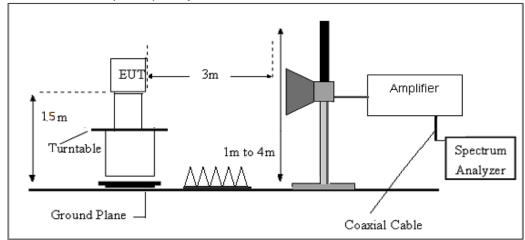


6.3 TEST SETUP

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



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



6.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

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

FS = Field Strength

- CL = Cable Attenuation Factor (Cable Loss)
- RA = Reading Amplitude
- AG = Amplifier Gain
- AF = Antenna Factor

For example

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

Factor=AF+CL-AG



6.6 TEST RESULTS

Below 1GHz

	Dense reader mode ISO-18000-63 (911.25MHz)									
Frequency (MHz)	Polarity	Level (dBm)	Ant gain (dBi)	Cable Loss (dB)	Absolute level (dBm)	Limit (dBm)	Margin (dB)			
40.25	Н	-45.36	0	0.10	-45.46	-25.00	-20.46			
40.38	V	-40.21	0	0.10	-40.31	-25.00	-15.31			
258.39	Н	-44.10	0	0.23	-44.33	-25.00	-19.33			
257.58	V	-40.01	0	0.23	-40.24	-25.00	-15.24			
621.24	Н	-38.45	0	0.45	-38.90	-25.00	-13.90			
620.23	V	-35.23	0	0.45	-35.68	-25.00	-10.68			

Above 1GHz

Frequency	Polarity	Level (dBm)	Antenna Gain	Cable Loss	Emission Level	Limits	Margin
(MHz)		(dBm)	(dBi)	(dB)	(dBm)	(dBm)	(dB)
1822.50	Н	-50.18	10.10	1.10	-41.18	-25.00	-16.18
1821.49	V	-45.17	10.10	1.10	-36.17	-25.00	-11.17
2733.75	Н	-53.18	10.30	1.35	-44.23	-25.00	-19.23
2732.84	V	-48.18	10.30	1.35	-39.23	-25.00	-14.23
3458.20	Н	-56.47	12.20	1.68	-45.95	-25.00	-20.95
3452.58	V	-50.47	12.20	1.68	-39.95	-25.00	-14.95
5847.25	Н	-57.97	12.80	2.35	-47.52	-25.00	-22.52
5845.36	V	-52.94	12.80	2.35	-42.49	-25.00	-17.49

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Below 1GHz

		Dense re	ader mode IS	O-18000-63 (920.25MHz)		
Frequency (MHz)	Polarity	Level (dBm)	Ant gain (dBi)	Cable Loss (dB)	Absolute level (dBm)	Limit (dBm)	Margin (dB)
40.25	Н	-44.87	0	0.1	-44.97	-25.00	-19.97
40.78	V	-40.55	0	0.1	-40.65	-25.00	-15.65
258.39	Н	-44.48	0	0.23	-44.71	-25.00	-19.71
258.10	V	-39.62	0	0.23	-39.85	-25.00	-14.85
621.24	Н	-38.45	0	0.45	-38.90	-25.00	-13.90
620.33	V	-35.19	0	0.45	-35.64	-25.00	-10.64

Above 1GHz

Frequency	Polarity	Level (dBm)	Antenna Gain	Cable Loss	Emission Level	Limits	Margin
(MHz)		(dBm)	(dBi)	(dB)	(dBm)	(dBm)	(dB)
1840.50	Н	-50.33	10.10	1.10	-41.33	-25.00	-16.33
1840.12	V	-45.23	10.10	1.10	-36.23	-25.00	-11.23
2760.75	Н	-53.64	10.30	1.35	-44.69	-25.00	-19.69
2760.00	V	-47.85	10.30	1.35	-38.90	-25.00	-13.90
3458.20	н	-56.18	12.20	1.68	-45.66	-25.00	-20.66
3455.32	V	-49.71	12.20	1.68	-39.19	-25.00	-14.19
5847.25	н	-58.44	12.80	2.35	-47.99	-25.00	-22.99
5848.41	V	-52.80	12.80	2.35	-42.35	-25.00	-17.35

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

 Scan with all of model, the worst case is Dense reader mode ISO-18000-63 Emission Level = Reading + Factor Margin = Limit - Emission Leve

3. The frequency emission of peak points that did not show above the forms are at least 20dB below the limit,

the frequency emission is mainly from the environment noise.



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.

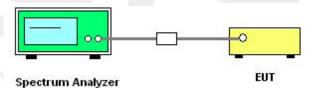
7.2 TEST PROCEDURE

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, is 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, set the span greater than RBW.

7.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



7.5 TEST RESULTS

Temperature :	25 ℃	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	DC 24V From POE
Test Mode :	Dense reader mode ISO-18000)-63	

911.25MHz

gilent Spectrum Analyzer - Swept						
L RF 50 ດ tart Freq 30.000000 I	AC MHz PNO: Fa IFGain:L		e Run	ALIGNAUTO Avg Type: Log Avg Hold: 11/1		10:10:20 PM Nov 14, 203 TRACE 1 2 3 4 5 TYPE MWWWM DET P N N N N
0 dB/div Ref 30.00 dB	m				1	Akr1 904 MH 27.256 dBr
0.0						
D.0						
0.0 2	and a service of the		man		www.www.www.	and the second second second
0.0						
art 30 MHz Res BW 100 kHz		#VBW 300 kH	lz		· · ·	Stop 25.00 GH .386 s (1001 pt
R MODE TRC SCL 1 N 1 f 2 N 1 f 3 N 1 f 4		27.256 dBm 43.867 dBm 41.499 dBm	UNCTION FUN	CTION WIDTH	FUNCTION	VALUE
5 7 3 9						
i i				STATUS		

920.25

Agilent Spectrum Analyzer - Swept SA			
$LKI = RF = 50 \Omega AC$	SENSE:PULSE	ALIGNAUTO	10:11:30 PM Nov 14, 2017
Display Line 6.89 dBm	PNO: Fast Trig: Free IFGain:Low Atten: 40	Avg Tyj Run Avg Hol	e: Log-Pwr TRACE 1 2 3 4 5 6
10 dB/div Ref 30.00 dBm			Mkr1 929 MHz 26.889 dBm
20.0			6.89 dBm
-10.0			
-20.0			
-40.0 2 -50.0	Mar any Martin Martin	Mun hour have	well make a well and the second from the second from the second
-60.0			
Start 30 MHz #Res BW 100 kHz	#VBW 300 kHz	:	Stop 25.00 GHz Sweep 2.386 s (1001 pts)
MKE MODE TRC SCL X 1 N 1 f 929 MH 2 N 1 f 1.853 GH 3 N 1 f 1.3988 GH 4	z 26.889 dBm z -45.020 dBm	ICTION FUNCTION WIDTH	FUNCTION VALUE
4 5 6 7 8			
9 10 11			*
MSG		STATUS	

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Report No.: STS1710201W03

Temperature :	25 ℃	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	DC 24V From POE
Test Mode :	Single reader mode ISO-18000	-63	

911.75MHz

L RF 50	Ω AC	SENSE:PULSE		ALIGNAUTO		10:06:12	PM Nov 14, 20:
arker 1 903.9500		Fast 😱 Trig: Fi	ree Run 40 dB	Avg Type: Avg Hold: 4		TF	ACE 1 2 3 4 5 TYPE M M M M M DET P N N N N
0 dB/div Ref 30.00) dBm						904 MH 194 dBr
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.00							7.19 d
3.0							
0.0							
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0.0 Junior and a starting	Star	non- Barrison and a strange of the					
0.0							
tart 30 MHz Res BW 100 kHz		#VBW 300 k	Hz		Swe	Stop ep 2.386 s	25.00 GH (1001 pt
			FUNCTION FU	INCTION WIDTH	5	UNCTION VALUE	
R MODE TRC SCL N 1 f	904 MHz	27.194 dBm	ronenon	INCTION WIDTH			
R MODE TRC SCL N 1 f 2 N 1 f				INCTION WIDTH			
R MODE TRC SCL N 1 f 2 N 1 f 3 N 1 f 4	904 MHz 2.727 GHz	27.194 dBm -44.237 dBm					
R MODE TRC SCL N 1 f 2 N 1 f 3 N 1 f 5 5 5	904 MHz 2.727 GHz	27.194 dBm -44.237 dBm					
F MODE TFC SCL I N 1 f 2 N 1 f 3 N 1 f 4 5 5 5 5 5 5 5 6 7 3 3	904 MHz 2.727 GHz	27.194 dBm -44.237 dBm					
F MODE TRC SCL N 1 f 2 N 1 f 3 N 1 f 5 5 5 5 7 3 9 9 9	904 MHz 2.727 GHz	27.194 dBm -44.237 dBm					
R MODE TRC SCL I N 1 f 2 N 1 f 3 N 1 f 5 5 5 5 7 - - -	904 MHz 2.727 GHz	27.194 dBm -44.237 dBm					

919.25MHz

L RF 50 Ω	AC	SENSE:PULS	E	ALIGNAUTO		10:07:17 PM Nov 14, 2
arker 1 928.920000	PNC		: Free Run n: 40 dB	Avg Type: L Avg Hold: 16	og-Pwr #100	TRACE 1 2 3 4 TYPE M WAMA DET P N N N
dB/div Ref 30.00 d	Bm					Mkr1 929 Mi 26.896 dB
a 1 .0						
.0						6.90
0						
0						
		^	3	-		an mar adapte marth
O www.www.www.	and the second s	manne	monorman	all and a second way way	August	
urt 30 MHz						Stop 25.00 G
		#VBW 300	kHz		Sweep	2.386 s (1001 p
es BW 100 kHz			FUNCTION	UNCTION WIDTH	FUNC	TION VALUE
es BW 100 kHz	×	Y				
Mode TRC SCL N 1 f N 1 f	× 929 MHz 2.752 GHz	26.896 dBm -45.161 dBm				
MODE TRC SCL N 1 f	929 MHz	26.896 dBm				
Mode TRC SCL N 1 f N 1 f	929 MHz 2.752 GHz	26.896 dBm -45.161 dBm				
MODE TRC SCL N 1 f N 1 f	929 MHz 2.752 GHz	26.896 dBm -45.161 dBm				
Mode TRC SCL N 1 f N 1 f	929 MHz 2.752 GHz	26.896 dBm -45.161 dBm				
Mode TRC SCL N 1 f N 1 f	929 MHz 2.752 GHz	26.896 dBm -45.161 dBm				

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Report No.: STS1710201W03

Temperature :	25 ℃	50%				
Pressure :	1012 hPa	Test Voltage :	DC 24V From POE			
Test Mode :	Low data rate ISO-18000-62(40kbps)					

911.75MHz

isplay Line 0 dB/div Ref 0 dB/div 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	7.20 dBm			rig: Free Run Atten: 40 dB		Type: Log-Pwr iold: 14/100	Mkr1	TRACE 12345 TYPE MWWWW DET P NNN 904 MH 204 dBr 7-204 dBr
••• ••								.204 dBr
22.0	 							7:20-df
0.0	 							7-20 dl
0.00 0.0 0.0 0.0 0.0 0.0 0.0 0.0	 ∧²							
0.0 0.0 0.0 0.0	 ⊘²							
0.0 0.0 0.0	 <u> </u>							
0.0	²							
0.0 and may	<mark>2</mark>							
March Chi Chi								
0.0	- Lorenza and	mana	Heren and some	-	Adama Anton March	where the second and the second secon	asher a contraction of the	
					,	_		
tart 30 MHz Res BW 100	kHz		#VBW :	300 kHz		SI	Stop weep 2.386	p 25.00 GH s (1001 pt
KR MODE TRC SCL		904 MHz	Y 27.204 dB	FUNCTION	FUNCTION WIDTH	H	FUNCTION VALUE	
2 N 1 f	2	2.727 GHz 2.215 GHz	-45.229 dB -46.000 dB	n				
4	12	2.215 GHZ	-46.000 dBI	n				
5 6								
7 8								
9								
1								
3					STAT			

919.75MHz

ilent Spectrum Analyzer - Swept SA					
L RF 50 Ω AC		SENSE:PULSE	ALIGNAUTO Ava Tvo	e: Log-Pwr	10:13:58 PM Nov 14, 20 TRACE 1 2 3 4 5
Isplay Lifle 0.09 dBill	PNO: Fast IFGain:Low			1: 18/100	TYPE MWWWW DET P N N N
0 dB/div Ref 30.00 dBm	I				Mkr1 929 MH 26.888 dBi
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1.0					
art 30 MHz Res BW 100 kHz		#VBW 300 kHz		Sweep	Stop 25.00 Gl 2.386 s (1001 p
R MODE TRC SCL	929 MHz 20	Y FUNCTIO	IN FUNCTION WIDTH	FUNCT	ON VALUE
2 N 1 f 3 N 1 f		5.243 dBm 7.863 dBm			
3					
)					
					>



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Report No.: STS1710201W03

Temperature :	25 ℃	25 ℃ Relative Humidity : 50%					
Pressure :	1012 hPa	Test Voltage :	DC 24V From POE				
Test Mode :	High data rate ISO-18000-62(8	High data rate ISO-18000-62(80kbps)					

912.75MHz

L	RF			SENSE:	PULSE	ALIGNAUTO			D PM Nov 14, 201
isplay	Line	7.19 d B m	PI		Trig: Free Run Atten: 40 dB	Avg Typ Avg Hold	e: Log-Pwr : 25/100		RACE 12345 TYPE MWWWWW DET PNNNN
0 dB/div	Rei	f 30.00 dBn	n						904 MH 191 dBr
0.0	1						_		
0.0									7.19 di
.00									
0.0									
0.0									
0.0									
0.0		\Diamond^2		3		n and the Mar	a way and a second	- marching	war when
0.0	and the second second	Manun	an material and a survey of	and a star and a second	42 and the second	mounth			
0.0									
tart 30 Res Bl) MHz W 100	kHz		#VBW :	300 kHz		Sw	Stop eep 2.386 s	25.00 GH s (1001 pt
1 N	TRC SCL 1 f		× 904 MHz	Y 27.191 dB		FUNCTION WIDTH		FUNCTION VALUE	
2 N 3 N	1 f		2.727 GHz 9.144 GHz	-45.197 dB -49.842 dB					
4 5									
5 5 7									
в									
9 0									
1									>

918.75MHz

tilent Spectrum Analyzer - Swe L RF 50 Ω		SENSE:PUL	E	ALIGNAUTO		10:33:31 F	MNov 14, 20
isplay Line 6.93 dB	m PN	0: Fast 😱 Trig	: Free Run en: 40 dB	Avg Type: Avg Hold: 1	Log-Pwr 7/100	TRA T)	CE 1 2 3 4 5 PE MWWW DET P N N N I
) dB/div	Bm				1		29 MH 34 dBi
0.0							6.93 c
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.0							
.0					. 84	والمواجهة المحاصور	Park Market
0	man	a Maring and a stranger	withur	and and the second and a second a	and the second and the second s	Contraction of the second	
art 30 MHz Res BW 100 kHz		#VBW 30) kHz		Swe	Stop 2 ep 2.386 s	25.00 GI (1001 pi
R MODE TRC SCL	×	Y	FUNCTION	FUNCTION WIDTH	F	UNCTION VALUE	
N 1 f 2 N 1 f 3 N 1 f	929 MHz 5.498 GHz	26.934 dBm -46.601 dBm					
N 1 f	12.190 GHz	-45.054 dBm					



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Report No.: STS1710201W03

Temperature :	25 ℃	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	DC 24V From POE
Test Mode :	Unmodulated ISO-10374		

902.75MHz

	AC	SENSE:PULSE	β	LIGNAUTO			PM Nov 20, 20
art Freq 30.00000	PNO		Free Run : 40 dB	Avg Type: Avg Hold: 2		TF	ACE 1 2 3 4 5 TYPE MWWWW DET P N N N
dB/div Ref 30.00 d	IBm						904 MH 686 dBi
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art 30 MHz	^	#VBW 300	k u 7		Swa	Stop	25.00 GI
tes BW 100 kHz	· · · ·	#VBW 300				ep 2.386 s	25.00 GI (1001 pt
Res BW 100 kHz R MODE TRE SCL N 1 f	× 904 MHz	Y 27.686 dBm		CTION WIDTH		Stop eep 2.386 s	25.00 GH (1001 pt
es BW 100 kHz MODE TRC SCL N 1 f N 1 f	904 MHz 1.803 GHz	27.686 dBm -44.163 dBm		CTION WIDTH		ep 2.386 s	25.00 GH (1001 pt
RES BW 100 KHz MODE TRC SCL N 1 f N 1 f N 1 f	904 MHz	Y 27.686 dBm		CTION WIDTH		ep 2.386 s	25.00 GI (1001 pi
Res BW 100 kHz N 1 f N 1 f N 1 f	904 MHz 1.803 GHz	27.686 dBm -44.163 dBm		CTION WIDTH		ep 2.386 s	25.00 Gi ; (1001 pi
Res BW 100 kHz	904 MHz 1.803 GHz	27.686 dBm -44.163 dBm		CTION WIDTH		ep 2.386 s	25.00 GI
tes BW 100 kHz	904 MHz 1.803 GHz	27.686 dBm -44.163 dBm		CTION WIDTH		ep 2.386 s	25.00 GI
Res BW 100 kHz	904 MHz 1.803 GHz	27.686 dBm -44.163 dBm	FUNCTION FUNI	CTION WIDTH		ep 2.386 s	25.00 GF

903.25MHz

	AC	SENSE:PULSE		ALIGNAUTO		04:09:32 PM Nov 20, 2
play Line 7.63 dB	PNO		Free Run I: 40 dB	Avg Type: Lo Avg Hold: 15/	og-Pwr 1100	TRACE 1 2 3 4 TYPE M MAAA DET P N N I
B/div Ref 30.00 d	IBm				N	/kr1 904 M 27.635 dE
0						7.63
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	~					Stop 25.00 G
rt 30 MHz					O O	.386 s (1001 j
rt 30 MHz es BW 100 kHz		#VBW 300	KHZ		Sweep Z.	
es BW 100 kHz Mode tric scl	×	Y		FUNCTION WIDTH	Sweep 2.	
N 1 f	904 MHz 1.803 GHz	7 27.635 dBm -44.758 dBm		FUNCTION WIDTH		
N 1 f	904 MHz	Y 27.635 dBm		FUNCTION WIDTH		
N 1 f	904 MHz 1.803 GHz	7 27.635 dBm -44.758 dBm		FUNCTION WIDTH		
N 1 f	904 MHz 1.803 GHz	7 27.635 dBm -44.758 dBm		FUNCTION WIDTH		
N 1 f	904 MHz 1.803 GHz	7 27.635 dBm -44.758 dBm		FUNCTION WIDTH		
es BW 100 kHz Model The Scu N 1 f N 1 f	904 MHz 1.803 GHz	7 27.635 dBm -44.758 dBm		Function width		



910.75MHz

Agilent Spectrum Analyzer - Swept SA					
L RF 50Ω AC		SENSE:PULSE	ALIGNAUTO Ava Tva	pe: Log-Pwr	04:10:40 PMNov 20, 2017 TRACE 1 2 3 4 5 6
Display Line 7.30 dBm	PNO: Fast	👝 🛛 Trig: Free R	tun Avg Hol	d: 13/100	TYPE M Indodededed
	IFGain:Lov	Atten: 40 dl	В		DET P N N N N N
					Mkr1 904 MHz
10 dB/div Log					27.295 dBm
20.0					
10.0					7.00.40-
					7.30 dDm
0.00					
-10.0					
-20.0					
-30.0					
-40.0			<u>3</u>	mellin and the second	moneymour
-50.0 -50.0	باليحديد ويعمله الريالة عد	was showed and	marken warnes a	welshine welshine to	
-60.0					
Start 30 MHz #Res BW 100 kHz		#VBW 300 kHz		0	Stop 25.00 GHz
					2.386 s (1001 pts)
MKR MODE TRC SCL X	904 MHz 2	Y FUNC 7.295 dBm	TION FUNCTION WIDTH	FUNCTI	DN VALUE
2 N 1 f	2.677 GHz -4	6.616 dBm			
3 N 1 f 4	13.664 GHz -4	6.002 dBm			
5					=
6 7					
8					
9					
11					✓
<					>
MSG			STATUS		

920.75MHz

L RF 50 Ω	AC	SENSE:PU	LSE	ALIGNAUTO		04:13:52 PM Nov 20, 20:
splay Line 6.99 dE	3m PNO	East Tri	ig: Free Run ten: 40 dB	Avg Type: L Avg Hold: 15		TRACE 1 2 3 4 5 TYPE MWWWW DET P N N N N
dB/div Ref 30.00 d	dBm					Mkr1 929 MH 26.991 dB
a x1						
.0						6.99 d
n						
0						
0						
□ <mark>2</mark>			∆3			N.Marcolator and the March
0 produces	and the state of the second	and the state of t	- Xnerton and a starter	when a wind		
0						
art 30 MHz es BW 100 kHz		#VBW 30	10 kHz		Sweep	Stop 25.00 GH 2.386 s (1001 pt
MODE TRC SCL	× 929 MHz 2.752 GHz	26.991 dBm		FUNCTION WIDTH	FUNCT	ION VALUE
N 1 f N 1 f N 1 f	11.341 GHz	-45.587 dBm -48.508 dBm				
N 1 f						
N 1 f						
N 1 f						
N 1 f						8

=#



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Report No.: STS1710201W03

Temperature :	25 ℃	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	DC 24V From POE
Test Mode :	TDM		

913.75MHz

RL	Ri		AC	SEN:	SE:PULSE	A	LIGNAUTO)4 PM Nov 14, 201
isplay	' Line	7.13 dB	Р	NO: Fast 🖵 Gain:Low	Trig: Free Ru Atten: 40 dE		Avg Type: Avg Hold: ′			TYPE M MMMM DET P N N N N
) dB/div	Re	f 30.00 d	IBm							904 MH .133 dBr
20.0	1									
0.0										7.13 dE
.00										
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0.0										
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0.0	· · ·									
tart 30 Res B		kHz		#VBV	V 300 kHz			Sw	Stoj eep 2.386	o 25.00 GH s (1001 pt
	TRC SC		×	Y	FUNCT	ON FUNC	TION WIDTH		FUNCTION VALUE	
1 N 2 N 3 N 4	1 f 1 f 1 f		904 MHz 2.752 GHz 13.664 GHz	27.133 c -46.155 c -44.931 c	IBm					
5 6 7										
в										
9										
0										
9 0 1										>

916.25MHz

ilent Spectrum Analyzer - Swep							
L RF 50 Ω splay Line 6.93 dBı	n PNO		E : Free Run en: 40 dB	ALIGNAUTO Avg Type Avg Hold	e: Log-Pwr : 16/100	T	1 PM Nov 14, 20 RACE 1 2 3 4 1 TYPE MWWWW DET P N N N
dB/div Ref 30.00 d	Bm						929 M⊦ 928 dB
0.0							6.931
.0							
.0							
1.0 V	water and manufacture			mannen	Jugo Bardin and Maril Suga	n all marked and	hyory altracks
art 30 MHz Res BW 100 kHz		#VBW 300	kHz		Sw	Stop	25.00 GI
R MODE TRC SCL N 1 f	× 929 MHz	Y 26.928 dBm		FUNCTION WIDTH		FUNCTION VALUE	
N 1 f N 1 f	1.828 GHz 10.992 GHz	-40.642 dBm -47.022 dBm					
)



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Report No.: STS1710201W03

Temperature :	25 ℃	Relative Humidity :	50%
Pressure :	1012 hPa	Test Voltage :	DC 24V From POE
Test Mode :	Title 21		

913.75MHz

ilent Spectrum Analy	zer - Swept SA 50 Ω AC	SENSE:F	PULSE	ALIGN AUTO		05:18:40	PM Nov 18, 201
isplay Line 8.			rig: Free Run Atten: 40 dB		ype: Log-Pwr old: 17/100	TR	ACE 1 2 3 4 5 YPE M WANNA DET P N N N N
dB/div Ref	ffset 1.5 dB 3 1.50 dBm						904 MH 649 dBr
og 1 21.5							
1.5							0.65 dE
.50							
.50							
8.5							
8.5							
8.5	. 02				when the start of the start when the	and a second and a s	Vale and the second
8.5 minute and half	here and the second	Marchard and the state of the states	adalaha hara a shara a	when			
8.5							
tart 30 MHz Res BW 100 k	Hz	#VBW 3	00 kHz		Sw	Stop eep 2.386 s	25.00 GH (1001 pt:
Kr mode trc scl <mark>1</mark> N 1 f 2 N 1 f	× 904 MHz 4.967 GHz			FUNCTION WIDTH		FUNCTION VALUE	
2 N 1 f 3 N 1 f 4	14.113 GHz						
5							
6 7							
9							
0							
••••••							>

917.75MHz

L	RF 50 Ω	AC	SENG	E:PULSE	AI	IGNAUTO		05:20:0	8 PM Nov 18, 20
splay L	ine 8.40 dBr	m Pi	NO: Fast 😱 Gain:Low	Trig: Free Ru Atten: 40 dB	un	Avg Type: Avg Hold: /	Log-Pwr 14/100		TYPE MWWW DET P N N N
) dB/div	Ref Offset 1.5 Ref 31.50 dl							Mkr1 28.	929 MI 399 dB
1.5									
1.5									8.40
50									
50									
1.5									
3.5									
3.5		²			3	and at the second	and and a start	and a far and and and	- you want
3.5	and the second s	dub work and a second	and the second state of the second states of the second states of the second states of the second states of the	montering	we that we all the				
8.5									
art 30 №	/IHz 100 kHz		#VBW	/ 300 kHz			Swe	Stop eep 2.386) 25.00 G s (1001 p
art 30 M Res BW F MODE TR N 1 2 N 1 3 N 1	100 kHz	× 929 MHz 5.616 GHz 13.664 GHz	#VBW 28.399 d -46.740 d -43.631 d	FUNCT Bm Bm	ION FUNC	TION WIDTH		Stop eep 2.386 s	25.00 G s (1001 p
art 30 IV Res BW R MODE TF N 1 2 N 1 3 N 1 4	100 kHz T f	929 MHz 5.616 GHz	28.399 d -46.740 d	FUNCT Bm Bm	ION FUNC	TION WIDTH		eep 2.386	25.00 G s (1001 p
art 30 IV Res BW F MODE IF N 1 2 N 1 3 N 1 4 5 5 7	100 kHz T f	929 MHz 5.616 GHz	28.399 d -46.740 d	FUNCT Bm Bm	ION FUNC	TION WIDTH		eep 2.386	25.00 G
art 30 M Res BW F MODE TE N 1 2 N 1 3 N 1 4 5 5 5 7 8 8 8	100 kHz T f	929 MHz 5.616 GHz	28.399 d -46.740 d	FUNCT Bm Bm	ION FUNC	TION WIDTH		eep 2.386	25.00 G s (1001 p
art 30 IV Res BW F MODE IF N 1 2 N 1 3 N 1 4 5 5 7 8	100 kHz T f	929 MHz 5.616 GHz	28.399 d -46.740 d	FUNCT Bm Bm	ION FUNC	TION WIDTH		eep 2.386	25.00 G s (1001 p

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nt Spectrum Analyzer - Swept SA 39 PM Nov 20, 2017 Avg Type: Log-Pw Avg|Hold:>100/100 Marker 2 904.000000000 MHz Trig: Free Ru Atten: 40 dB DET P N N N N PNO: Wide 😱 IFGain:Low Mkr2 904.000 MHz -46.745 dBm 10 dB/div Ref 30.00 dBm 20.0 10. 20.0 -30.1 40.1 \Diamond ٥ -50.0 60.0 Start 901.000 MHz #Res BW 100 kHz Stop 905.000 MHz #VBW 300 kHz Sweep 1.000 ms (1001 pts) MKR MODE TRC SCL UNCTION FUNCTION WIDTH 1 N 2 N 3 4 5 6 7 8 9 10 11 902.000 MHz 904.000 MHz -46.161 dBm -46.745 dBm f STATUS

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	Electric Field	Magnetic Field	Power Density							
(MHz)	Strength (V/m)	Strength (A/m)	(mW/cm²)							
Limits for Occupational / c	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							

8.2 EUT ANTENNA

Protocol	MAX EIRP (mW)	Power Density (mW/cm)	Limit (mW/cm)	Result
LMS	30000	0.239	0.6013	Pass

Friss Transmission Formula: $Pd = (Pout) / (4^*pi^*R^2)$

Where

Pd = power density in mW/cm²

Pout = output power to antenna in mW

Pi = 3.1416

R = Distance between observation point and the center of radiator in cm, R=100cm





Report No.: STS1710201W03

9. EUT TEST SETUP PHOTO

<image>



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

Shenzhen STS Test Services Co., Ltd.