

FCC Test Report

Equipment : Mini Telemetry
Model No. : Mini Telemetry
Brand Name : GE
Filing Type : New Application
FCC ID : YOMMINITEL2010
STANDARD : 47 CFR FCC Part 95
Applicant : **GE HEALTHCARE**
8200W TOWER AVENUE, MILWAUKEE, WI, 53223, USA
Manufacturer : **WIPRO GE HEALTHCARE**
No.4, KADUGODI INDUSTRIAL AREA, BANGALORE 560
067, INDIA

The product sample received on May 04, 2010 and completely tested on May 24, 2010. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI/TIA-603-D-2010 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.




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SPORTON International Inc.

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SUMMARY OF TEST RESULT

FCC Standard Requirements and Conformance Test Specifications				
Report Clause	Ref. Std. Clause	Description	Result	Remark
3.1	15.107	AC Power Conducted Emissions	Complied	-
3.2	2.1049/95.1115	Occupied Bandwidth	Complied	-
3.3	2.1046	Transmitter Power	Complied	-
3.4	95.1115	Fundamental Field Strength	Complied	-
3.5	95.1115	Radiated Out-of-band Emissions	Complied	-
3.6	2.1051	Conducted Out-of-band Emissions	Complied	-
3.7	95.1115	Frequency Stability	Complied	-
4	2.1093	Maximum Permissible Exposure	Complied	-

1 General Description

1.1 Information

1.1.1 Operating Frequency Range(s)

Operating Frequency Range(s)	
Range 1:	<input checked="" type="checkbox"/> 608 – 614 MHz
Range 2:	<input type="checkbox"/> 1395 – 1400 MHz
Range 3:	<input type="checkbox"/> 1427 – 1432 57 MHz

1.1.2 The Channel Plan(s)

The Channel Plan(s)	
Channel Plan 1:	608 – 614 MHz Band
Nominal Channel Bandwidth 1:	25kHz, 608.0125 +n x 0.025 (n=0 – 239) GHz
Channel Use:	
<input type="checkbox"/> 608 – 614 MHz, broadband such as spread spectrum, channel bandwidth 1.5 – 6MHz	
<input checked="" type="checkbox"/> 608 – 614 MHz, narrowband such as FSK, channel bandwidth below 25kHz	
<input type="checkbox"/> 1395–1400 MHz and 1427–1432 MHz, no specific channels are specified	
NOTE: EUT complied with FCC 95.1115(d)	

1.1.3 Transmit Operating Modes

The Different Transmit Operating Modes	
<input checked="" type="checkbox"/> Operating mode 1: Single Antenna Equipment	
<input type="checkbox"/> Operating mode 2: Smart Antenna Systems - without beam forming	
<input type="checkbox"/> Operating mode 3: Smart Antenna Systems - with beam forming	

1.1.4 Smart Antenna Systems

In Case of Smart Antenna Systems	
<input checked="" type="checkbox"/> No, EUT is without smart antenna feature.	
<input type="checkbox"/> Yes, specify smart antenna feature:	
The number of Receive chains:	1
The number of Transmit chains:	1
Equal power distribution among the transmit chains:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> In case of beam forming, the maximum beam forming gain:	dB



1.1.5 Antenna Information

Antenna Information	
Maximum Antenna Gain (TPC 1):	-38.34 dBi
<input type="checkbox"/> Equipment placed on the market without antennas	
<input checked="" type="checkbox"/> Integral antenna (antenna permanently attached)	
Integral antenna gain:	-38.34 dBi
	<input type="checkbox"/> Temporary RF connector provided
	<input checked="" type="checkbox"/> No temporary RF connector provided
<input type="checkbox"/> External antenna (dedicated antennas)	
	<input type="checkbox"/> Single power level with corresponding antenna(s)
	<input type="checkbox"/> Multiple power settings and corresponding antenna(s)
	<input type="checkbox"/> Professional Install
	<input type="checkbox"/> Unique antenna connector
	<input type="checkbox"/> BIOS lock.
NOTE: EUT antenna complied with FCC 15.203, antenna requirements.	

1.1.6 Type of Equipment

Type of Equipment
<input checked="" type="checkbox"/> Stand-alone
<input type="checkbox"/> Combined Equipment (The radio part is fully integrated within another type of equipment)
<input type="checkbox"/> Plug-in radio device (Equipment intended for a variety of host systems)
<input type="checkbox"/> Other:

1.1.7 Power Setting Range

(a) Worst Power Levels for Power Setting 1 (Integrated Antenna)							
Applicable power levels:		<input checked="" type="checkbox"/> Conducted <input type="checkbox"/> EIRP					
Integral antenna gain:		-38.34 dBi					
Nominal Channel Bandwidth:		1					
Operating Mode # & Frequency (MHz)		Highest setting (P_{high}): (dBm)					
		Power Setting	Modulation	Data Rate (Mb/s)	Average Power	Peak Power	Peak Power Limit
Mode #1	608.025	Default	FSK	-	-	7.13	10.82
	613.975	Default	FSK	-	-	6.97	10.82



1.1.8 Extreme Operating

The Extreme Operating Temperature Range that Apply to the Equipment			
<input type="checkbox"/> -20 °C to +50 °C			
<input type="checkbox"/> 0 °C to +35 °C			
<input checked="" type="checkbox"/> Other: 10 °C to +40 °C			
The nominal voltages of the stand-alone radio equipment or the nominal voltages of the combined (host) equipment or test jig in case of plug-in devices.			
Details provided are for the:	<input type="checkbox"/> stand-alone equipment		
	<input type="checkbox"/> combined (or host) equipment		
	<input checked="" type="checkbox"/> test jig		
Supply Voltage	<input type="checkbox"/> AC mains	State AC voltage	V
Supply Voltage	<input checked="" type="checkbox"/> DC	State DC voltage	7.2 V
		State DC current	2600 mA
In case of DC, indicate the type of power source:			
<input type="checkbox"/> Internal Power Supply			
<input checked="" type="checkbox"/> External Power Supply or AC/DC adapter			
<input checked="" type="checkbox"/> Battery	<input type="checkbox"/> Nickel Cadmium		
	<input type="checkbox"/> Alkaline		
	<input type="checkbox"/> Nickel-Metal Hydride		
	<input checked="" type="checkbox"/> Lithium-Ion		
	<input type="checkbox"/> Lead acid (Vehicle regulated)		
	<input type="checkbox"/> Other:		
Operating Voltage	<input checked="" type="checkbox"/> Vnom (7.2 VDC)	<input checked="" type="checkbox"/> Vmin (6.6 VDC)	<input checked="" type="checkbox"/> Vmax (8 VDC)
Operating Climatic	<input checked="" type="checkbox"/> Tnom (20°C)	<input checked="" type="checkbox"/> Tmin (10°C)	<input checked="" type="checkbox"/> Tmax (40°C)

1.2 Additional Information Provided by the Submitter

1.2.1 Modulation

Modulation	
ITU Class of emission - Mode 1	F7D (FSK), except for video and voice
Can the transmitter operate un-modulated:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
NOTE: Refer as FCC 95.1115(c) WMTS may transmit any emission type appropriate for communications in this service, except for video and voice. Waveforms such as electrocardiograms (ECGs) are not considered video.	

1.2.2 Duty Cycle

Duty Cycle	
The transmitter is intended for:	<input checked="" type="checkbox"/> Continuous Duty: 100 %
	<input type="checkbox"/> Intermittent Duty: %
	<input type="checkbox"/> Continuous operation possible for testing purposes

1.2.3 About the EUT

About the EUT	
<input checked="" type="checkbox"/>	The equipment submitted are representative production models.
<input type="checkbox"/>	If not, the equipment submitted are pre-production models
<input type="checkbox"/>	If pre-production equipment is submitted, the final production equipment will be identical in all respects with the equipment tested.
<input type="checkbox"/>	If not, supply full details:

1.3 Ancillary and/or Support Equipment

Ancillary Equipment (AE)				
Item	Equipment	Brand Name	Model Name	Serial No.
AE01	AC/DC Power Adapter	MEDICAL	MW172KB1203B01	-
AE02	Battery	Panasonic Rajamane	UR18650F	-
AE03	Head phone	-	-	-

Support Equipment (SE)				
Item	Equipment	Brand Name	Model Name	Serial No.
SE01	-	-	-	-

1.4 EUT Setups

For the purposes of this test report, EUT's ancillary equipment (AE) or testing support equipment (SE) is defined as equipment which is used in conjunction with the EUT to provide operational and control features to the EUT. It is necessary to configure the system in a typical fashion, as a customer would normally use it. But nevertheless EUT's ancillary equipment (AE) or testing support equipment (SE) could possible influence the test results. EUT setups describe the combination of EUT's and EUT's ancillary equipment (AE) or testing support equipment (SE) used for testing.



Setup No.	Combination of EUT with AE or SE	Description
Setup_01	EUT (Transmitter) + AE01	Setup for all tests

The diagram illustrates the test setup. A vertical line labeled "AC Main" is connected to a rectangular box labeled "EUT". The "EUT" box is centered within a larger rectangular frame.

1.5 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 95
- ♦ ANSI/TIA-603-D-2010

1.6 Testing Location

Testing Location			
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.	
		TEL : 886-3-327-3456	FAX : 886-3-318-0055
<input type="checkbox"/>	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.	
		TEL : 886-3-656-9065	FAX : 886-3-656-9085
Testing Site No.			
TH01-HY	03CH03-HY	-	-

1.7 Abbreviations Used for the Test Report

- ♦ Test Channel: B (Bottom Channel), M (Middle Channel), and T (Top Channel).
- ♦ EUT: Equipment under Test.
- ♦ AE: EUT's Ancillary Equipment
- ♦ SE: Testing Support Equipment
- ♦ TPC: Transmit Power Control
- ♦ WMTS: Wireless Medical Telemetry Service

2 Test Configuration of Equipment under Test

2.1 Test Channel Frequencies

Nominal Channel Bandwidth 1				
Frequency Band	Channel Plan	B (Bottom Channel)	M (Middle Channel)	T (Top Channel)
608 – 614 MHz	1	608.025 MHz (F1)	N/A	613.975 MHz (F3)

2.2 Conformance Tests and Related Test Frequencies

Test	Test Frequencies (MHz)
AC Power Conducted Emissions	F1
Occupied Bandwidth	F1, F3
Fundamental Field Strength	F1, F3
Radiated Out-of-band Emissions	F1, F3
Conducted Out-of-band Emissions	F1
Frequency Stability	F1

F1: The centre freq. of the lowest declared channel for every declared nominal bandwidth within this band.
 F2: The centre freq. of the middle declared channel for every declared nominal bandwidth within this band.
 F3: The centre freq. of the highest declared channel for every declared nominal bandwidth within this band.

3 Transmitter Test Result

3.1 AC Power Conducted Emissions

3.1.1 Limit of AC Power Conducted Emissions

AC Power Conducted Emissions Limit		
Frequency Emission (MHz)	Quasi-Peak	Average
0.15~0.5	79	66
0.5~30	73	60

Note: * Decreases with the logarithm of the frequency.

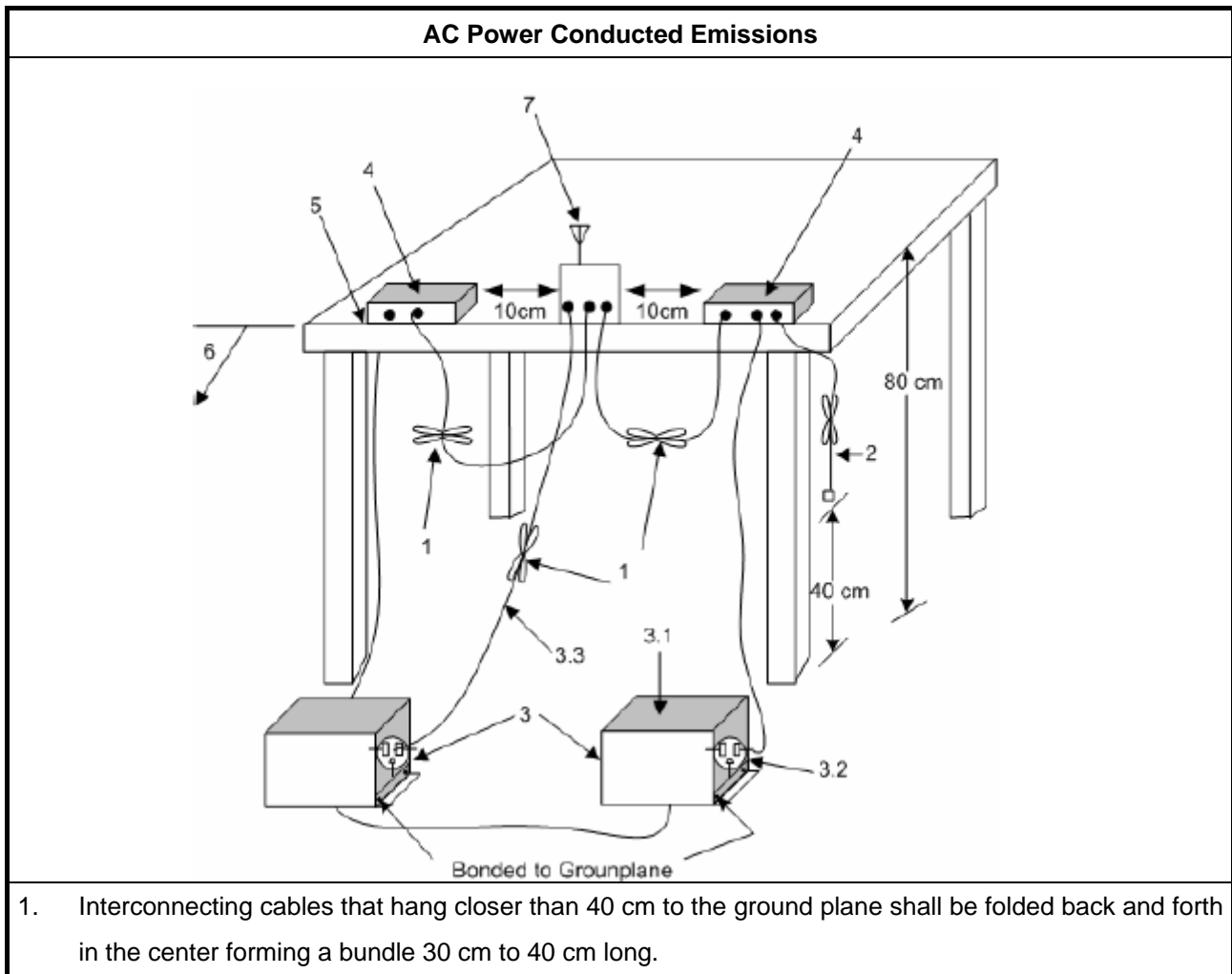
3.1.2 Measuring Instruments

Refer a measuring instruments list in this test report.

3.1.3 Test Procedures

Method of measurement: Method of measurement: Refer as ANSI/TIA-603-D-2010, clause 2.1.3.

3.1.4 Test Setup





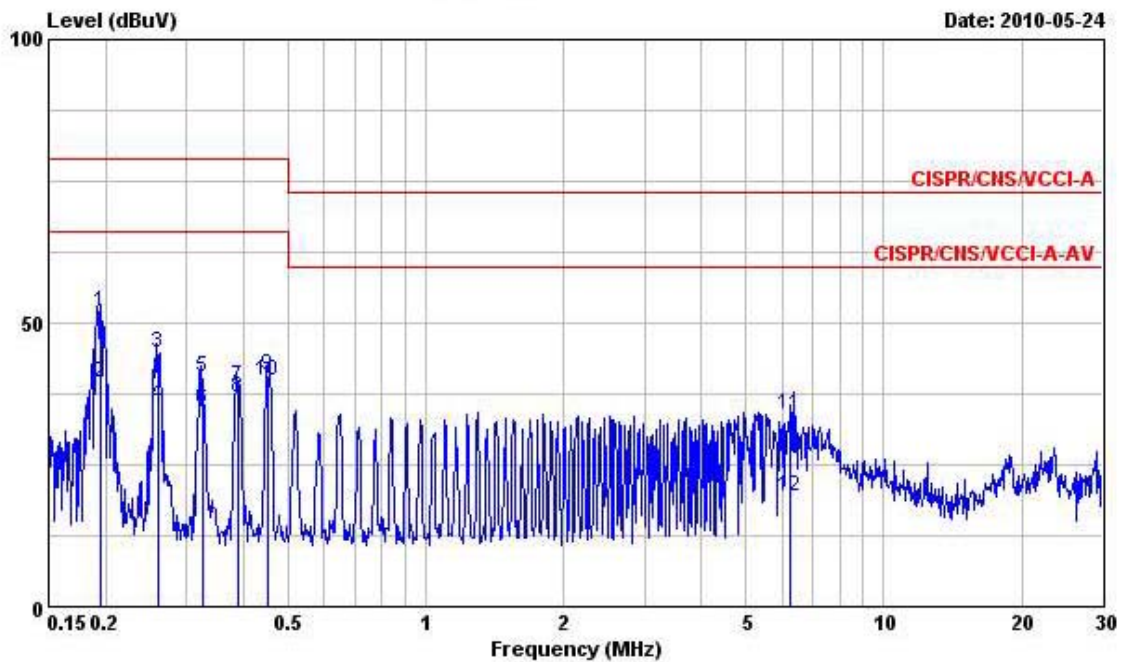
AC Power Conducted Emissions	
2.	I/O cables that are not connected to an accessory shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
3.	EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 ohm loads. LISN can be placed on top of, or immediately beneath, reference ground plane. <ul style="list-style-type: none"> 3.1. All other equipment powered from additional LISN(s). 3.2. A multiple-outlet strip can be used for multiple power cords of non-EUT equipment. 3.3. LISN at least 80 cm from nearest part of EUT chassis.
4.	Non-EUT components of EUT system being tested.
5.	Rear of EUT, including peripherals, shall all be aligned and flush with edge of tabletop.
6.	Edge of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.
7.	Antenna may be integral or detachable. If detachable, the antenna shall be attached for this test.

3.1.5 Test Result of AC Power Conducted Emissions

Frequency Band:	608 – 614 MHz Band
Power Setting:	1 (see test report clause 1.1.7)
Operating Mode #:	1 (see test report clause 1.1.3)
Nominal Channel Bandwidth #:	1 (see test report clause 1.1.2)
<p>NOTE 1: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.2), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes. If equipment having different transmit operating modes (see test report clause 1.1.3), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.</p> <p>NOTE 2: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.</p>	



Test Configure: Continuous Transmission	
Power Phase: Line	Operating Mode #: 1
Test Engineer: Ace Liao	Nominal Channel Bandwidth #: 1
Rel. Humidity: 65 %	Test Results
Ambient Temp.: 25.9 °C	
Test Frequency (MHz): F1, 608.025	



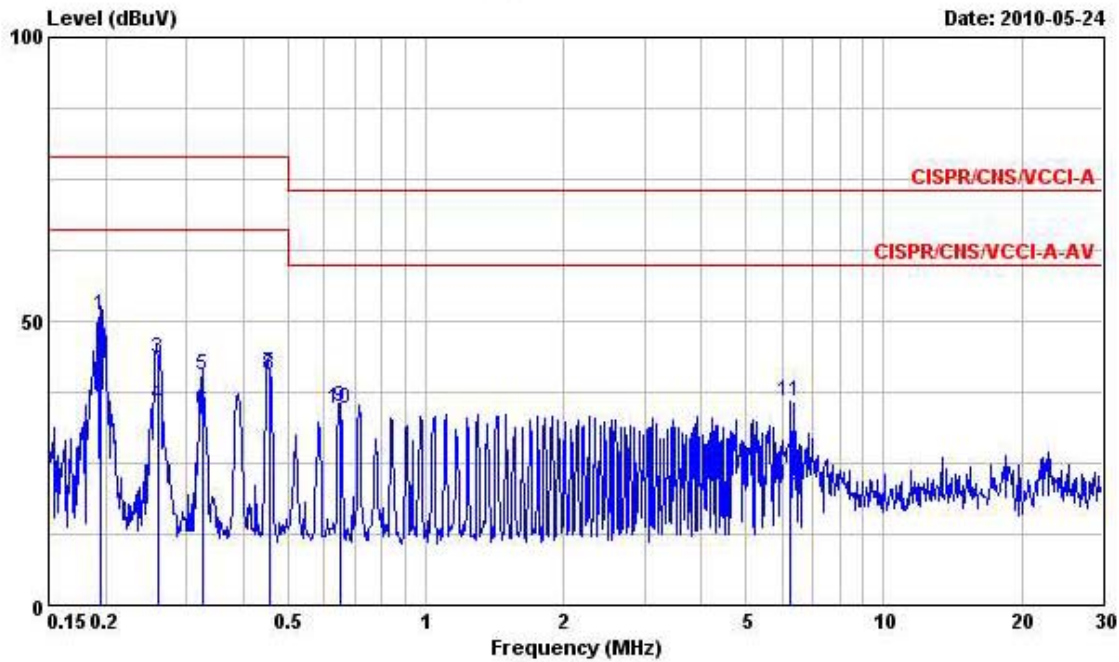
Site : CO04-HY
 Condition : CISPR/CNS/VCCI-A NSLK 8127477 LINE
 EUT : Mini Telemetry
 POWER: 120/60Hz
 Model : Mini Telemetry
 Memo : TX

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.1944650	52.02	-26.98	79.00	51.67	0.30	0.05	QP
2	@0.1944650	39.61	-26.39	66.00	39.26	0.30	0.05	Average
3	0.2600110	44.57	-34.43	79.00	44.22	0.30	0.05	QP
4	0.2600110	35.63	-30.37	66.00	35.28	0.30	0.05	Average
5	0.3246510	40.59	-38.41	79.00	40.23	0.30	0.06	QP
6	0.3246510	35.00	-31.00	66.00	34.64	0.30	0.06	Average
7	0.3902360	38.94	-40.06	79.00	38.58	0.29	0.07	QP
8	0.3902360	36.92	-29.08	66.00	36.56	0.29	0.07	Average
9	0.4536600	40.74	-38.26	79.00	40.38	0.29	0.07	QP
10	@0.4536600	39.89	-26.11	66.00	39.53	0.29	0.07	Average
11	6.255	33.85	-39.15	73.00	33.04	0.40	0.41	QP
12	6.255	19.33	-40.67	60.00	18.52	0.40	0.41	Average

Measurement uncertainty: ±2.26 dB



Test Configure: Continuous Transmission	
Power Phase: Neutral	Operating Mode #: 1
Test Engineer: Ace Liao	Nominal Channel Bandwidth #: 1
Rel. Humidity: 65 %	Test Results
Ambient Temp.: 25.9 °C	
Test Frequency (MHz): F1, 608.025	



Site : CO04-HY
 Condition : CISPR/CNS/VCCI-A NSLK 8127477 NEUTRAL
 EUT : Mini Telemetry
 POWER: 120/60Hz
 Model : Mini Telemetry
 Memo : TX

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.1954980	51.04	-27.96	79.00	50.75	0.25	0.04	QP
2	0.1954980	36.72	-29.28	66.00	36.43	0.25	0.04	Average
3	0.2610110	43.29	-35.71	79.00	42.99	0.25	0.05	QP
4	0.2610110	35.20	-30.80	66.00	34.90	0.25	0.05	Average
5	0.3251190	40.36	-38.64	79.00	40.06	0.24	0.06	QP
6	0.3251190	34.28	-31.72	66.00	33.98	0.24	0.06	Average
7	0.4553000	40.82	-38.18	79.00	40.51	0.24	0.07	QP
8	@0.4553000	40.34	-25.66	66.00	40.03	0.24	0.07	Average
9	0.6495540	34.72	-38.28	73.00	34.39	0.25	0.08	QP
10	@0.6495540	34.68	-25.32	60.00	34.35	0.25	0.08	Average
11	6.250	35.83	-37.17	73.00	35.08	0.34	0.41	QP
12	6.250	21.21	-38.79	60.00	20.46	0.34	0.41	Average

Measurement uncertainty: ±2.26 dB

3.2 Occupied Bandwidth

3.2.1 Limit of Occupied Bandwidth

26dBc Bandwidth (see Note 1)	None
99% Occupied Bandwidth (see Note 2)	None

NOTE 1: The 26dBc bandwidth is the frequency bandwidth of the signal power at the -26 dBc points when measured the resolution bandwidth should be with a approximately 5 % of the occupied bandwidth. These measurements shall also be performed at normal test conditions.

NOTE 2: The 99% occupied bandwidth is the frequency bandwidth of the signal power at the 99% channel power of occupied bandwidth when resolution bandwidth should be approximately 1 % to 5 % of the occupied bandwidth (OBW). These measurements shall also be performed at normal test conditions.

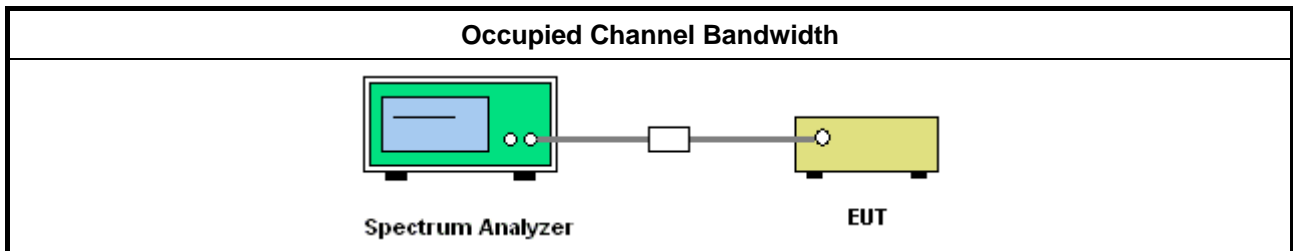
3.2.2 Measuring Instruments

Refer a measuring instruments list in this test report.

3.2.3 Test Procedures

Method of measurement: Refer as ANSI/TIA-603-D-2010, clauses 1.3.4.4

3.2.4 Test Setup



3.2.5 Test Result of Occupied Bandwidth

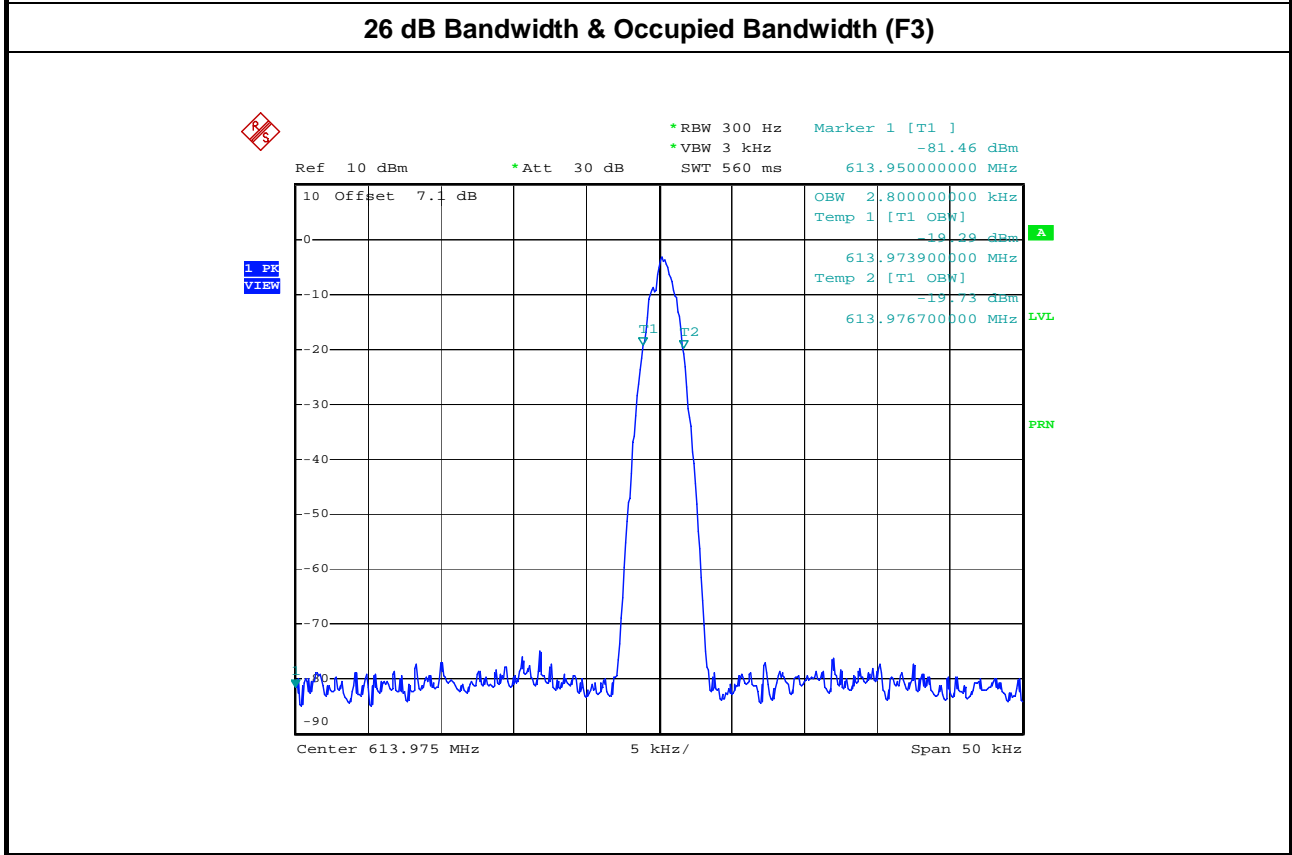
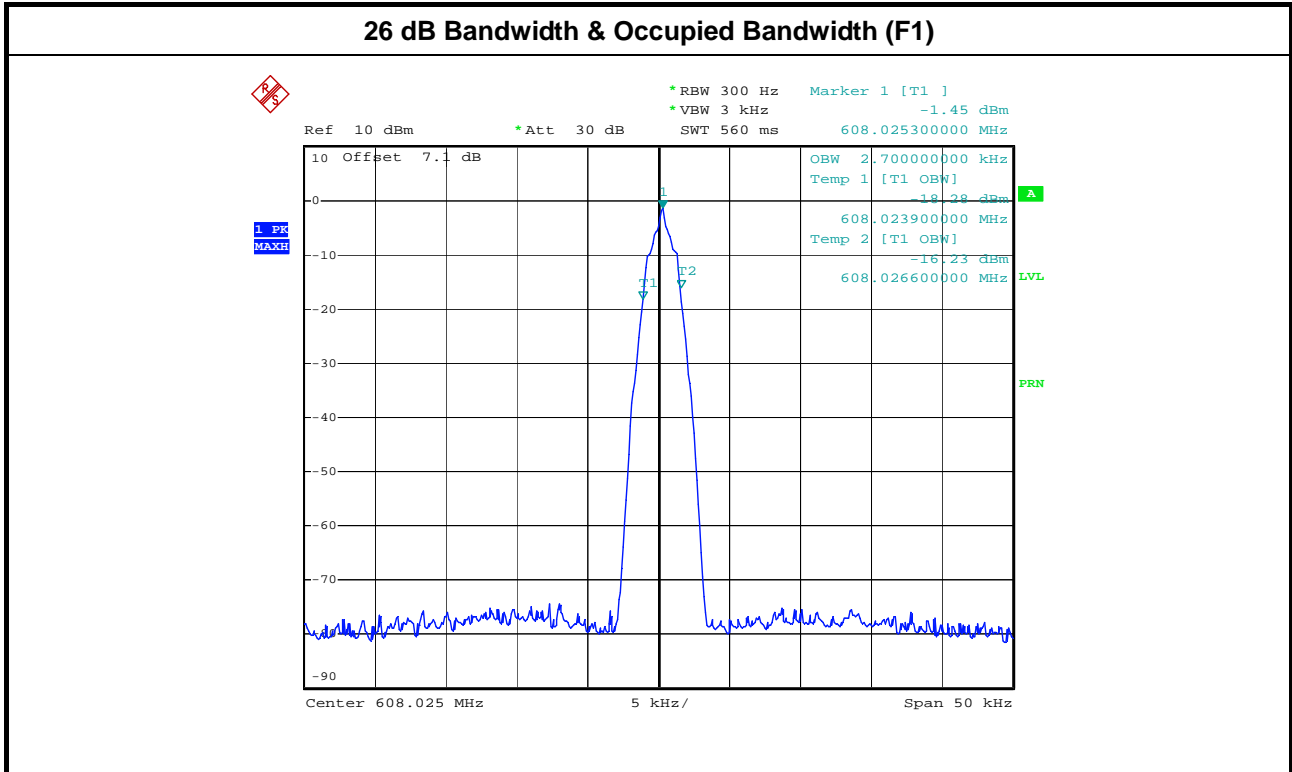
Frequency Band:	608 – 614 MHz Band
Power Setting:	1 (see test report clause 1.1.7)
Operating Mode #:	1 (see test report clause 1.1.3)
Nominal Channel Bandwidth #:	1 (see test report clause 1.1.2)
<p>NOTE: If equipment having different transmit operating modes (see test report clause 1.1.3), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing. Observe and record with plotted graphs or photographs the worst-case (i.e., widest) occupied bandwidth produced by these different modulation sources.</p>	

Operating Mode #:	1 (see test report clause 1.1.3)
Worse case modulation for this operating mode:	FSK
Worse case data rate for this operating mode:	-
Number of transmit chains present:	1
Number of active transmit chains in this mode:	1

608 – 614 MHz Band				
Modulation: FSK		Operating Mode #: 1		
Test Engineer: Ian		Nominal Channel Bandwidth #: 1		
Duty Cycle: 100 %	Test results			
Rel. Humidity: 61 %	Occupied Bandwidth (kHz)	26 dBc Bandwidth (kHz)	Limit (MHz)	Margin (%)
Ambient Temp.: 25 °C				
Test Frequency:				
F1, 608.025 MHz	2.7	N/A	N/A	N/A
F3, 613.975 MHz	2.8	N/A	N/A	N/A
Measurement uncertainty:		$\pm 8.5 \times 10^{-8}$		



3.2.5.1 Bandwidth Plots for 608 – 614 MHz Band



3.3 Transmitter Power

3.3.1 Limit of Transmitter Power

Transmitter Power (see Note 1)	None
<p>NOTE 1: Conducted transmitter power limit do not required.</p> <p>608 – 614 MHz: QP 200 mV/m at 3m equivalent 106.02 dBuV/m (EIRP 10.82 dBm).</p> <p>1395 – 1400 MHz: AV 740 mV/m at 3m equivalent 117.38 dBuV/m (EIRP 22.18 dBm)</p> <p>1427 – 1432 57 MHz: AV 740 mV/m at 3m equivalent 117.38 dBuV/m (EIRP 22.18 dBm)</p>	

3.3.2 Measuring Instruments

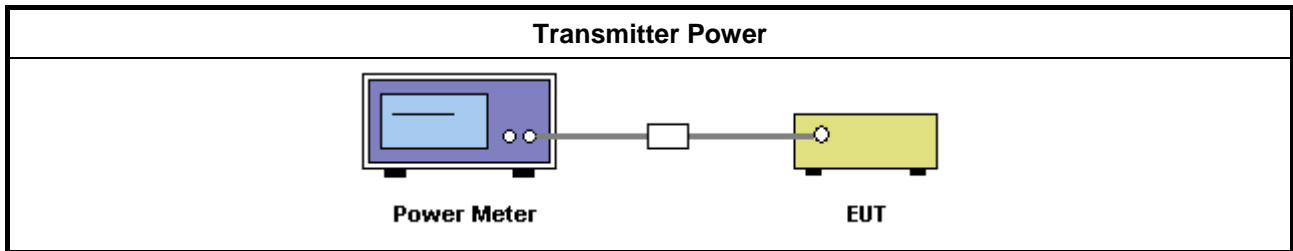
Refer a measuring instruments list in this test report.

3.3.3 Test Procedures

Refer as ANSI/TIA-603-D-2010, clause 3.2.1 for power meter measurement.

Transmit path bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.

3.3.4 Test Setup





3.3.5 Test Result of Transmitter Power

Frequency Band:	608 – 614 MHz Band
Power Setting:	1 (see test report clause 1.1.7)
Operating Mode #:	1 (see test report clause 1.1.3)
Nominal Channel Bandwidth #:	1 (see test report clause 1.1.2)
NOTE: If equipment having different transmit operating modes (see test report clause 1.1.3), the measurements are uninfluenced by different transmit operating modes, may not need to be repeated for all the operating modes. Similar, if the equipment supports different modulations and/or data rates may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.	

Operating Mode #:	1 (see test report clause 1.1.3)
Worse case modulation for this operating mode:	FSK
Worse case data rate for this operating mode:	-
Number of transmit chains present:	1
Number of active transmit chains in this mode:	1

608 – 614 MHz Band			
Modulation: FSK		Operating Mode #: 1	
Test Engineer: Ian		Nominal Channel Bandwidth #: 1	
Duty Cycle: 100 %	Test results		
Rel. Humidity: 61 %	Conducted Power (dBm)	Limit (MHz)	Margin (dB)
Ambient Temp.: 25 °C			
Test Frequency:			
F1, 608.025 MHz	7.13	N/A	N/A
F2, 611.025 MHz	5.94	N/A	N/A
F3, 613.975 MHz	6.97	N/A	N/A
Measurement uncertainty: ±0.5 dB			

3.4 Fundamental Field Strength

3.4.1 Limit of Fundamental Field Strength

Frequency Band	Fundamental Field Strength Limit
608 – 614 MHz	QP 200 mV/m at 3m equivalent 106.02 dBuV/m (EIRP 10.82 dBm)
1395 – 1400 MHz	AV 740 mV/m at 3m equivalent 117.38 dBuV/m (EIRP 22.18 dBm)
1427 – 1432.57 MHz	AV 740 mV/m at 3m equivalent 117.38 dBuV/m (EIRP 22.18 dBm)

NOTE: For the applicable limit, see FCC 95.1115 (a)

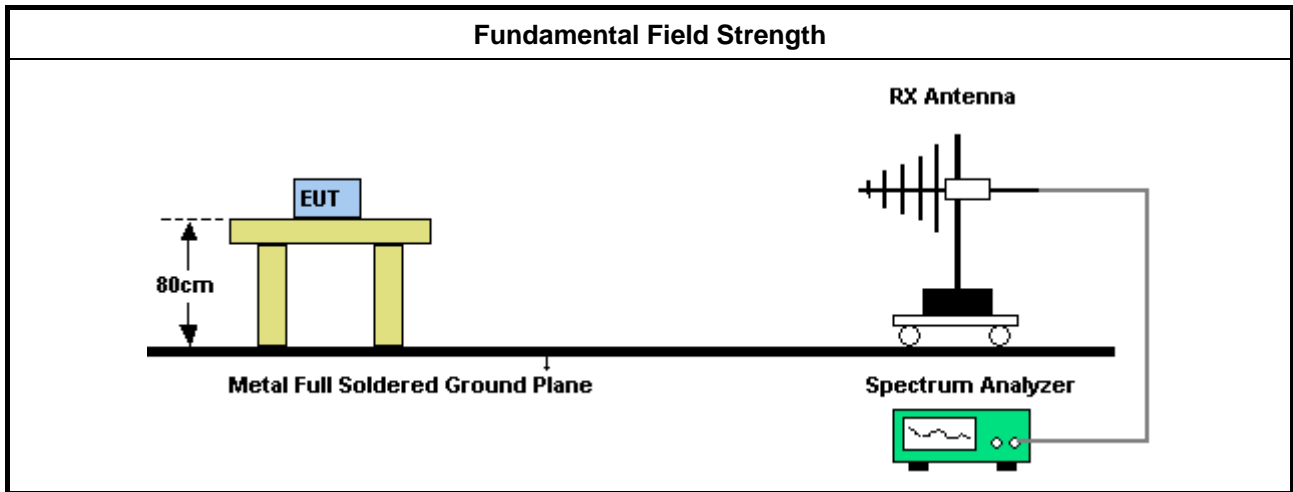
3.4.2 Measuring Instruments

Refer a measuring instruments list in this test report.

3.4.3 Test Procedures

Method of measurement:
<input checked="" type="checkbox"/> Refer as ANSI/TIA-603-D-2010, clause 3.2.12 for radiated measurement.

3.4.4 Test Setup



3.4.5 Test Result of Fundamental Field Strength

Frequency Band:	608 – 614 MHz Band
Power Setting:	1 (see test report clause 1.1.7)
Operating Mode #:	1 (see test report clause 1.1.3)
Nominal Channel Bandwidth #:	1 (see test report clause 1.1.2)
<p>NOTE: If equipment having different transmit operating modes (see test report clause 1.1.3) may not need to be repeated for all the operating modes. If the equipment supports different modulations and/or data rates may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.</p>	

3.4.5.1 Power Setting 1

Power Setting:	1 (see test report clause 1.1.7)
<p>NOTE: Conformance tests have to be performed over the frequency range(s) that has been declared with this Power Setting (see test report clause 1.1.7) and using the antenna gain of the antenna with the highest gain among those that have been declared with this Power Setting.</p>	

3.4.5.1.1 Operating Mode 1

Operating Mode #:	1 (see test report clause 1.1.3)
Worse case modulation for this operating mode:	FSK
Worse case data rate for this operating mode:	-
Number of transmit chains present:	1
Number of active transmit chains in this mode:	1



3.4.5.1.1.1 Test Result of Fundamental Field Strength

608 – 614 MHz Band				
Maximum Antenna Gain: -38.34 dBi		Power Setting: 1		
Modulation: FSK		Operating Mode #: 1		
Test Engineer: Eddie		Nominal Channel Bandwidth #: 1 and 2		
Duty Cycle: 100 %	Test Results			
Rel. Humidity: 65 %	Field Strength (dBuV/m)	Field Strength Limit (dBuV/m)	EIRP Power (dBm) (note 1)	Margin (dB)
Temp.: 25.9 °C				
Test Distance: 3 m				
Test Frequency (MHz):				
F1, 608.025	63.99	106.02	-31.21	42.03
F3, 613.975	63.88	106.02	-31.32	42.14
Measurement uncertainty: ±2.7 dB				
NOTE 1: Refer as FCC KDB 412172, field strength level at 3 meters using $E(\text{dB}\mu\text{V}/\text{m}) = P(\text{dBm EIRP}) + 95.2$. The measured power level is converted to EIRP.				

3.5 Radiated Out-of-band Emissions

3.5.1 Limit of Radiated Out-of-band Emissions

Frequency Band	Radiated Out-of-band Emissions Limit
below 960 MHz	QP 200 uV/m at 3m equivalent 46 dBuV/m
above 960 MHz	AV 500 uV/m at 3m equivalent 54 dBuV/m

NOTE: For the applicable limit, see FCC 95.1115 (b)

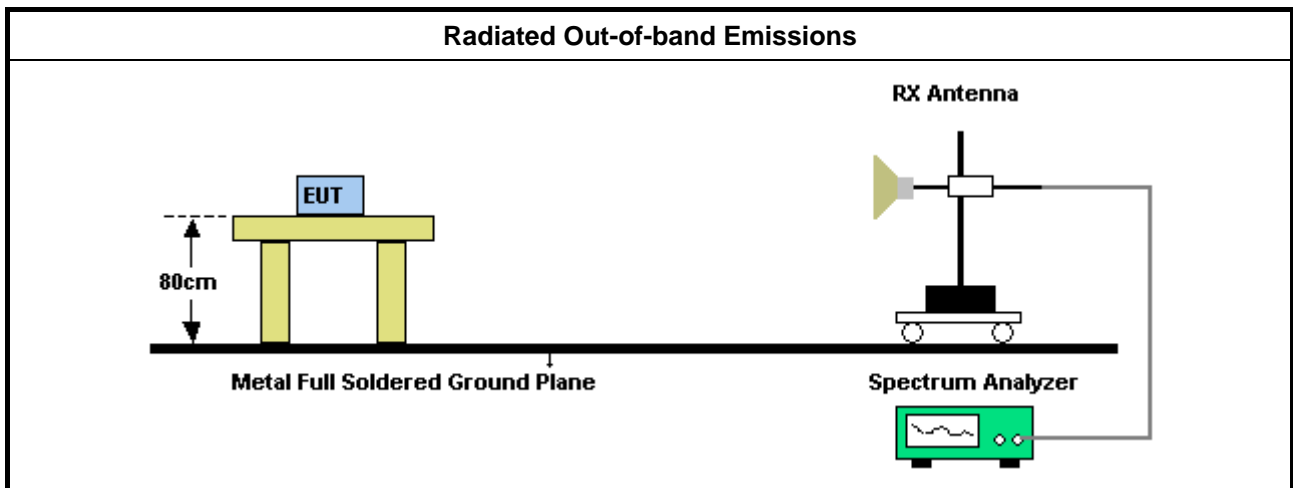
3.5.2 Measuring Instruments

Refer a measuring instruments list in this test report.

3.5.3 Test Procedures

Method of measurement:
<input checked="" type="checkbox"/> Refer as ANSI/TIA-603-D-2010, clause 3.2.12 for radiated measurement.

3.5.4 Test Setup



3.5.5 Test Result of Radiated Out-of-band Emissions

Frequency Band:	608 – 614 MHz Band
Power Setting:	1 (see test report clause 1.1.7)
Operating Mode #:	1 (see test report clause 1.1.3)
Nominal Channel Bandwidth #:	1 (see test report clause 1.1.2)
<p>NOTE: If equipment having different transmit operating modes (see test report clause 1.1.3) may not need to be repeated for all the operating modes. If the equipment supports different modulations and/or data rates, the measurements described in ANSI C63.10, clause 5.12 may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.</p>	

3.5.5.1 Power Setting 1

Power Setting:	1 (see test report clause 1.1.7)
<p>NOTE: Conformance tests have to be performed over the frequency range(s) that has been declared with this Power Setting (see test report clause 1.1.7) and using the antenna gain of the antenna with the highest gain among those that have been declared with this Power Setting.</p>	

3.5.5.1.1 Operating Mode 1

Operating Mode #:	1 (see test report clause 1.1.3)
Worse case modulation for this operating mode:	FSK
Worse case data rate for this operating mode:	-
Number of transmit chains present:	1
Number of active transmit chains in this mode:	1



3.5.5.1.1.1 Test Frequency F1, Radiated Out-of-band Emissions

Frequency Band: 608 – 614 MHz Band		Power Setting: 1				
Modulation: FSK		Operating Mode #: 1				
Test Engineer: Eddie		Nominal Channel Bandwidth #: 1				
Duty Cycle: 100 %	Test Range: 9 kHz – 10 th harmonic					
Rel. Humidity: 65 %	Test Distance: 3m					
Ambient Temp.: 25.9 °C	Test Results					
Test Frequency: 608.025 MHz						
Test Range	Emission Frequency (MHz)	Emission Observed (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol. (note 3)	Remark
9 kHz - 30 MHz	N/F	N/F	46	N/A	N/A	N/A
Test Range	(MHz)	(dBuV/m)	(dBuV/m)	(dB)	Pol.	Remark
30 MHz - 1000 MHz	43.580	34.79	46	11.21	V	Peak
30 MHz - 1000 MHz	98.700	34.12	46	11.88	H	Peak
30 MHz - 1000 MHz	198.780	34.12	46	11.88	H	Peak
30 MHz - 1000 MHz	498.510	35.49	46	10.51	V	Peak
30 MHz - 1000 MHz	700.270	42.49	46	3.51	V	QP
30 MHz - 1000 MHz	901.060	38.57	46	7.43	V	Peak
Test Range	(MHz)	(dBuV/m)	(dBuV/m)	(dB)	Pol.	Remark
1 GHz –10 th harmonic	1216.050	50.67	54	3.33	H	Average
1 GHz –10 th harmonic	1824.075	49.66	54	4.34	V	Average
1 GHz –10 th harmonic	2432.100	45.55	54	8.45	V	Average
1 GHz –10 th harmonic	3040.125	42.45	54	11.55	V	Average
1 GHz –10 th harmonic	3648.150	49.08	54	4.92	V	Average
1 GHz –10 th harmonic	4256.175	42.32	54	11.68	V	Average
1 GHz –10 th harmonic	4864.200	40.63	54	13.37	V	Average
1 GHz –10 th harmonic	5472.225	39.61	54	14.39	H	Average
1 GHz –10 th harmonic	6080.250	53.90	54	0.10	V	Average
Measurement uncertainty: ±2.7 dB						
NOTE 1: “>20dB” means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.						
NOTE 2: “N/F” means Nothing Found (No spurious emissions were detected.)						
NOTE 3: Receive antenna of polarization: H (Horizontal), V (Vertical)						
NOTE 4: The emissions were out of spec limits in the uncoated plastic enclosure version of the unit & the present PASS readings are with the EMI shield coating on the inside surface of plastic enclosures.						



3.5.5.1.1.2 Test Frequency F3, Radiated Out-of-band Emissions

Frequency Band: 608 – 614 MHz Band		Power Setting: 1				
Modulation: FSK		Operating Mode #: 1				
Test Engineer: Eddie		Nominal Channel Bandwidth #: 1				
Duty Cycle: 100 %	Test Range: 9 kHz – 10 th harmonic					
Rel. Humidity: 65 %	Test Distance: 3m					
Ambient Temp.: 25.9 °C	Test Results					
Test Frequency: 613.975 MHz						
Test Range	Emission Frequency (MHz)	Emission Observed (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol. (note 3)	Remark
9 kHz - 30 MHz	N/F	N/F	46	N/A	N/A	N/A
Test Range	(MHz)	(dBuV/m)	(dBuV/m)	(dB)	Pol.	Remark
30 MHz - 1000 MHz	44.550	35.80	46	10.20	V	Peak
30 MHz - 1000 MHz	98.700	30.82	46	15.18	V	Peak
30 MHz - 1000 MHz	198.780	34.30	46	11.70	H	Peak
30 MHz - 1000 MHz	498.510	37.01	46	8.99	V	Peak
30 MHz - 1000 MHz	700.270	45.13	46	0.87	H	QP
30 MHz - 1000 MHz	901.060	39.47	46	6.53	H	Peak
Test Range	(MHz)	(dBuV/m)	(dBuV/m)	(dB)	Pol.	Remark
1 GHz –10 th harmonic	1227.950	36.91	54	17.09	V	Average
1 GHz –10 th harmonic	1841.925	53.46	54	0.54	V	Average
1 GHz –10 th harmonic	2455.900	44.02	54	9.98	V	Average
1 GHz –10 th harmonic	3069.875	43.01	54	10.99	H	Average
1 GHz –10 th harmonic	3683.850	49.57	54	4.43	V	Average
1 GHz –10 th harmonic	4297.825	46.85	54	7.15	H	Average
1 GHz –10 th harmonic	4911.800	47.29	54	6.71	H	Average
1 GHz –10 th harmonic	5525.775	47.91	54	6.09	H	Average
1 GHz –10 th harmonic	6139.750	43.08	54	10.92	V	Average
Measurement uncertainty: ±2.7 dB						
NOTE 1: “>20dB” means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.						
NOTE 2: “N/F” means Nothing Found (No spurious emissions were detected.)						
NOTE 3: Receive antenna of polarization: H (Horizontal), V (Vertical)						

3.6 Conducted Out-of-band Emissions

3.6.1 Limit of Conducted Out-of-band Emissions

Frequency Band	Conducted Out-of-band Emissions Limit
30MHz – 10 th harmonic	20 dB below the fundamental emission
NOTE: For the applicable limit, see FCC 2.1051	

3.6.2 Measuring Instruments

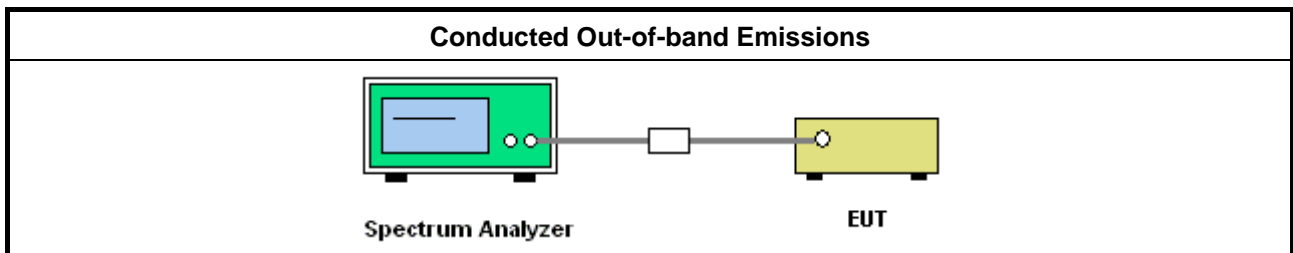
Refer a measuring instruments list in this test report.

3.6.3 Test Procedures

Refer as ANSI/TIA-603-D-2010, clause 3.2.13 for conducted measurement.

Transmit path bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.

3.6.4 Test Setup



3.6.5 Test Result of Conducted Out-of-band Emissions

Frequency Band:	608 – 614 MHz Band
Power Setting:	1 (see test report clause 1.1.7)
Operating Mode #:	1 (see test report clause 1.1.3)
Nominal Channel Bandwidth #:	1 (see test report clause 1.1.2)
NOTE: If equipment having different transmit operating modes (see test report clause 1.1.3) may not need to be repeated for all the operating modes. If the equipment supports different modulations and/or data rates may not need to be repeated for all these modulations and data rates. Simple comparison of engineering test across all operating modes, modulations and data rates may need to be performed to define the worse case combination to be used for the conformance testing.	



3.6.5.1 Power Setting 1

Power Setting: 1 (see test report clause 1.1.7)
 NOTE: Conformance tests have to be performed over the frequency range(s) that has been declared with this Power Setting (see test report clause 1.1.7) and using the antenna gain of the antenna with the highest gain among those that have been declared with this Power Setting.

3.6.5.1.1 Operating Mode 1

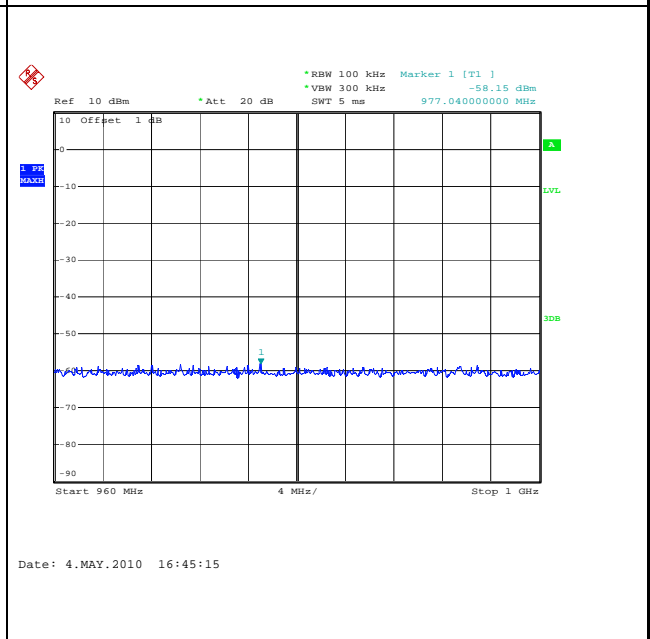
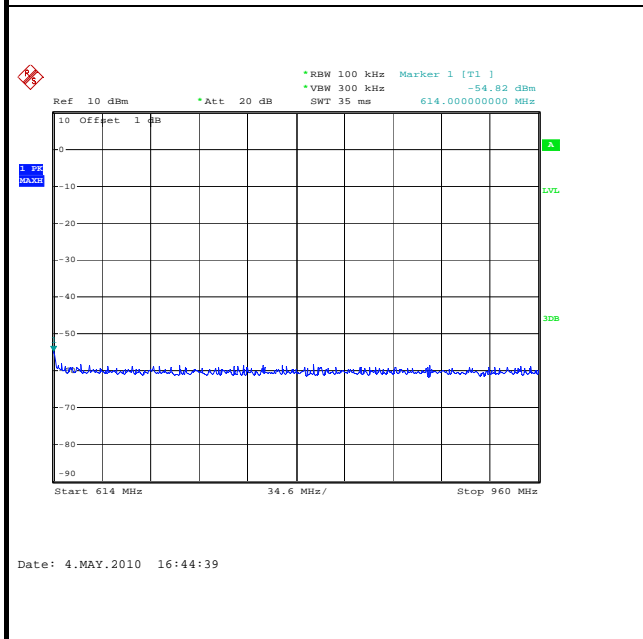
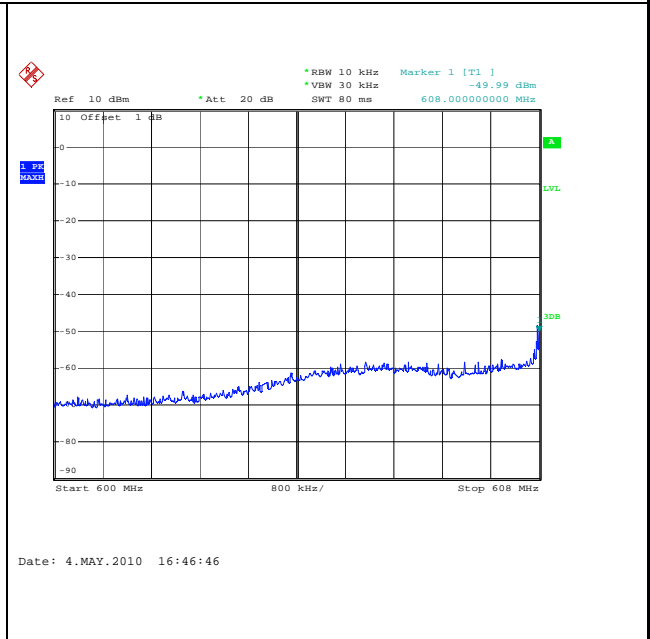
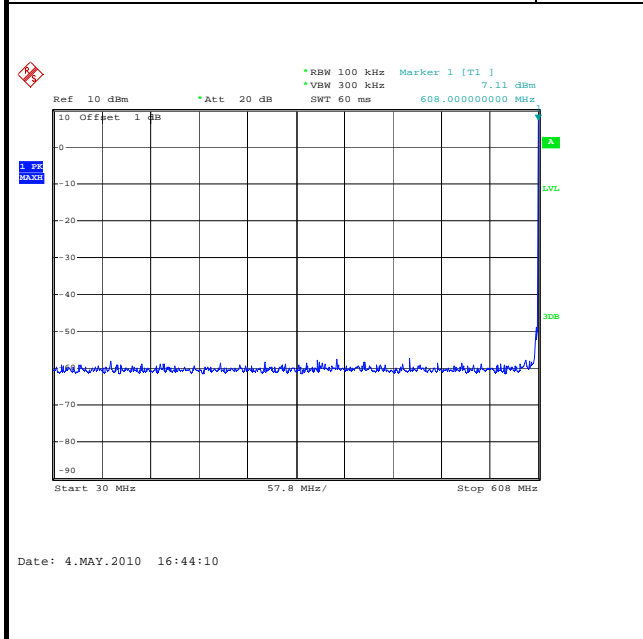
Operating Mode #: 1 (see test report clause 1.1.3)
Worse case modulation for this operating mode: FSK
Worse case data rate for this operating mode: -
Number of transmit chains present: 1
Number of active transmit chains in this mode: 1

3.6.5.1.1.1 Test Frequency F1, Conducted Out-of-band Emissions

Frequency Band: 608 – 614 MHz Band		Power Setting: 1			
Modulation: FSK		Operating Mode #: 1			
Test Engineer: Ian		Nominal Channel Bandwidth #: 1			
Duty Cycle: 100 %	Test Range: 30 MHz – 10 th harmonic				
Rel. Humidity: 61 %	RF Power: 7.13 dBm				
Ambient Temp.: 25 °C	Limit: -12.87 dBm				
Test Frequency: 608.025 MHz	Test Results				
Test Range	Emission Frequency (MHz)	Emission Observed (dBm)	Limit (dBm)	Margin (dB)	Remark
30 MHz - 1000 MHz	608	-49.99	-12.87	37.12	Peak
Test Range	(MHz)	(dBm)	(dBm)	(dB)	Remark
1 GHz –10 th harmonic	3652	-41.51	-12.87	28.64	Peak
Measurement uncertainty: ±2.7 dB					
NOTE 1: ">20dB" means the tables in this clause should only list values of spurious emissions that exceed the level of 20 dB below the applicable limit.					
NOTE 2: "N/F" means Nothing Found (No spurious emissions were detected.)					



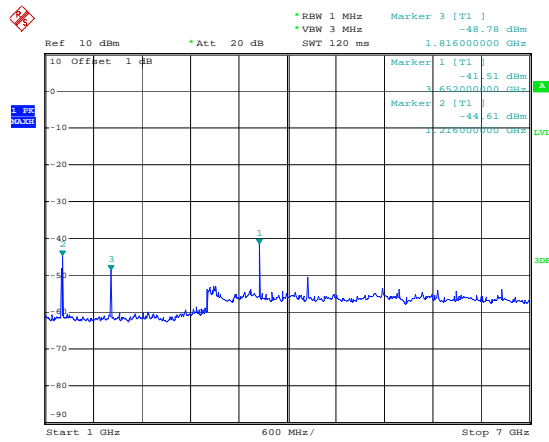
Frequency Band:	608 – 614 MHz Band	Power Setting:	1
Modulation:	FSK	Operating Mode #:	1
Test Engineer:	Ian	Nominal Channel Bandwidth #:	1
Duty Cycle HRP:	100 %	Test Range:	30 MHz – 1000 MHz
Rel. Humidity:	61 %	Polarization:	N/A
Ambient Temp.:	25 °C	Test Distance:	Conducted
Test Frequency:	F1, 608.025 MHz	Test Results	



Measurement uncertainty: ±0.5 dB



Frequency Band: 608 – 614 MHz Band		Power Setting: 1	
Modulation: FSK		Operating Mode #: 1	
Test Engineer: Ian		Nominal Channel Bandwidth #: 1	
Duty Cycle HRP: 100 %	Test Range: 1000 MHz – 10 th harmonic		
Rel. Humidity: 61 %	Polarization: N/A		
Ambient Temp.: 25 °C	Test Distance: Conducted		
Test Frequency: F1, 608.025 MHz	Test Results		



Date: 4.MAY.2010 16:46:03

Measurement uncertainty: ±0.5 dB

3.7 Frequency Stability

3.7.1 Limit of Frequency Stability

Frequency Stability	Limit
Refer as FCC 95.1115(e)	within the frequency bands
Note: These measurements shall also be performed at normal and extreme test conditions.	

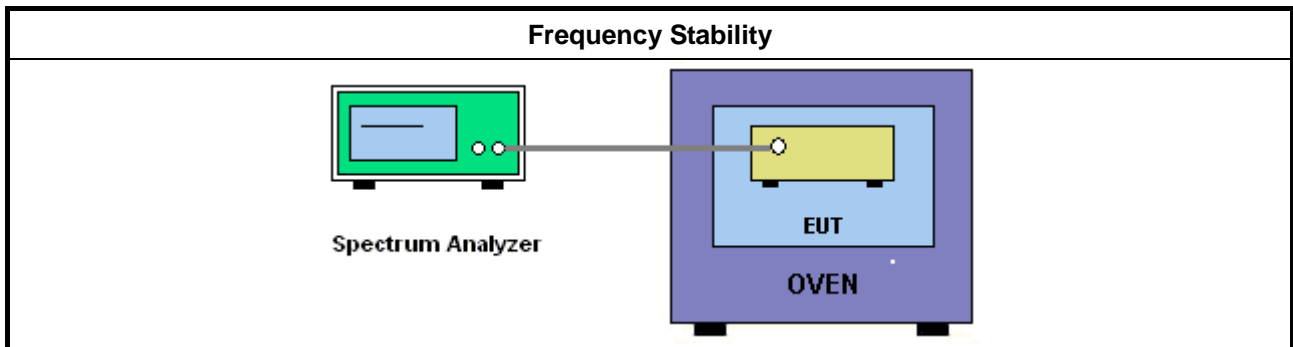
3.7.2 Measuring Instruments

Refer a measuring instruments list in this test report.

3.7.3 Test Procedures

Method of measurement: Refer as ANSI/TIA-603-D-2010, clause 3.2.2.

3.7.4 Test Setup



3.7.5 Test Result of Frequency Stability

Frequency Band:	608 – 614 MHz Band		
Power Setting:	1 (see test report clause 1.1.7)		
Operating Mode #:	1	Nominal Channel Bandwidth #:	1
Worse case modulation for this operating mode:	FSK		
Worse case data rate for this operating mode:	-		
Number of transmit chains present:	1		
Number of active transmit chains in this mode:	1		
NOTE: If equipment having different channel plan and nominal channel bandwidth modes (see test report clause 1.1.2), the measurements are uninfluenced by different channel plan and nominal channel bandwidth modes, may not need to be repeated for all modes.			



3.7.5.1 Frequency Stability with Respect to Ambient Temperature

Frequency Stability with Respect to Ambient Temperature						
Frequency Band: 608 – 614 MHz Band			Power Setting: 1			
Modulation: FSK			Operating Mode #: 1			
Test Engineer: Ian			Nominal Channel Bandwidth #: 1			
Duty Cycle: 100 %	Test results					
Rel. Humidity: 61 %						
Amb. Temp.: 25 °C	Measured Frequency (MHz)	Delta Frequency (kHz)	Freq. Error (ppm)	Limit (±kHz)	Margin (kHz)	
Test Frequency: 608.025 MHz						
Test Temperature: (°C)						
-20	608.026880	1.880	3.092	within band	-	
-10	608.025880	0.880	1.447	within band	-	
0	608.026460	1.460	2.401	within band	-	
10	608.026170	1.170	1.924	within band	-	
20	608.025970	0.970	1.595	within band	-	
30	608.025490	0.490	0.806	within band	-	
40	608.025250	0.250	0.411	within band	-	
50	608.025030	0.030	0.049	within band	-	
Measurement uncertainty:			±8.5×10 ⁻⁸			

3.7.5.2 Frequency Stability When Varying Supply Voltage

Frequency Stability When Varying Supply Voltage						
Frequency Band: 608 – 614 MHz Band			Power Setting: 1			
Modulation: FSK			Operating Mode #: 1			
Test Engineer: Ian			Nominal Channel Bandwidth #: 1			
Duty Cycle: 100 %	Test results					
Rel. Humidity: 61 %						
Amb. Temp.: 25 °C	Measured Frequency (MHz)	Delta Frequency (kHz)	Freq. Error (ppm)	Limit (±kHz)	Margin (kHz)	
Test Frequency: 608.025 MHz						
Test Voltage: (Vdc)						
Vnom 7.2	608.025600	0.600	0.987	within band	-	
Vmin 6.6	608.025970	0.970	1.595	within band	-	
Vmax 8.0	608.025410	0.410	0.674	within band	-	
Measurement uncertainty:			±8.5×10 ⁻⁸			

4 Maximum Permissible Exposure

4.1 Maximum Permissible Exposure

4.1.1 Limit of Maximum Permissible Exposure

Limits for Occupational / Controlled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6
Limits for General Population / Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30
NOTE 1: f = frequency in MHz ; *Plane-wave equivalent power density				
NOTE 2: For the applicable limit, see FCC 1.1310				

4.1.2 Result of Maximum Permissible Exposure

Please refer to SAR report.

5 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Apr. 06, 2010	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99041	9kHz – 30MHz	Mar. 23, 2010	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Apr. 29, 2010	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2010	Conduction (CO04-HY)
Spectrum Analyzer	R&S	FSU26.5	100015	20Hz ~ 26.5GHz	Oct. 29, 2009	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jul. 31, 2009	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Mar. 12, 2010	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Aug. 06, 2009	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 02, 2009	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 02, 2009	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 24, 2010	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	0917017	300MHz-40GHz	Dec. 03, 2009	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	0949003	300MHz-40GHz	Dec. 03, 2009	Conducted (TH01-HY)
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jul. 12, 2009	Conducted (TH01-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 07, 2009	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	COA9231A	18667	9 kHz - 2 GHz	Jan. 24, 2010	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	Jul. 21, 2009	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100004	9 kHz - 40 GHz	Oct. 03, 2009	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Sep. 26, 2009	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	May 20, 2010	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	Jan.11, 2010	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz - 1 GHz	Jan. 05, 2010	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Jan. 05, 2010	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 – 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)

Note: Calibration Interval of instruments listed above is one year.

6 Certification of TAF Accreditation



Certificate No. : L1190-100319

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien,
Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	: ISO/IEC 17025:2005
Accreditation Number	: 1190
Originally Accredited	: December 15, 2003
Effective Period	: January 10, 2010 to January 09, 2013
Accredited Scope	: Testing Field, see described in the Appendix
Specific Accreditation Program	: Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities


Jay-San Chen
President, Taiwan Accreditation Foundation
Date : March 19, 2010

P1, total 22 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when use without the Appendix