FCC 47 CFR PART 22H and 24E

Test Report

Product Type	:	GPS TRACKER
Applicant	:	CONNECTED HOLDINGS LLC
Address	:	4740 VON KARMAN AVENUE, SUITE 120, NEWPORT BEACH, CA 92660, USA
Trade Name	:	N/A
Model Number	:	ARROW-G
Test Specification	:	FCC 47 CFR PART 22H: Oct, 2012 FCC 47 CFR PART 24E: Oct, 2012 ANSI/TIA-603-C-2004
Application Purpose	:	Original
Receive Date	:	February 28, 2015
Test Period	:	March 01,2015 to April15, 2015
Issue Date	:	April 15, 2015

Issue by

A Test Lab Techno Corp.
No. 140-1, Changan Street, Bade City,
Taoyuan County 334, Taiwan R.O.C.
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Taiwan Accreditation Foundation accreditation number: 1330

Revision History

Rev.	Issue Date	Revisions	Revised By
00	April 15, 2015	Initial Issue	

Verification of Compliance

Issued Date: 04/15/2015

Product Type	:	GPS TRACKER
Applicant	:	CONNECTED HOLDINGS LLC
Address	:	4740 VON KARMAN AVENUE, SUITE 120, NEWPORT BEACH, CA 92660, USA
Trade Name	:	N/A
Model Number	:	ARROW-G
FCC ID	:	2AEB4ARROWG01
EUT Rated Voltage	:	DC 12V, 45mA
Test Voltage	:	120 Vac / 60 Hz
Applicable Standard	:	FCC 47 CFR PART 22H: Oct, 2012 FCC 47 CFR PART 24E: Oct, 2012 ANSI/TIA-603-C-2004
Application Purpose	:	Original
Test Result	:	Complied
Performing Lab.	:	A Test Lab Techno Corp. No. 140-1, Changan Street, Bade City, Taoyuan County 334, Taiwan R.O.C. Tel：+886-3-2710188 / Fax：+886-3-2710190 Taiwan Accreditation Foundation accreditation number: 1330 http://www.atl-lab.com.tw/e-index.htm

The above equipment was tested by A Test Lab Techno Corp. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2009 and the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 22H, Part 24E.
The test results of this report relate only to the tested sample identified in this report.

Approved By	:		Reviewed By	:	
(Manager)		(Murphy Wang)	(Testing Engineer)		(Fly Lu)

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1 General Information

1.1. EUT Description

Applicant	CONNECTED HOLDINGS LLC			
Applicant Address	4740 VON KARMAN AVENUE, SUITE 120, NEWPORT BEACH, CA 92660, USA			
Manufacturer	SHENZHEN EELINK COMMUNICATION TECHNOLOGY CO., LTD			
Manufacturer Address	FLOOR 3, YUYANG BUILDING, LANGSHAN 2ND ROAD, NANSHAN DISTRICT, SHENZHEN, CHINA			
Product Type	GPS TRACKER			
Trade Name	N/A			
Model Number	ARROW-G			
FCC ID	2AEB4ARROWG01			
IMEI No.	352165051623520			
GPRS	Band	UL Frequency (MHz)	DL Frequency (MHz)	Modulation
	850	824.2 ~ 848.8	869.2 ~ 893.8	GMSK
	1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8	GMSK
Channel Control	Auto			
Type of Antenna	Internal Antenna			
Max. RF Output power	GPRS 850 : 31.92 dBm / 1.56 W			
	GPRS 1900 : 29.03 dBm / 0.80 W			
Max. ERP/EIRP	GPRS 850 : 29.76 dBm / 0.95 W			
	GPRS 1900 : 27.49 dBm / 0.56 W			
Emission Designator	GPRS 850 : 242KGXW			
	GPRS 1900 : 245KGXW			

1.2. Mode of Operation

ATL has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

Test Mode
Mode 1: GPRS 850 Link Mode
Mode 2: GPRS 1900 Link Mode
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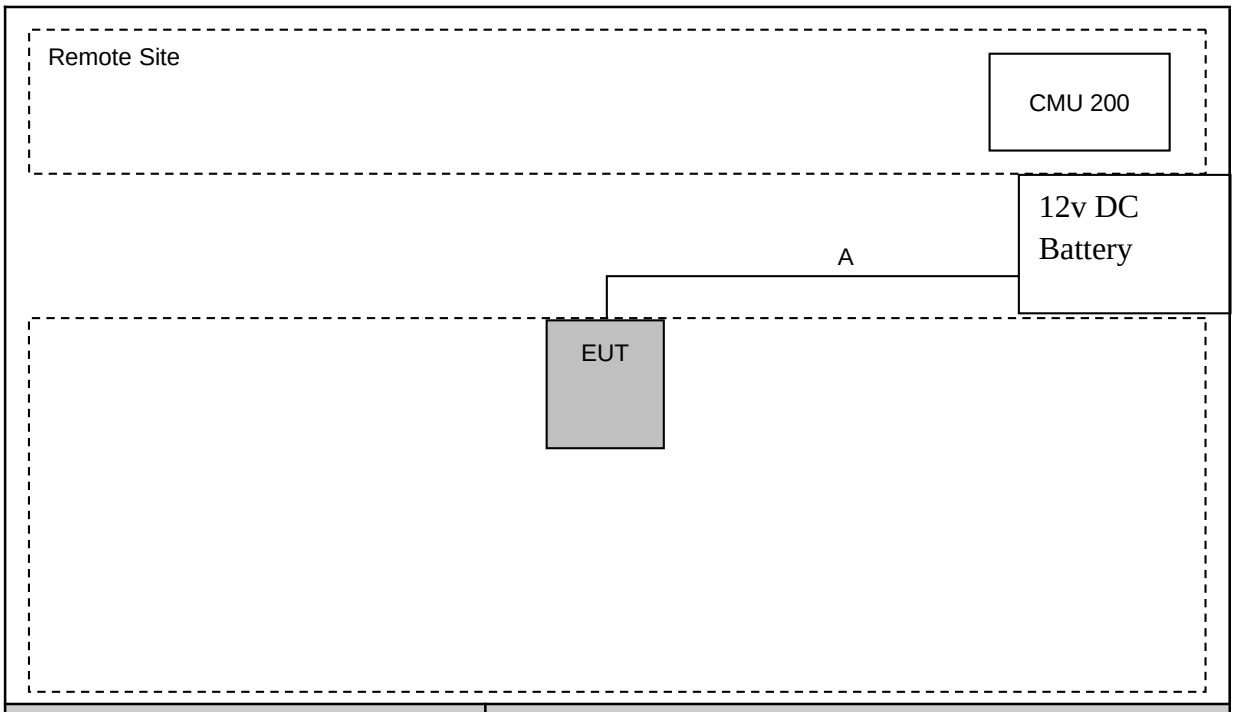
Note: Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that “X axis” position was the worst, then the final test was executed the worst condition and test data were recorded in this report.

1.3. EUT Exercise Software

1	Setup the EUT and Base Station (CMU200) as shown on 1.4.
2	Turn on the power of all equipment.

1.4. Configuration of Test System Details



Signal Cable Type		Signal Cable Description
A	Power cable	Unshielded, 0.4 m
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Devices Description					
Product		Manufacturer	Model Number	Serial Number	Power Cord
1.	Battery	Panasonic	LC-RA127R2	-----	-----

1.5. Test Site Environment

Items	Required (IEC 60068-1)	Actual
Temperature (°C)	15-35	26
Humidity (%RH)	25-75	60
Barometric pressure (mbar)	860-1060	950

1.6. Summary of Test Result

Description	FCC Rule	Limit	Result
Conducted Output Power	§2.1046	N/A	Pass
Effective Radiated Power	§22.913(a)(2)	< 7 Watts for FCC (<6.3 Watts for IC)	Pass
Equivalent Isotropic Radiated Power	§24.232(c)	< 2 Watts	Pass
Emission Bandwidth & Occupied Bandwidth	§2.1049 §22.917(a) §24.238(a)	N/A	Pass
Band Edge Measurement	§2.1051 §22.917(a) §24.238(a)	< $43+10\log_{10}(P[Watts])$	Pass
Conducted Spurious Emission	§2.1051 §22.917(a) §24.238(a)	< $43+10\log_{10}(P[Watts])$	Pass
Field Strength of Spurious Radiation	§2.1053 §22.917(a) §24.238(a)	< $43+10\log_{10}(P[Watts])$	Pass
Frequency Stability for Temperature & Voltage	§2.1055 §22.355 §24.235	< 2.5 ppm	Pass

2 RF Output Power Test

2.1. Limit

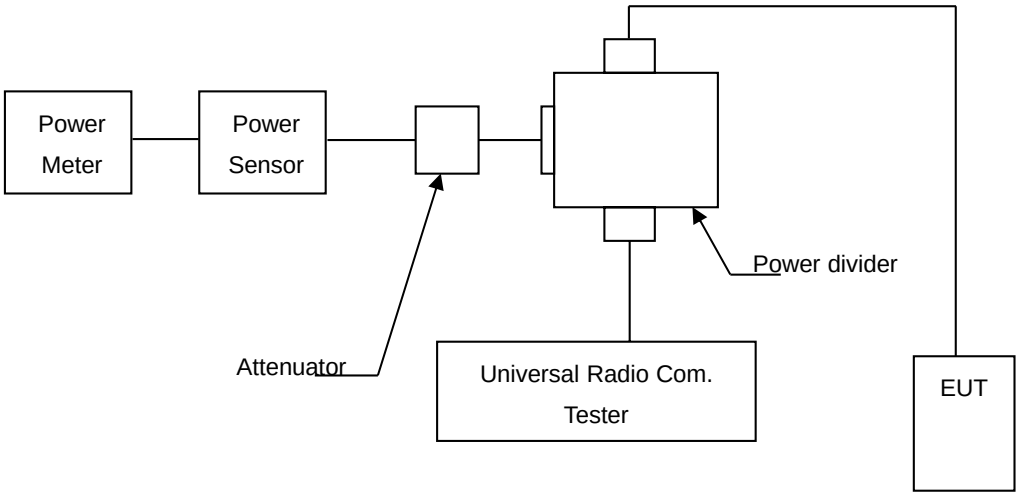
N/A

2.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	08/07/2014	(1)
Single Channel PK Power Sensor	Agilent	N1911A	MY45101619	12/21/2014	(1)
Wideband Power Meter	Agilent	N1921A	MY45241957	12/21/2014	(1)
RF cable	WOKEN	--	S02-140512-011	07/14/2014	(1)
RF cable	WOKEN	--	S02-140512-018	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-045	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-049	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-041	07/14/2014	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.
Note: N.C.R. = No Calibration Request.

2.3. Test Setup



2.4. Test Procedure

The measurement is made according to ANSI/TIA-603-C-2004 as follows:

1. The transmitter output was connected to power meter and base station through Power Divider.
2. Set base station for EUT at GSM 850: PCL=5 and PCS 1900: PCL=0.
3. Select lowest, middle, and highest channels for each band.

2.5. Uncertainty

The measurement uncertainty is defined as for RF output power measurement is 1.2 dB.

2.6. Test Result

Model Number	ARROW-G						
Test Item	RF Output Power						
Date of Test	3/05/2015			Test Site		TE05	
Bands	Modulation Type	Data Rate	Frequency (MHz)	Burst Average Power		Peak Power	
				(dBm)	(W)	(dBm)	(W)
GRRS 850 Multi Class :33 Max Up:4 Max Down:5 Sum:6	GMSK	4Down1Up (Duty Factor 1/8)	824.2	31.14	1.30	31.78	1.51
			836.6	**31.25**	**1.33**	**31.92**	**1.56**
			848.8	31.09	1.29	31.55	1.43
		3Down2Up (Duty Factor 2/8)	824.2	30.89	1.23	31.05	1.27
			836.6	30.24	1.06	30.66	1.44
			848.8	30.08	1.02	30.81	1.21
		2Down3Up (Duty Factor 3/8)	824.2	29.92	0.98	30.04	1.01
			836.6	29.15	0.82	29.87	0.97
			848.8	29.09	0.81	29.85	0.97
		1Down4Up (Duty Factor 4/8)	824.2	28.91	0.78	29.07	0.81
			836.6	28.33	0.68	29.02	0.80
			848.8	28.75	0.64	29.16	0.82
GRRS 1900 Multi Class :33 Max Up:4 Max Down:5 Sum:6	GMSK	4Down1Up (Duty Factor 1/8)	1850.20	28.52	0.71	28.92	0.78
			1880.00	28.66	0.73	28.71	0.74
			1909.80	**28.71**	**0.74**	**29.03**	**0.80**
		3Down2Up (Duty Factor 2/8)	1850.20	27.25	0.53	27.88	0.61
			1880.00	27.04	0.51	27.63	0.58
			1909.80	27.11	0.51	27.91	0.62
		2Down3Up (Duty Factor 3/8)	1850.20	26.54	0.45	26.68	0.47
			1880.00	26.14	0.41	27.03	0.50
			1909.80	26.25	0.42	26.87	0.49
		1Down4Up (Duty Factor 4/8)	1850.20	25.48	0.35	25.96	0.39
			1880.00	25.44	0.35	25.88	0.39
			1909.80	25.12	0.33	25.64	0.37

Note: The peak power testing result was used peak detector.

3 CCDF Procedure for PAPR

3.1. Limit:

In addition, the transmitter’s peak-to-average power ratio (PAPR) shall not exceed 13 dB.

3.2. Test Procedure:

Use one of the procedures presented in 4.1 to measure the total peak power and record as PPk. Use one of the applicable procedures presented 4.2 to measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from: PAPR (dB) = PPk (dBm) - PAvg (dBm).

3.3. Test result

	Ch.	Frequency(MHZ)	PAPR	Limit(dB)
GPRS850	128	824.2	0.64	13
	190	836.6	0.72	13
	251	848.8	0.76	13
GPRS1900	Ch.	Frequency	PAPR	limit
	512	1850.2	0.63	13
	690	1880.0	0.89	13
	810	1909.8	0.80	13

4 Effective Radiated Power / Equivalent Isotropic Radiated Power Test

4.1. Limit

For FCC Part 22.913(a)(2): The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

For FCC Part 24.232(b): The EIRP of mobile transmitters and auxiliary test transmitters must not exceed 2 Watts.

4.2. Test Instruments

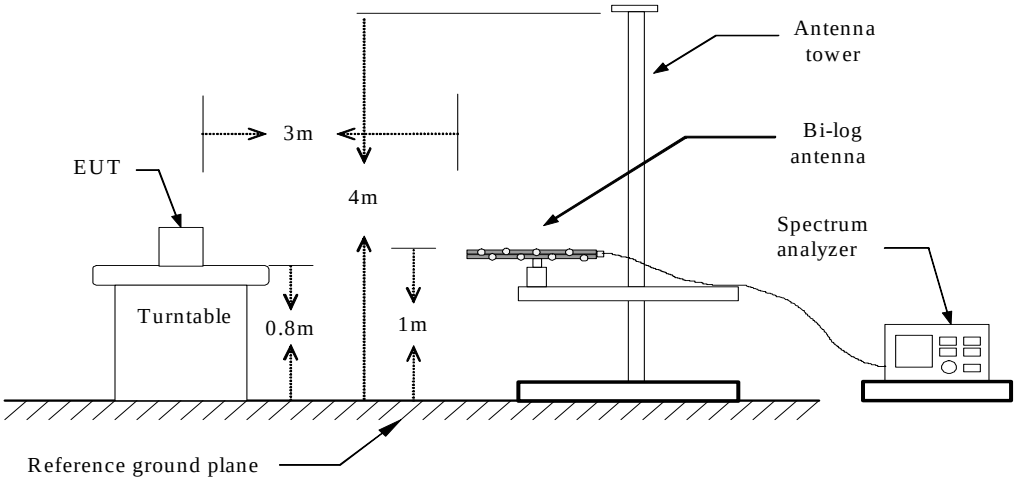
3 Meter Chamber (966-A)					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/10/2015	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/10/2015	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/21/2015	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/21/2015	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	07/16/2014	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/10/2014	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	06/13/2014	(1)
RF cable	WOKEN	--	S02-140409-026	07/14/2014	(1)
RF cable	WOKEN	--	S02-140409-027	07/14/2014	(1)
RF cable	WOKEN	--	S02-140409-028	07/14/2014	(1)
RF cable	WOKEN	--	S02-140409-052	07/14/2014	(1)
Test Site	ATL	TE01	888001	08/28/2014	(1)
3 Meter Chamber (966-B)					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY46181986	05/16/2014	(1)
Amplifier	Mini-Circuits	ZKL-1R5+	N/A	05/29/2014	(1)
Amplifier	Mini-Circuits	ZVA-213-S+	N/A	05/29/2014	(1)
RF Pre-selector	Agilent	N9039A	MY46520255	05/10/2014	(1)
Trilog-Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	SB AC VULB	9168-419	05/16/2014	(1)
Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00128055	08/09/2014	(1)
RF cable	WOKEN	--	S02-140512-09	07/14/2014	(1)
RF cable	WOKEN	--	S02-140512-021	07/14/2014	(1)
RF cable	WOKEN	--	S02-140512-022	07/14/2014	(1)
Test Site	ATL	TE09	TE09	05/11/2014	(1)

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.

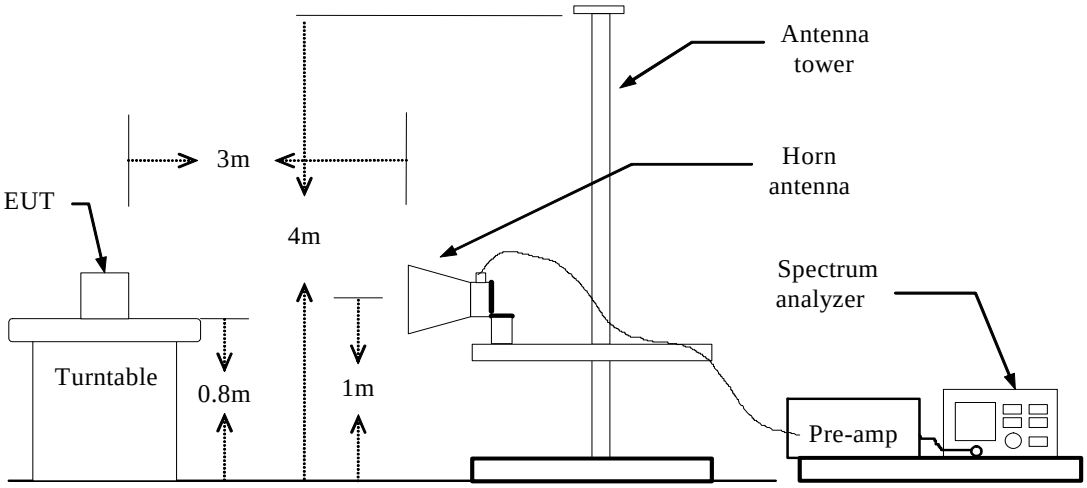
Note: N.C.R. = No Calibration Request.

4.3. Setup

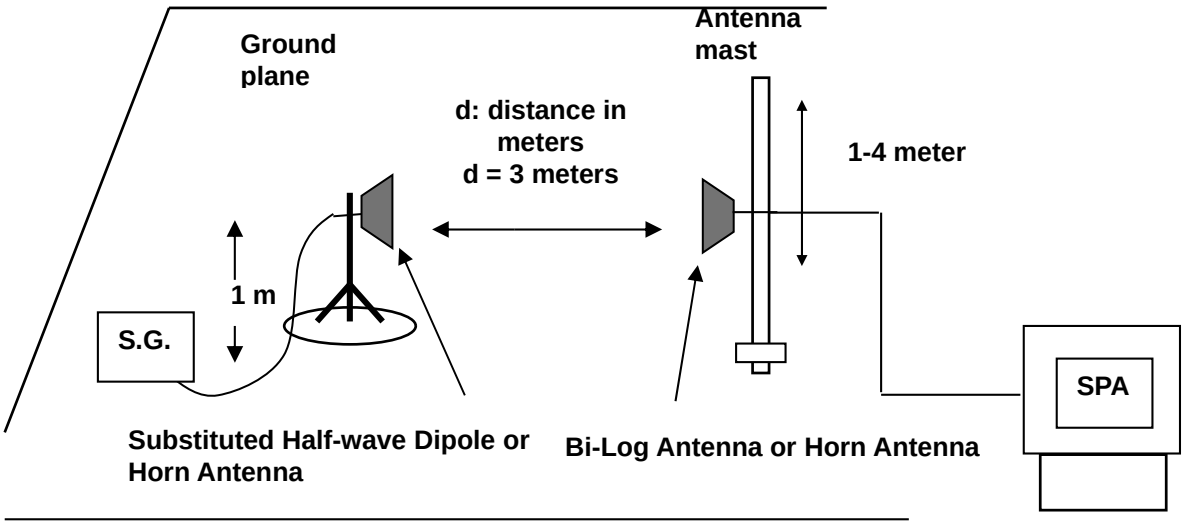
Below 1 GHz



Above 1 GHz



For Substituted Method Test Set-UP



4.4. Test Procedure

The measurement is made according to ANSI/TIA-603-C-2004 as follows:

The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.

During the measurement of the EUT, the resolution bandwidth was set to 3MHz and the average bandwidth was set to 3MHz. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna. The reading was recorded and the field strength (E in dBuV/m) was calculated.

ERP in frequency band 824-849MHz, and EIRP in frequency band 1851.25 –1910MHz were measured using a substitution method. The EUT was replaced by half-wave dipole (824-849MHz) or horn antenna (1851.25-1910MHz) connected to a signal generator. The spectrum analyzer reading was recorded and ERP/EIRP was calculated as follows:

ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable (dB)

EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable (dB)

4.5. Uncertainty

The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is ± 3.072 dB.

4.6. Test Result

Model Number	ARROW-G							
Test Item	ERP/EIRP							
Date of Test	03/10/2015					Test Site	TE01	
Bands	Modulation Type	Frequency (MHz)	Ant. Polar.	Read Level (dBm)	Correction Factor (dBm)	ERP		Limit
						(dBm)	(W)	
GPRS 850	GMSK	824.2	H	16.55	10.81	25.21	0.33	< 7W
			V	21.10	10.81	29.76	0.95	< 7W
		836.6	H	17.38	10.82	26.05	0.40	< 7W
			V	20.42	10.82	29.09	0.81	< 7W
		848.8	H	17.14	10.90	25.89	0.39	< 7W
			V	20.77	10.90	29.52	0.90	< 7W

Model Number	ARROW-G							
Test Item	ERP/EIRP							
Date of Test	03/10/2015					Test Site	TE01	
Bands	Modulation Type	Frequency (MHz)	Ant. Polar.	Read Level (dBm)	Correction Factor (dBm)	EIRP		Limit
						(dBm)	(W)	
GPRS 1900	GMSK	1850.20	H	17.45	6.33	23.78	0.24	< 2W
			V	21.16	6.33	27.49	0.56	< 2W
		1880.00	H	17.26	6.55	23.81	0.24	< 2W
			V	20.42	6.55	26.97	0.50	< 2W
		1909.80	H	15.72	8.50	24.22	0.26	< 2W
			V	20.34	6.79	27.13	0.52	< 2W

Note: 1. ERP/EIRP = Read Level + Correction factor.

2. For GPRS signals, a peak detector is used, with RBW = VBW= 1 MHz.

5 Emission Bandwidth & Occupied Bandwidth Test

5.1. Limit

The Occupied Bandwidth Limit:

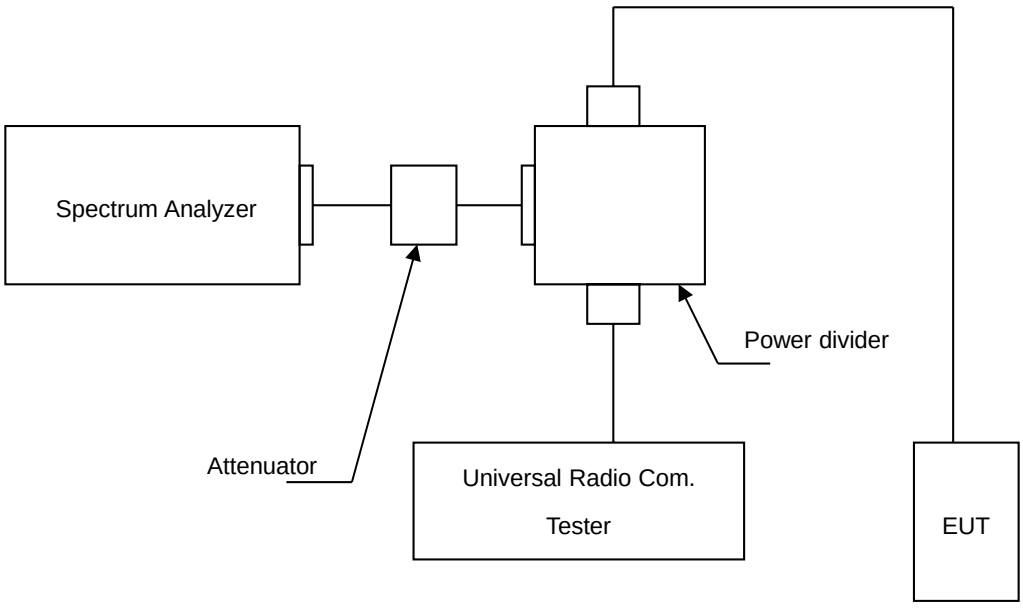
N/A.

5.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	08/07/2014	(1)
Spectrum Analyzer	Agilent	N9020A	MY53420615	05/16/2014	(1)
Attenuator	RADIALL	R41572000	0603033073	N.C.R.	-----
Power Divider	Agilent	87302C	3239A00760	N.C.R.	-----
RF cable	WOKEN	--	S02-140512-011	07/14/2014	(1)
RF cable	WOKEN	--	S02-140512-018	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-045	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-049	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-041	07/14/2014	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.
Note: N.C.R. = No Calibration Request.

5.3. Setup



5.4. Test Procedure

The measurement is made according to FCC rules part 22 and 24:

1. The EUT was connected to Spectrum Analyzer and Base Station via Power Divider.
2. The occupied bandwidth of middle channel for the highest and lowest RF powers was measured.

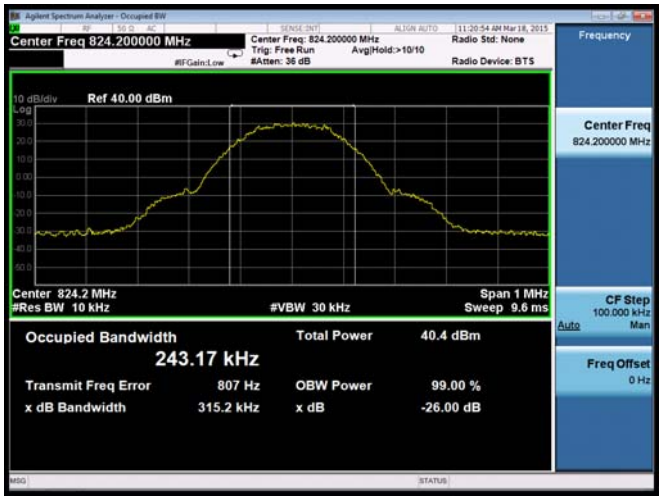
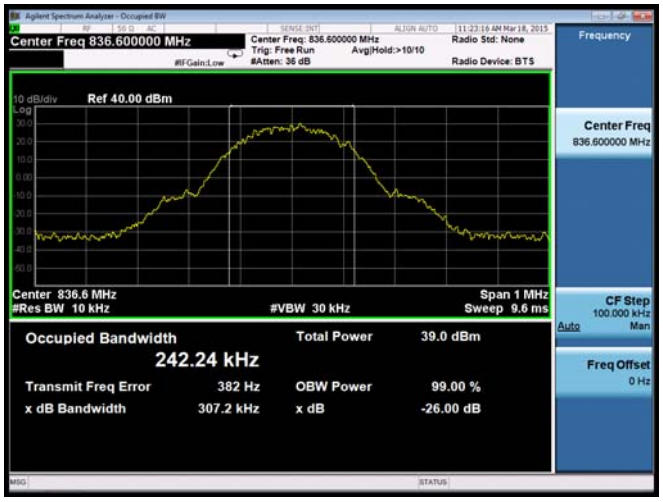
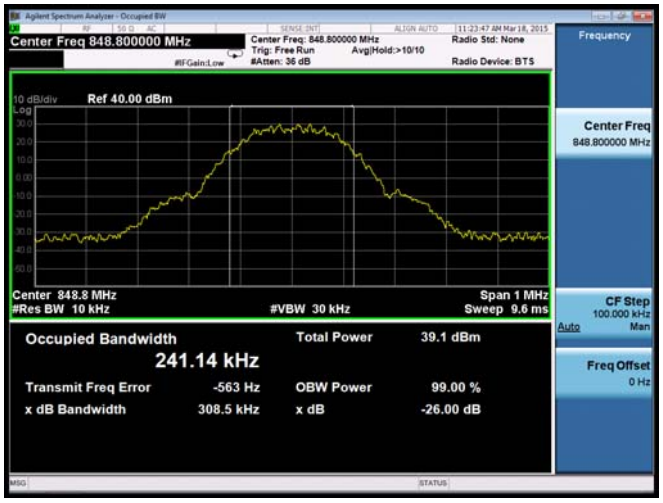
5.5. Uncertainty

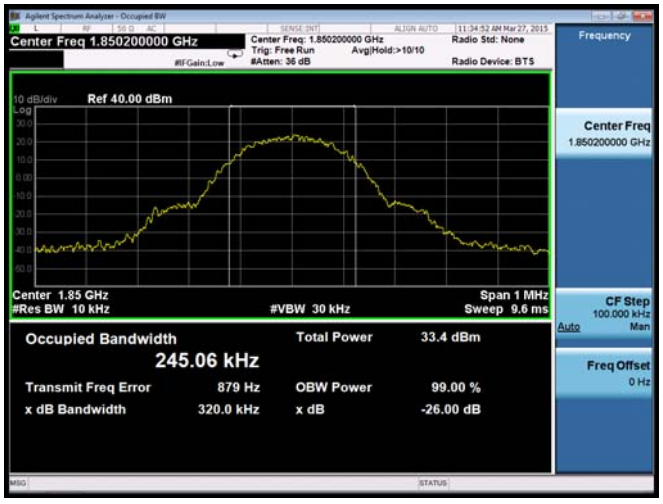
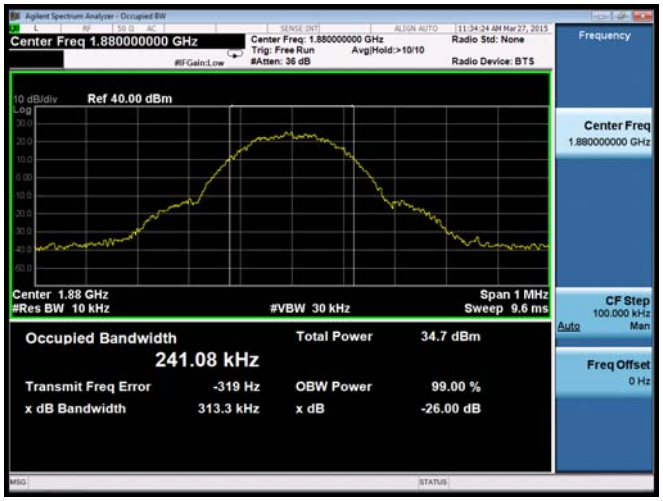
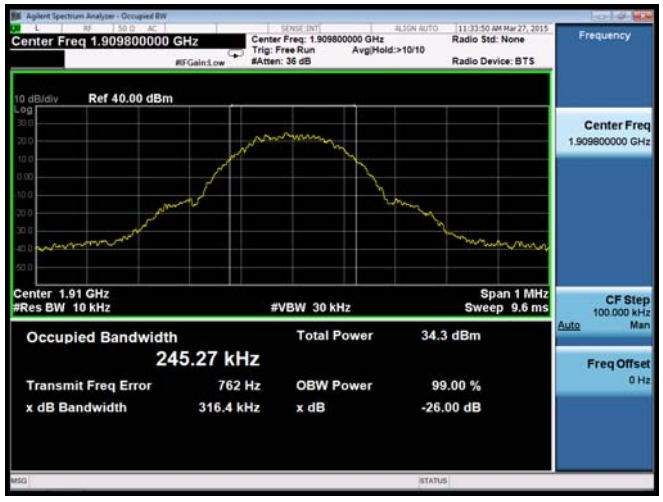
The measurement uncertainty is defined as ± 10Hz

5.6. Test Result

Model Number	ARROW-G					
Test Item	Emission Bandwidth & Occupied Bandwidth					
Date of Test	03/27/2015				Test Site	TE05
Bands	Channel	Frequency (MHz)	-26dB Bandwidth (kHz)	99% Bandwidth (kHz)	Note	
GPRS 850	128	824.2	315.2	243.17	RBW:10KHz , VBW:30KHz	
	190	836.6	307.2	242.24	RBW:10KHz , VBW:30KHz	
	251	848.8	308.5	241.14	RBW:10KHz , VBW:30KHz	
GPRS 1900	512	1850.20	320.0	245.06	RBW:10KHz , VBW:30KHz	
	661	1880.00	313.3	241.08	RBW:10KHz , VBW:30KHz	
	810	1909.80	316.4	245.27	RBW:10KHz , VBW:30KHz	

5.7. Test Graphs

Mode 1: GPRS 850 Link Mode	
824.2 MHz	
836.6 MHz	
848.8 MHz	

Mode 2: GPRS 1900 Link Mode	
1850.20 MHz	
1880.00 MHz	
1909.80 MHz	

6 Band Edge Test

6.1. Limit

The Band Edge Limit:

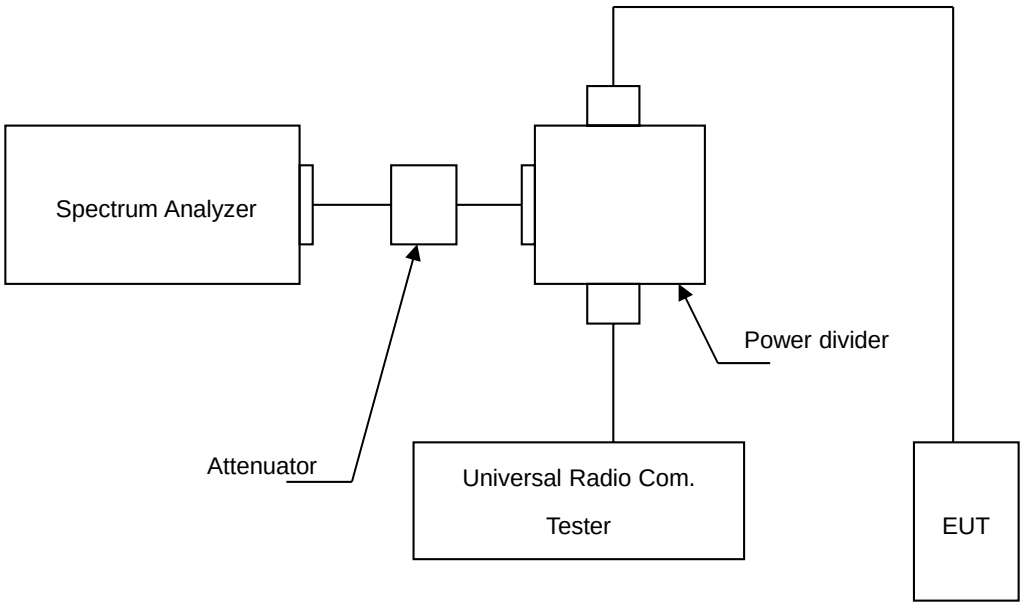
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB.

6.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	08/07/2014	(1)
Spectrum Analyzer	Agilent	N9020A	MY53420615	05/16/2014	(1)
Attenuator	RADIALL	R41572000	0603033073	N.C.R.	-----
Power Divider	Agilent	87302C	3239A00760	N.C.R.	-----
RF cable	WOKEN	--	S02-140512-011	07/14/2014	(1)
RF cable	WOKEN	--	S02-140512-018	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-045	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-049	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-041	07/14/2014	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.
Note: N.C.R. = No Calibration Request.

6.3. Setup



6.4. Test Procedure

The measurement is made according to FCC rules part 22 and 24:

1. The EUT was connected to Spectrum Analyzer and Base Station via Power Divider.
2. The band edge of low and high channels for the highest RF powers within the transmitting frequency band were measured. Setting RBW as roughly BW/100.
3. The band edge setting:

   RB=10 kHz; VB=30 kHz for GSM 850 and PCS 1900.

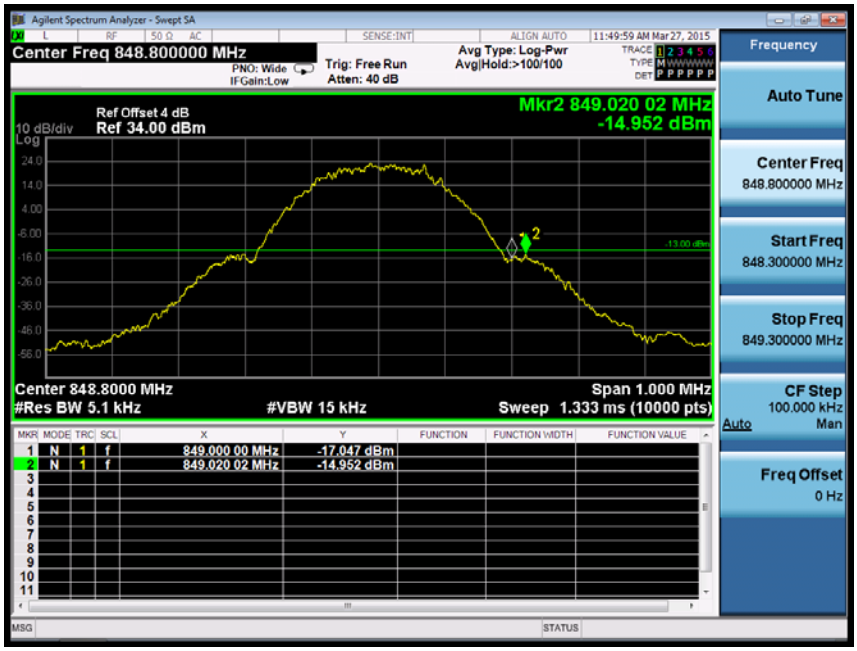
6.5. Uncertainty

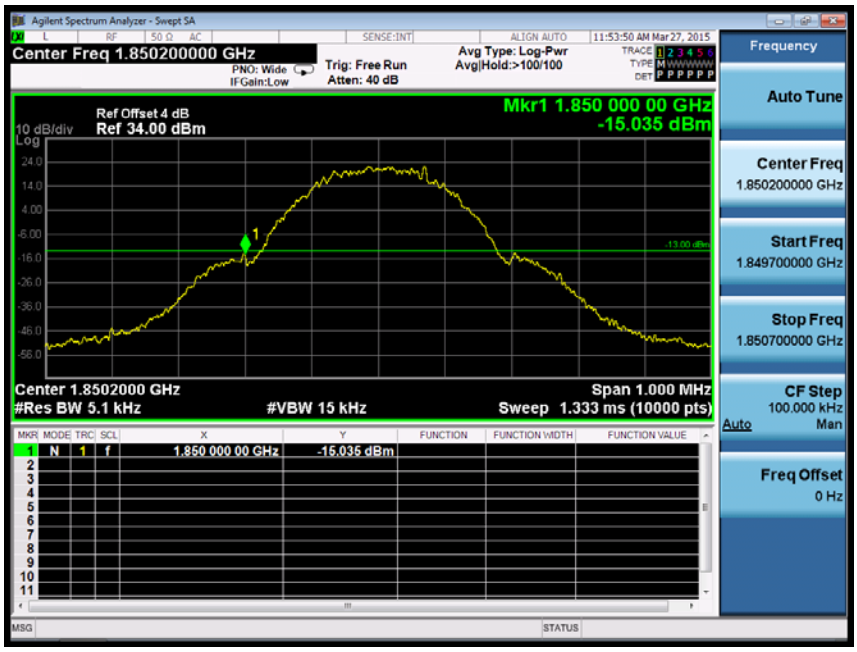
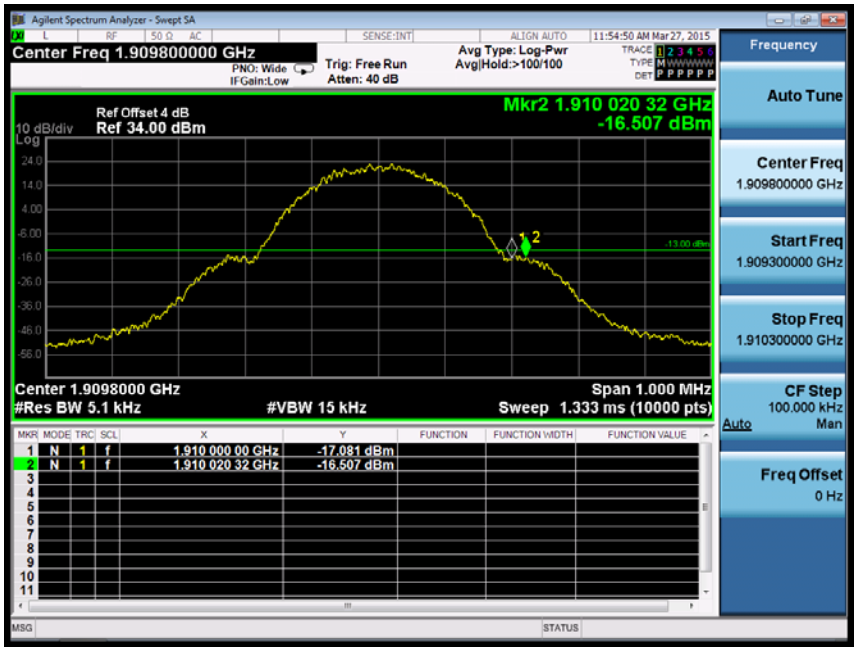
The measurement uncertainty is defined as ± 10Hz

6.6. Test Result

Model Number		ARROW-G				
Test Item		Band Edge				
Date of Test		03/27/2015			Test Site	TE05
Bands		Channel	Frequency (MHz)	Bandedge (dBm)	Limit (dBm)	Result
GPRS 850	Lower	128	824.0000	-14.437	-13	Pass
	Higher	251	849.0000	-17.047	-13	Pass
GPRS 1900	Lower	512	1850.000	-15.035	-13	Pass
	Higher	810	1910.000	-17.081	-13	Pass

6.7. Test Graphs

Mode 1: GPRS 850 Link Mode	
Lower Band	
Higher Band	

Mode 2: GPRS 1900 Link Mode	
Lower Band	
Higher Band	

7 Conducted Spurious Emission Test

7.1. Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10log(P) dB.

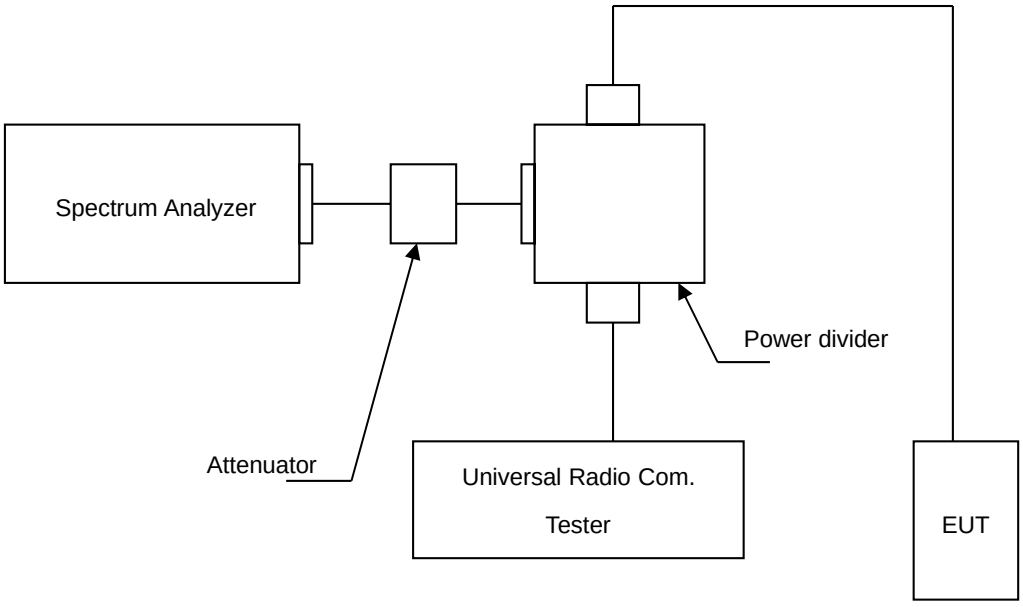
7.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	08/07/2014	(1)
Spectrum Analyzer	Agilent	E4445A	MY46181986	05/16/2014	(1)
Attenuator	RADIALL	R41572000	0603033073	N.C.R.	-----
Power Divider	Agilent	87302C	3239A00760	N.C.R.	-----
RF cable	WOKEN	--	S02-140512-011	07/14/2014	(1)
RF cable	WOKEN	--	S02-140512-018	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-045	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-049	07/14/2014	(1)
RF cable	WOKEN	--	S02-140428-041	07/14/2014	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

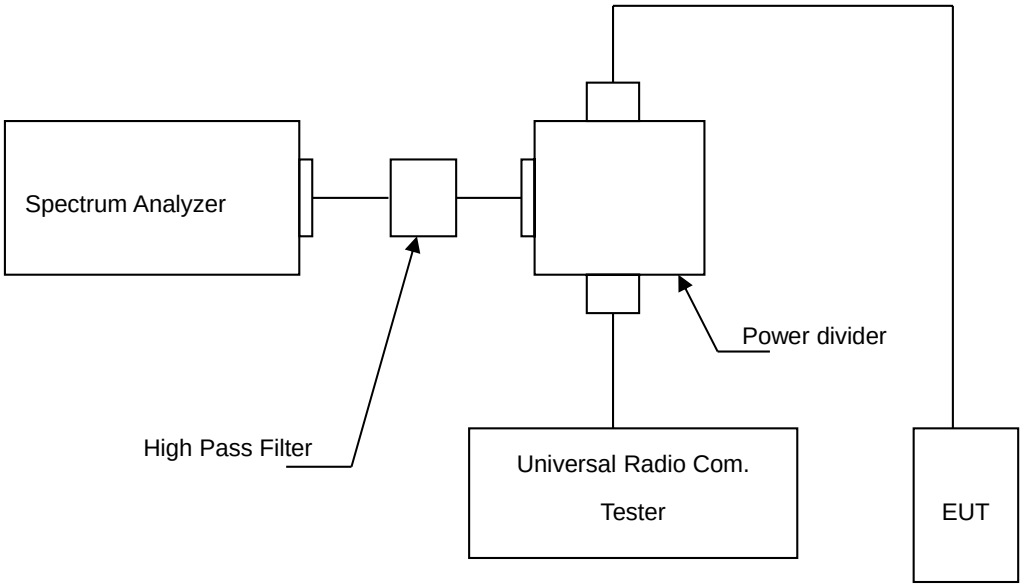
Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.
Note: N.C.R. = No Calibration Request.

7.3. Setup

Below 2.8GHz



Above 2.8GHz



7.4. Test Procedure

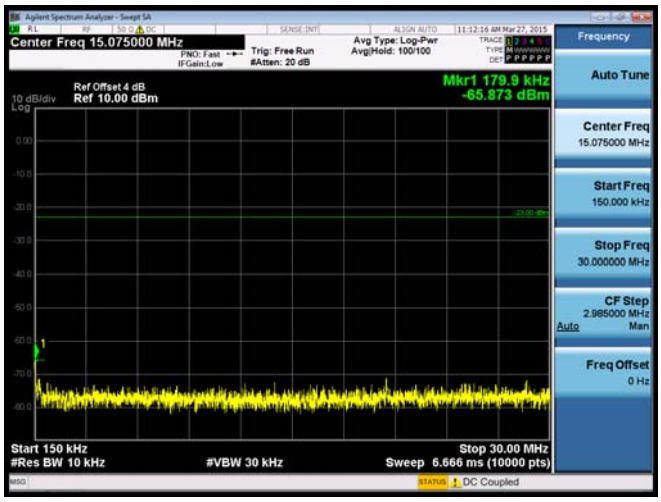
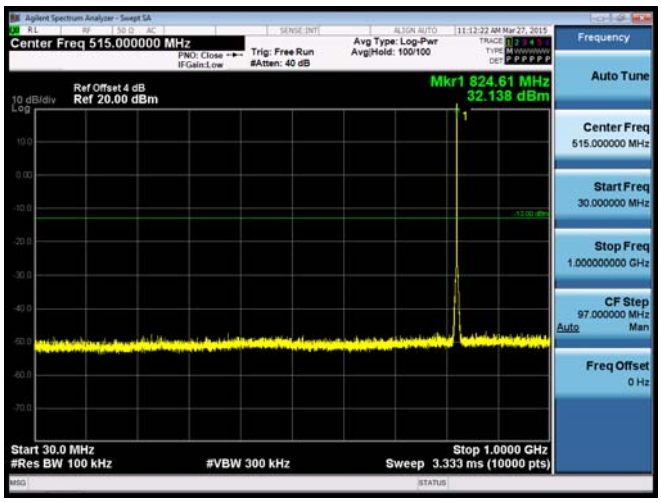
1. The EUT was connected to Spectrum Analyzer and Base Station via Power Divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.
4. Test setting at GSM 850 RB>100 kHz, VB>100 kHz; PCS 1900 RB>1MHz, VB>1MHz.

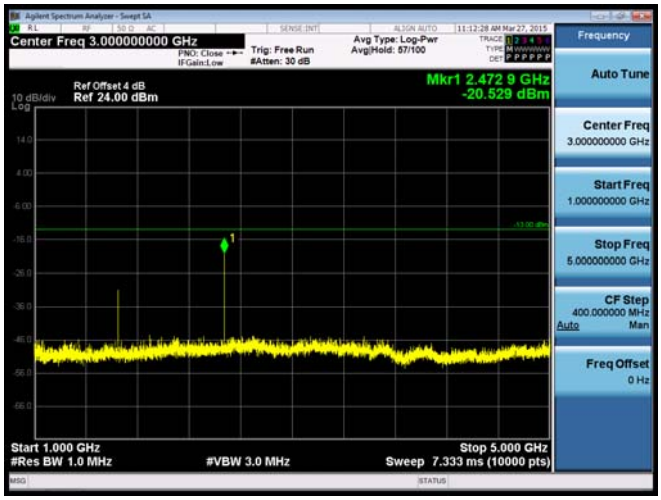
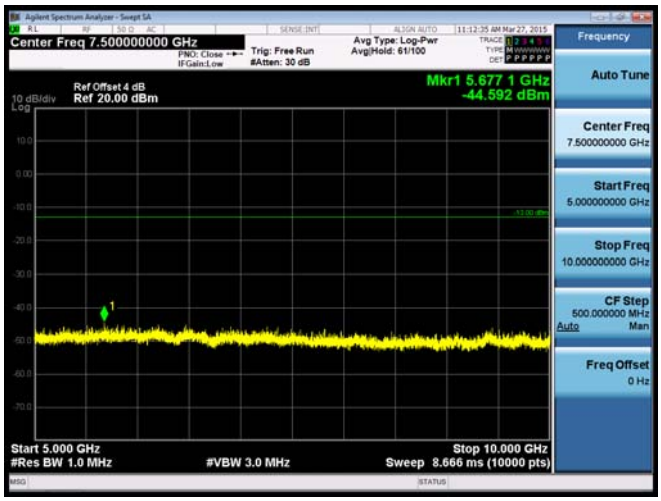
7.5. Uncertainty

The measurement uncertainty is evaluated as ± 2.24 dB.

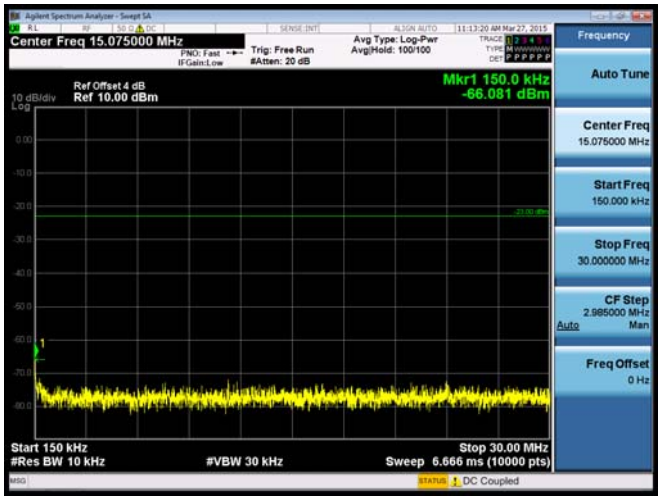
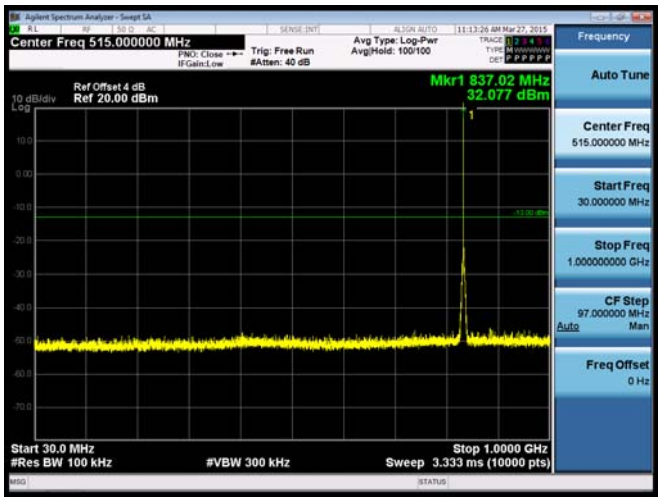
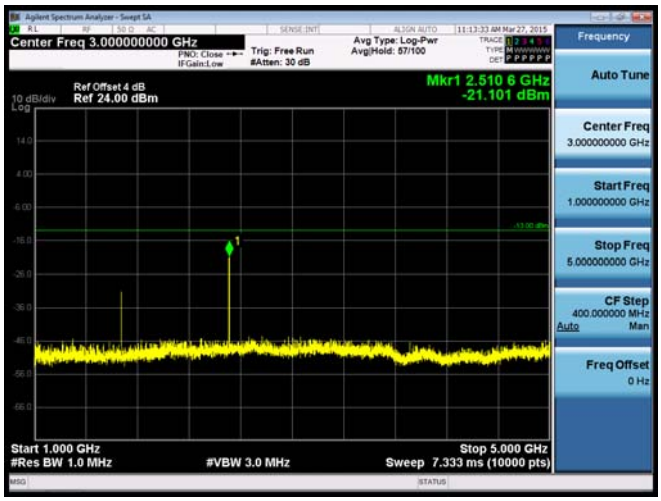
7.6. Test Result

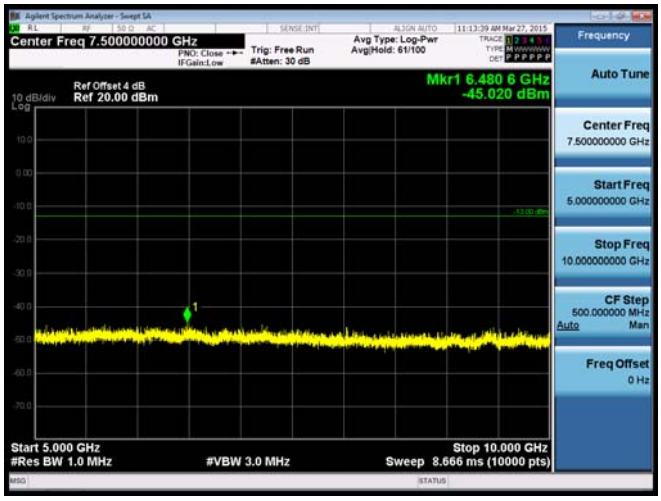
Model Number	ARROW-G		
Test Item	Conducted Spurious Emission		
Test Mode	Mode 1 / Mode 2		
Date of Test	01/16/2015	Test Site	TE05

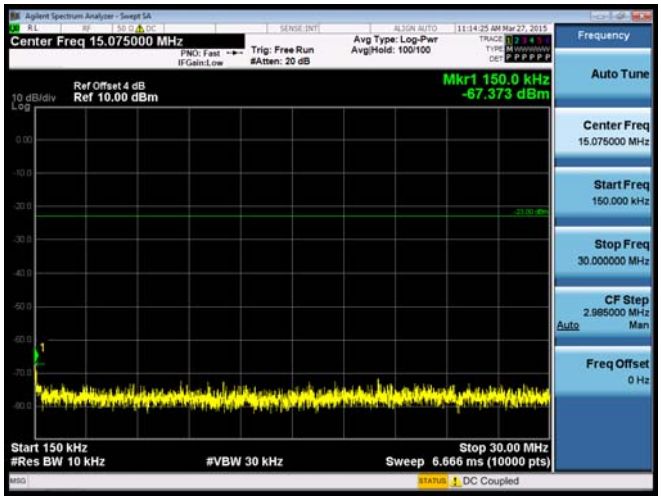
Mode 1: GPRS 850 Link Mode(CH128)	
9kHz-15MHz	
15MHz-30MHz	
30MHz-1GHz	

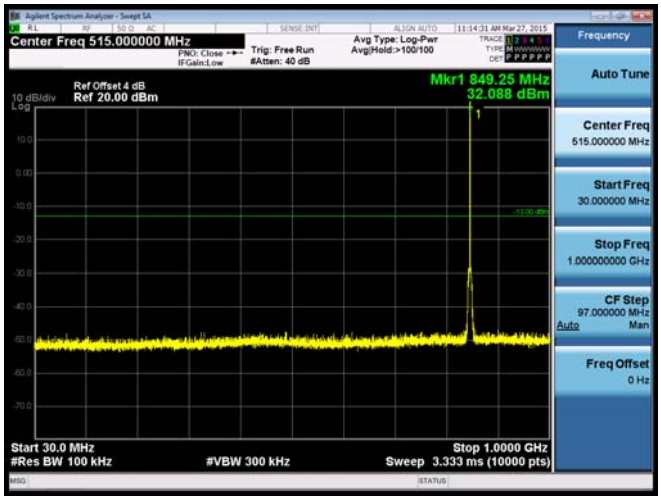
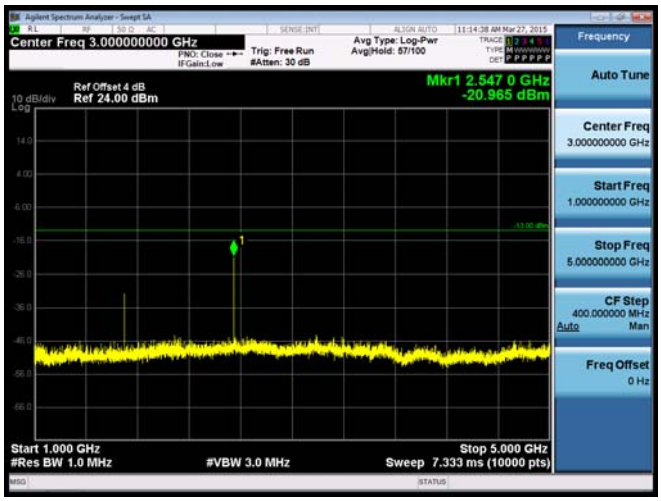
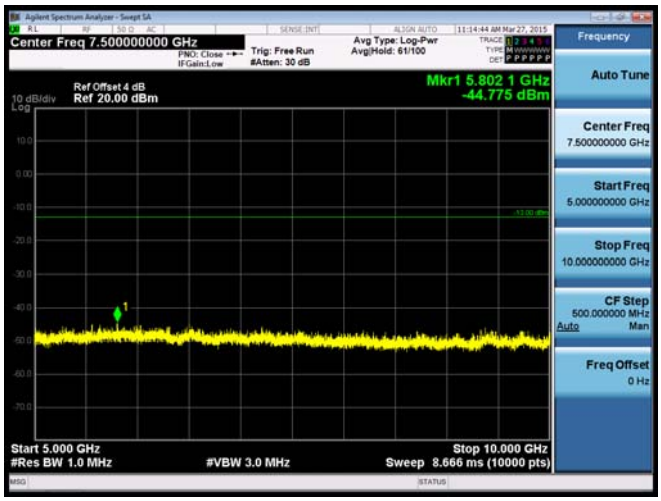
1GHz-5GHz	
5GHz-10GHz	

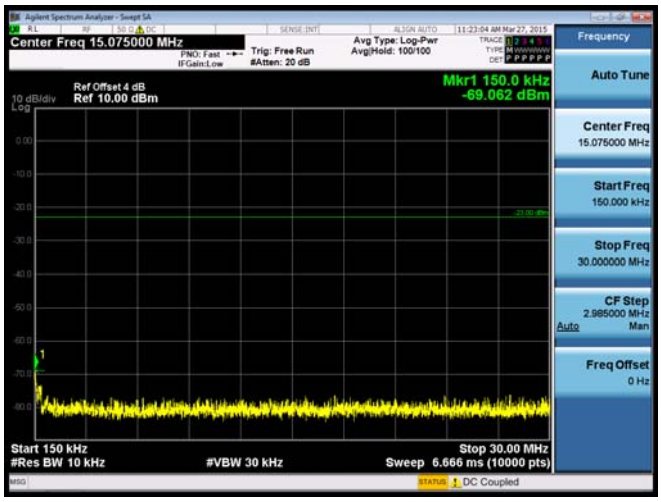
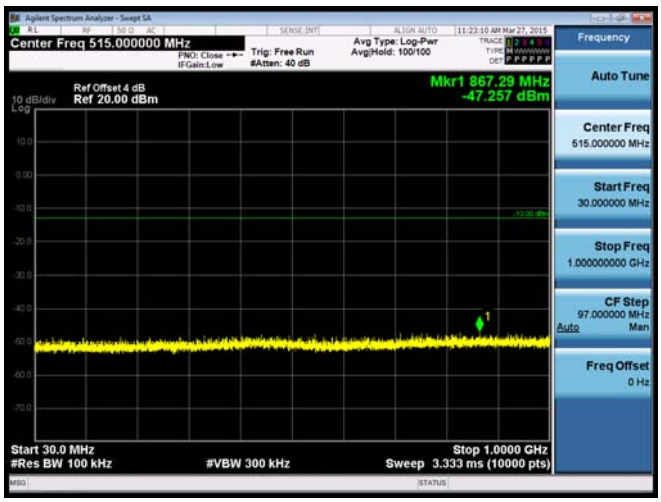
Mode 1: GPRS 850 Link Mode(CH190)	
9kHz-15MHz	

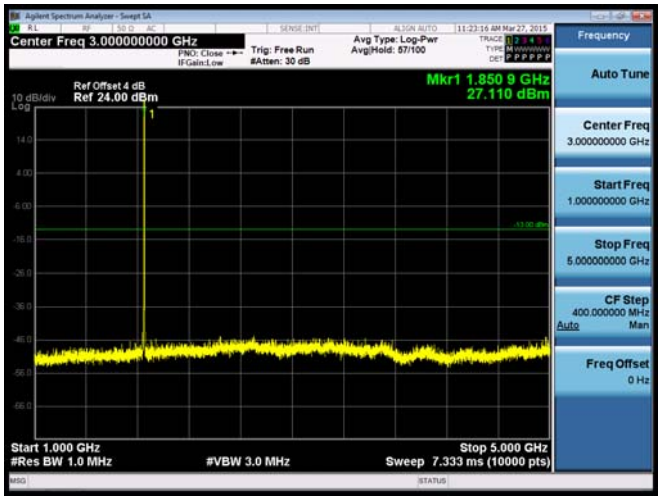
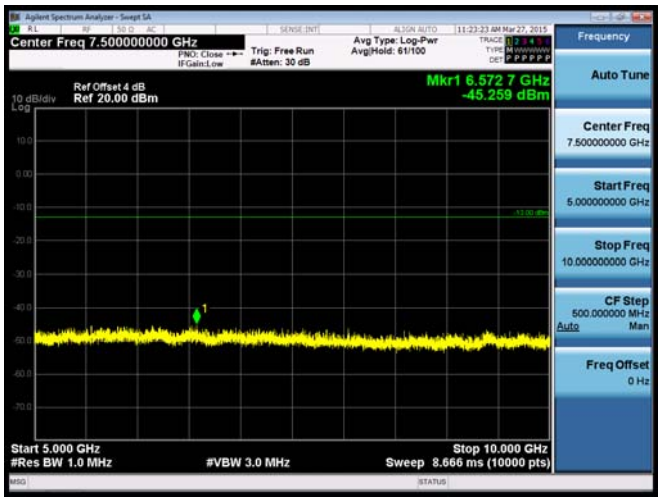
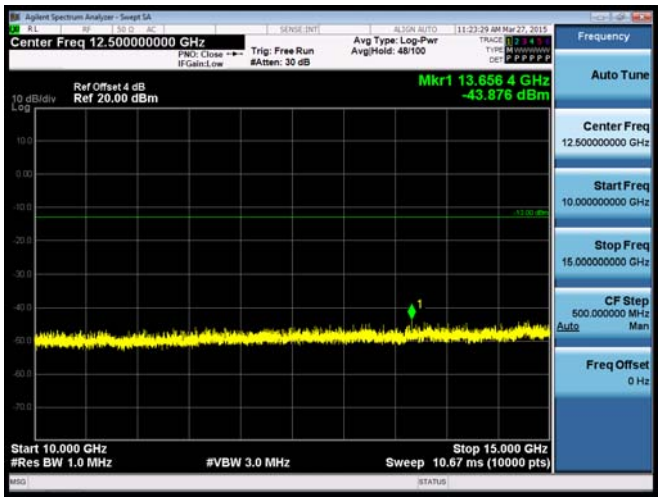
15MHz-30MHz	
30MHz-1GHz	
1GHz-5GHz	

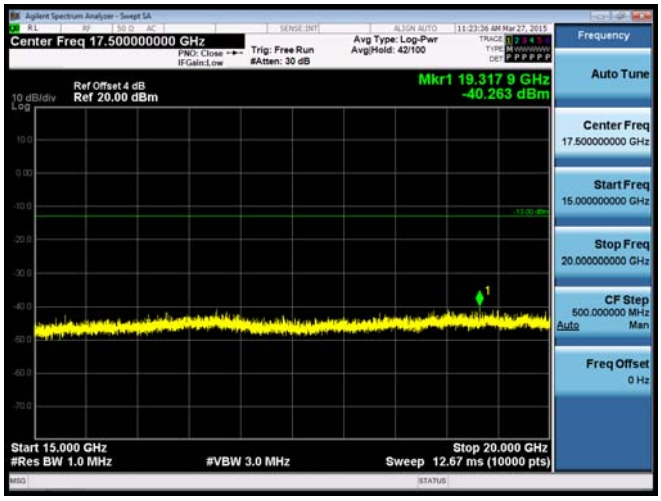
5GHz-10GHz	

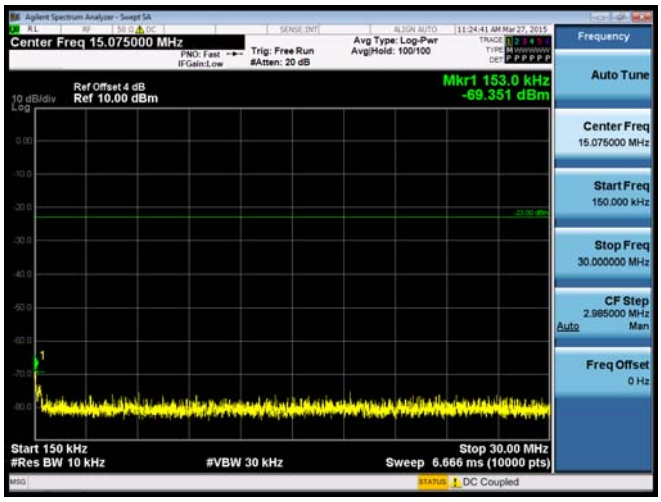
Mode 1: GPRS 850 Link Mode(CH251)	
9kHz-15MHz	
15MHz-30MHz	

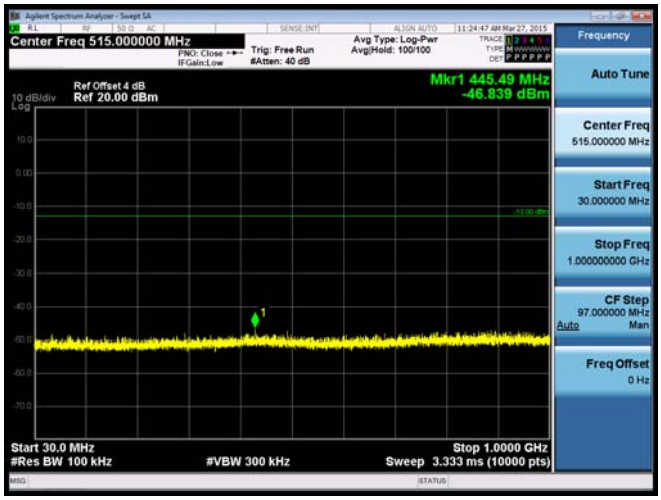
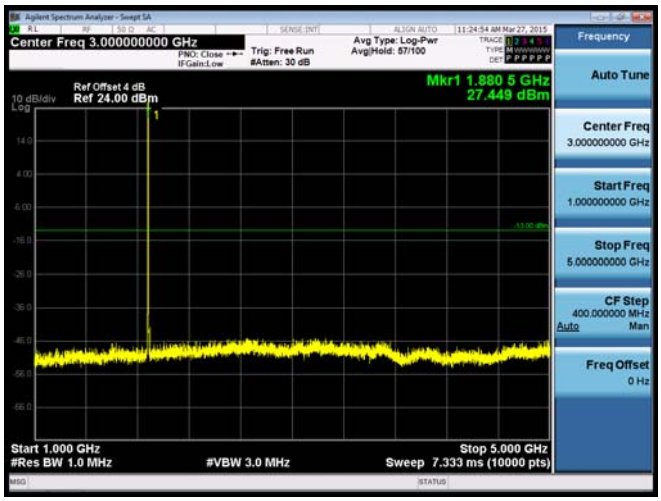
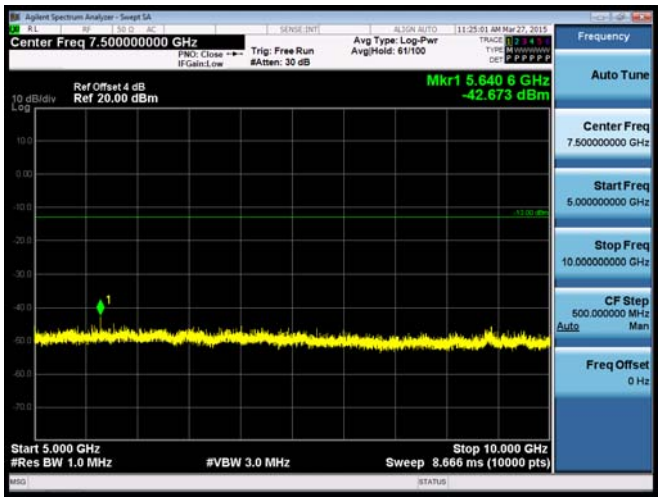
30MHz-1GHz	
1GHz-5GHz	
5GHz-10GHz	

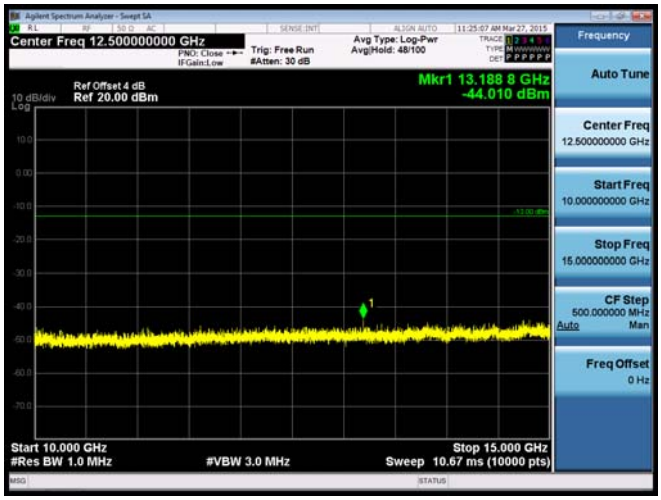
Mode 2: GPRS 1900 Link Mode(CH512)	
9kHz-15MHz	
15MHz-30MHz	
30MHz-1GHz	

1GHz-5GHz	
5GHz-10GHz	
10GHz-15GHz	

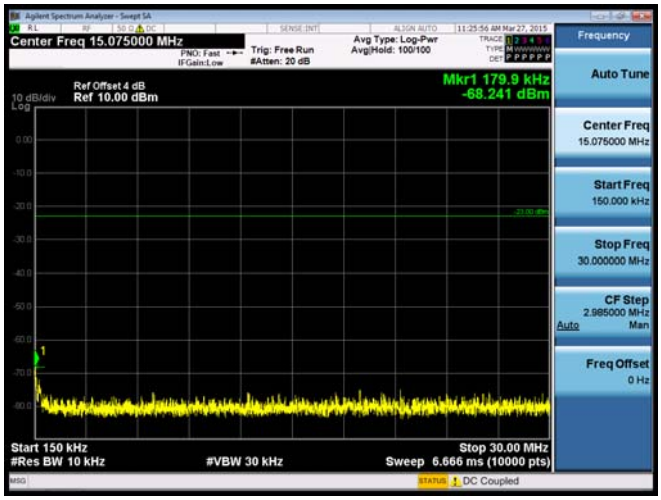
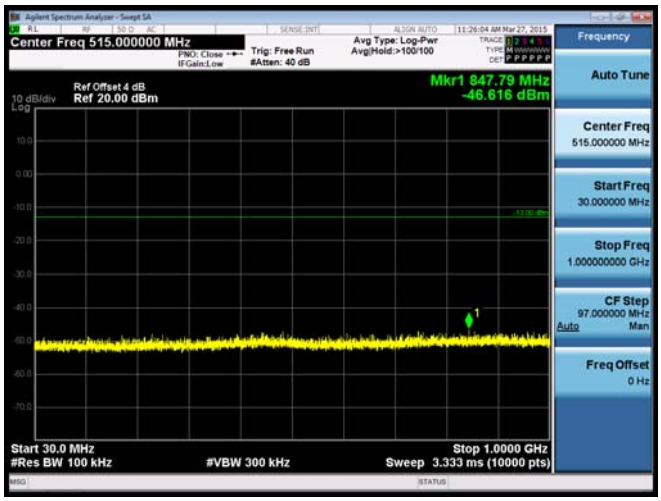
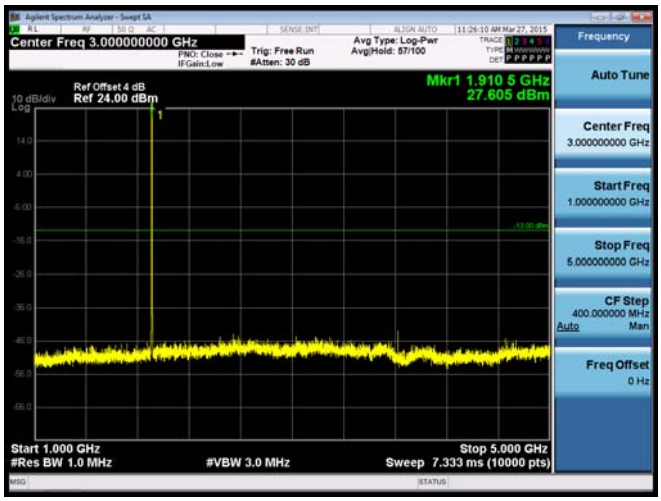
15GHz-20GHz	

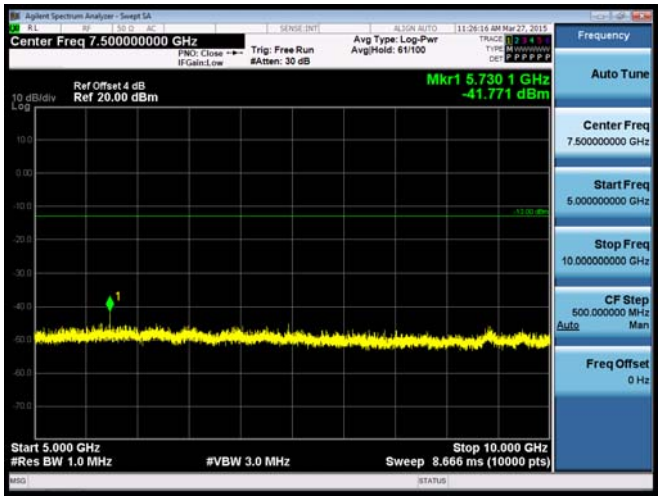
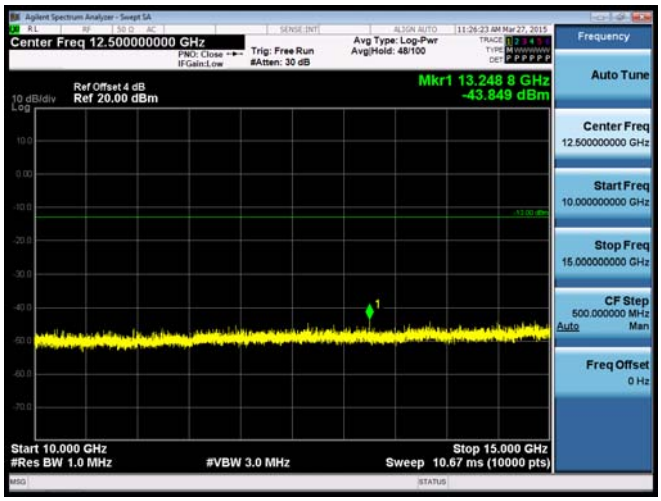
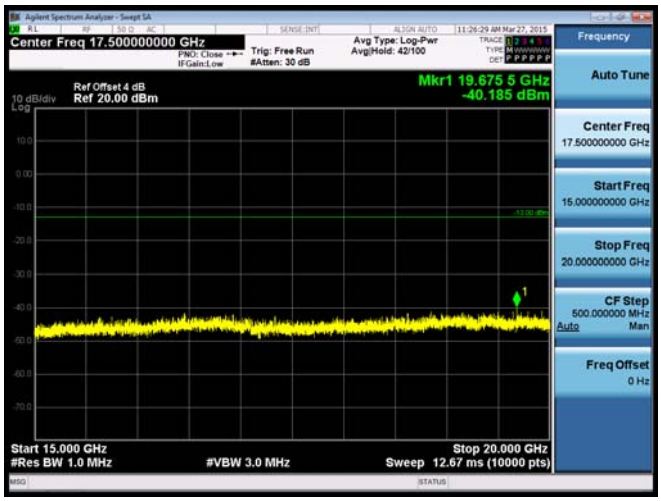
Mode 2 : GPRS 1900 Link Mode(CH661)	
9kHz-15MHz	
15MHz-30MHz	

30MHz-1GHz	
1GHz-5GHz	
5GHz-10GHz	

10GHz-15GHz	
15GHz-20GHz	

Mode 2: GPRS 1900 Link Mode(CH810)	
9kHz-15MHz	

15MHz-30MHz	
30MHz-1GHz	
1GHz-5GHz	

5GHz-10GHz	
10GHz-15GHz	
15GHz-15GHz	

8 Field Strength of Spurious Radiation Test

8.1. Limit

According to 24.238 and 22.917 specify that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

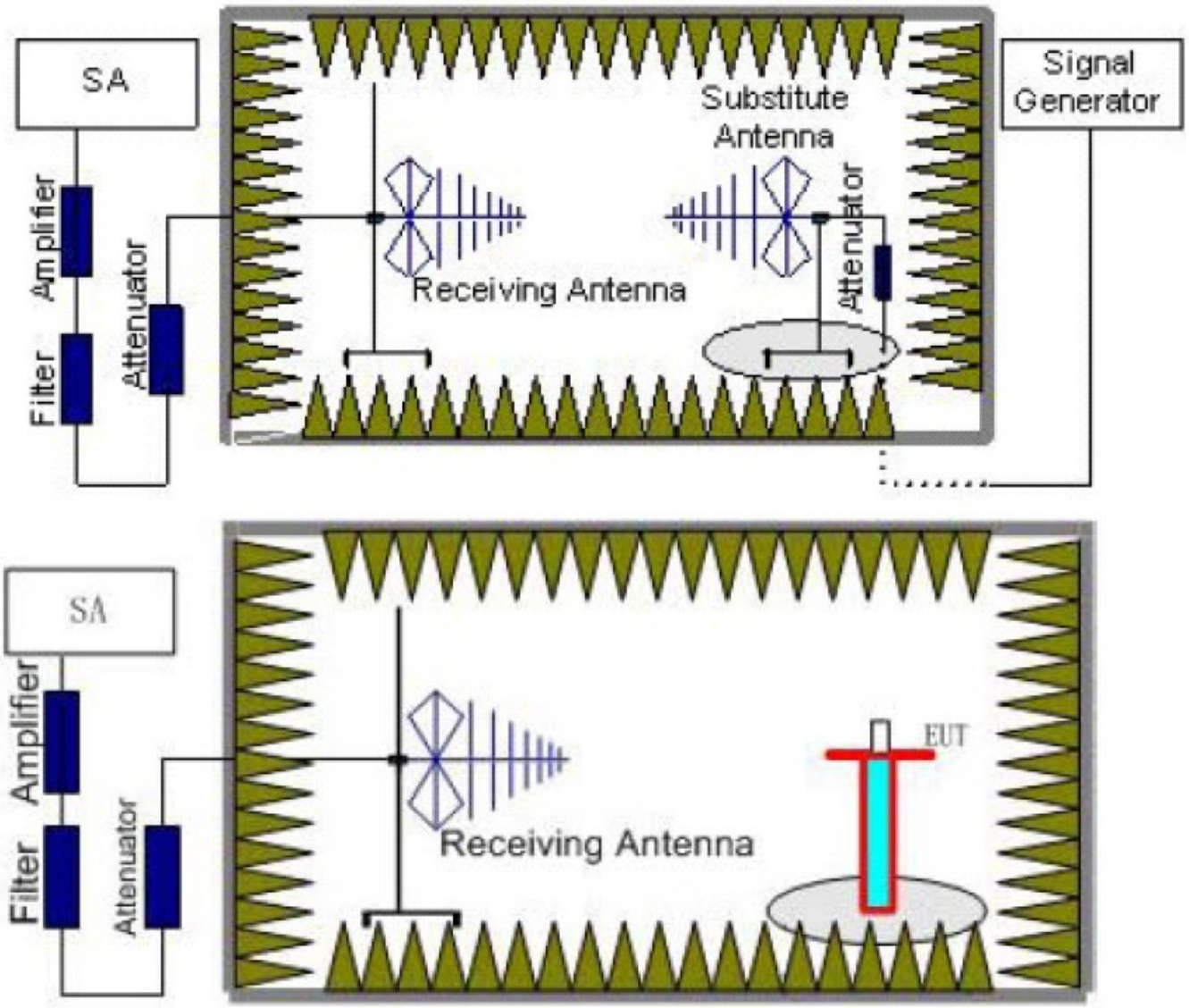
The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

8.2. Test Instruments

3 Meter Chamber (966-A)					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
RF Pre-selector	Agilent	N9039A	MY46520256	01/10/2015	(1)
Spectrum Analyzer	Agilent	E4446A	MY46180578	01/10/2015	(1)
Pre Amplifier	Agilent	8449B	3008A02237	02/21/2015	(1)
Pre Amplifier	Agilent	8447D	2944A10961	02/21/2015	(1)
Broadband Antenna (30MHz~1GHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	9163-270	07/16/2014	(1)
Horn Antenna (1~18GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9120D	9120D-550	06/10/2014	(1)
Horn Antenna (18~40GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA9170	9170-320	06/13/2014	(1)
RF cable	WOKEN	--	S02-140409-026	07/14/2014	(1)
RF cable	WOKEN	--	S02-140409-027	07/14/2014	(1)
RF cable	WOKEN	--	S02-140409-028	07/14/2014	(1)
RF cable	WOKEN	--	S02-140409-052	07/14/2014	(1)
Test Site	ATL	TE01	888001	08/28/2014	(1)
3 Meter Chamber (966-B)					
Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY46181986	05/16/2014	(1)
Amplifier	Mini-Circuits	ZKL-1R5+	N/A	05/29/2014	(1)
Amplifier	Mini-Circuits	ZVA-213-S+	N/A	05/29/2014	(1)
RF Pre-selector	Agilent	N9039A	MY46520255	05/10/2014	(1)
Trilog-Broadband Antenna	SCHWARZBECK MESS-ELEKTRONIK	SB AC VULB	9168-419	05/16/2014	(1)
Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00128055	08/09/2014	(1)
RF cable	WOKEN	--	S02-140512-09	07/14/2014	(1)
RF cable	WOKEN	--	S02-140512-021	07/14/2014	(1)
RF cable	WOKEN	--	S02-140512-022	07/14/2014	(1)
Test Site	ATL	TE09	TE09	05/11/2014	(1)

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.
Note: N.C.R. = No Calibration Request.

8.3. Setup


SA
Amplifier
Filter
Attenuator
Substitute
Antenna
Receiving Antenna
Attenuator
Signal
Generator
SA
Amplifier
Filter
Attenuator
Receiving Antenna
EUT

8.4. Test Procedure

1. According to the TIA/EIA 603D:2010 test method, The Receiver or Spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 1910 MHz. The resolution bandwidth is set as outlined in Part 24.238 and Part 22.917. The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of PCS1900 and GSM850.

2. EUT was placed on a 0.80 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 0.80m. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.
3. A log-periodic antenna or double-ridged waveguide horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
4. The EUT is then put into continuously transmitting mode at its maximum power level during the test.Set Test Receiver or Spectrum RBW=1MHz,VBW=3MHz, And the maximum value of the receiver should be recorded as (P_r).
5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}- P_{Ag} - P_{cl} + G_a
7. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
8. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.
9. In order to make sure test results more clearly,we set frequency range and sweep time for difference frequency range as follows table:

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
850MHz	0.009~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~10	1 MHz	3 MHz	3
1900MHz	0.009~0.03	10KHz	30KHz	10
	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	3

8.5. Uncertainty

The measurement uncertainty is defined as for Field Strength of Spurious Radiation measurement is ± 3.072 dB.

8.6. Test Result

Job No.:	P22 24 Harmonic	Ant.Polar.:	Horizontal
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:13:51
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 850	Test By:	Ricky
Description:	CH128		

No.	Frequency	SG Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	78.5000	-69.12	-2.57	-71.69	-13.00	-58.69	peak
2	156.0000	-81.74	6.51	-75.23	-13.00	-62.23	peak
3	300.0000	-78.29	-2.92	-81.21	-13.00	-68.21	peak
4	400.0000	-80.13	1.62	-78.51	-13.00	-65.51	peak
5	530.0000	-80.85	7.08	-73.77	-13.00	-60.77	peak
6	663.0000	-80.76	6.81	-73.95	-13.00	-60.95	peak
7	3316.000	-72.02	12.41	-59.61	-13.00	-46.61	peak
8	4708.000	-72.74	15.11	-57.63	-13.00	-44.63	peak
9	7168.000	-73.27	24.01	-49.26	-13.00	-36.26	peak

Job No.:	P22 24 Harmonic	Ant.Polar.:	Vertical
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:12:56
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 850	Test By:	Ricky
Description:	CH128		

No.	Frequency	SG Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	141.5000	-79.66	15.12	-64.54	-13.00	-51.54	peak
2	208.0000	-81.08	8.65	-72.43	-13.00	-59.43	peak
3	305.0000	-82.19	1.73	-80.46	-13.00	-67.46	peak
4	431.5000	-80.41	0.72	-79.69	-13.00	-66.69	peak
5	606.5000	-80.49	7.05	-73.44	-13.00	-60.44	peak
6	702.0000	-80.57	10.17	-70.40	-13.00	-57.40	peak
7	3340.000	-71.27	16.02	-55.25	-13.00	-42.25	peak
8	4756.000	-72.78	19.59	-53.19	-13.00	-40.19	peak
9	7132.000	-74.64	21.65	-52.99	-13.00	-39.99	peak

Job No.:	P22 24 Harmonic	Ant.Polar.:	Horizontal
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:17:24
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 850	Test By:	Ricky
Description:	CH190		

	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	160.0000	-80.90	7.53	-73.37	-13.00	-60.37	peak
2	233.0000	-81.67	-1.56	-83.23	-13.00	-70.23	peak
3	300.0000	-78.70	-2.92	-81.62	-13.00	-68.62	peak
4	432.5000	-81.72	3.05	-78.67	-13.00	-65.67	peak
5	567.0000	-79.68	6.76	-72.92	-13.00	-59.92	peak
6	658.5000	-78.76	6.78	-71.98	-13.00	-58.98	peak
7	3364.000	-72.67	12.57	-60.10	-13.00	-47.10	peak
8	4624.000	-73.73	14.67	-59.06	-13.00	-46.06	peak
9	7084.000	-75.20	23.76	-51.44	-13.00	-38.44	peak

Job No.:	P22 24 Harmonic	Ant.Polar.:	Vertical
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:16:30
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 850	Test By:	Ricky
Description:	CH190		

No.	Frequency	SG Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	144.0000	-78.83	14.96	-63.87	-13.00	-50.87	peak
2	213.0000	-82.72	7.31	-75.41	-13.00	-62.41	peak
3	305.5000	-81.43	1.69	-79.74	-13.00	-66.74	peak
4	356.0000	-80.15	1.40	-78.75	-13.00	-65.75	peak
5	498.0000	-80.81	1.92	-78.89	-13.00	-65.89	peak
6	660.0000	-80.85	9.04	-71.81	-13.00	-58.81	peak
7	3328.000	-71.58	15.95	-55.63	-13.00	-42.63	peak
8	4660.000	-73.09	19.41	-53.68	-13.00	-40.68	peak
9	7060.000	-73.98	21.54	-52.44	-13.00	-39.44	peak

Job No.:	P22 24 Harmonic	Ant.Polar.:	Horizontal
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:20:07
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 850	Test By:	Ricky
Description:	CH251		

No.	Frequency	SG Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	158.5000	-81.89	7.15	-74.74	-13.00	-61.74	peak
2	204.5000	-80.39	1.47	-78.92	-13.00	-65.92	peak
3	343.5000	-80.98	-1.16	-82.14	-13.00	-69.14	peak
4	441.5000	-81.56	3.34	-78.22	-13.00	-65.22	peak
5	527.5000	-81.50	7.00	-74.50	-13.00	-61.50	peak
6	626.5000	-79.31	6.82	-72.49	-13.00	-59.49	peak
7	3292.000	-71.96	12.35	-59.61	-13.00	-46.61	peak
8	4672.000	-74.27	14.92	-59.35	-13.00	-46.35	peak
9	7108.000	-74.64	23.84	-50.80	-13.00	-37.80	peak

Job No.:	P22 24 Harmonic	Ant.Polar.:	Vertical
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:19:13
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 850	Test By:	Ricky
Description:	CH251		

No.	Frequency	SG Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	146.0000	-75.98	14.84	-61.14	-13.00	-48.14	peak
2	211.5000	-80.97	7.84	-73.13	-13.00	-60.13	peak
3	300.0000	-80.28	2.15	-78.13	-13.00	-65.13	peak
4	487.5000	-80.17	1.76	-78.41	-13.00	-65.41	peak
5	636.0000	-79.91	8.15	-71.76	-13.00	-58.76	peak
6	724.5000	-80.52	10.68	-69.84	-13.00	-56.84	peak
7	3328.000	-71.52	15.95	-55.57	-13.00	-42.57	peak
8	4636.000	-74.81	19.36	-55.45	-13.00	-42.45	peak
9	7120.000	-74.24	21.63	-52.61	-13.00	-39.61	peak

Job No.:	P22 24 Harmonic	Ant.Polar.:	Horizontal
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:27:32
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 1900	Test By:	Ricky
Description:	CH512		

No.	Frequency	SG Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	157.5000	-81.21	6.90	-74.31	-13.00	-61.31	peak
2	232.5000	-80.43	-1.49	-81.92	-13.00	-68.92	peak
3	347.0000	-77.74	-1.09	-78.83	-13.00	-65.83	peak
4	477.5000	-80.31	4.87	-75.44	-13.00	-62.44	peak
5	603.5000	-79.41	6.99	-72.42	-13.00	-59.42	peak
6	762.5000	-81.78	9.05	-72.73	-13.00	-59.73	peak
7	3328.000	-70.51	12.45	-58.06	-13.00	-45.06	peak
8	4660.000	-72.77	14.86	-57.91	-13.00	-44.91	peak
9	7072.000	-74.06	23.73	-50.33	-13.00	-37.33	peak

Job No.:	P22 24 Harmonic	Ant.Polar.:	Vertical
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:26:38
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 1900	Test By:	Ricky
Description:	CH512		

No.	Frequency	SG SG Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	144.5000	-78.68	14.92	-63.76	-13.00	-50.76	peak
2	217.5000	-83.14	5.74	-77.40	-13.00	-64.40	peak
3	350.5000	-80.92	1.08	-79.84	-13.00	-66.84	peak
4	495.0000	-80.96	1.88	-79.08	-13.00	-66.08	peak
5	612.5000	-80.06	7.58	-72.48	-13.00	-59.48	peak
6	683.5000	-80.68	9.49	-71.19	-13.00	-58.19	peak
7	3292.000	-71.18	15.73	-55.45	-13.00	-42.45	peak
8	4768.000	-71.51	19.61	-51.90	-13.00	-38.90	peak
9	7072.000	-74.53	21.56	-52.97	-13.00	-39.97	peak

Job No.:	P22 24 Harmonic	Ant.Polar.:	Horizontal
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:30:02
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 1900	Test By:	Ricky
Description:	CH661		

No.	Frequency	SG Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	161.5000	-80.99	6.13	-74.86	-13.00	-61.86	peak
2	235.0000	-81.78	-1.82	-83.60	-13.00	-70.60	peak
3	388.5000	-81.07	0.64	-80.43	-13.00	-67.43	peak
4	498.0000	-81.46	6.06	-75.40	-13.00	-62.40	peak
5	601.5000	-78.89	6.99	-71.90	-13.00	-58.90	peak
6	719.5000	-81.16	7.38	-73.78	-13.00	-60.78	peak
7	3340.000	-69.98	12.49	-57.49	-13.00	-44.49	peak
8	4732.000	-72.18	15.24	-56.94	-13.00	-43.94	peak
9	7084.000	-73.99	23.76	-50.23	-13.00	-37.23	peak

Job No.:	P22 24 Harmonic	Ant.Polar.:	Vertical
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:29:09
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 1900	Test By:	Ricky
Description:	CH661		

No.	Frequency	SG Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	139.0000	-76.49	15.61	-60.88	-13.00	-47.88	peak
2	214.5000	-83.28	6.79	-76.49	-13.00	-63.49	peak
3	300.0000	-81.07	2.15	-78.92	-13.00	-65.92	peak
4	404.0000	-81.65	0.43	-81.22	-13.00	-68.22	peak
5	523.5000	-80.87	2.44	-78.43	-13.00	-65.43	peak
6	674.5000	-81.27	9.27	-72.00	-13.00	-59.00	peak
7	3388.000	-71.75	16.32	-55.43	-13.00	-42.43	peak
8	4672.000	-72.47	19.43	-53.04	-13.00	-40.04	peak
9	7108.000	-74.20	21.63	-52.57	-13.00	-39.57	peak

Job No.:	P22 24 Harmonic	Ant.Polar.:	Horizontal
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:33:39
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 1900	Test By:	Ricky
Description:	CH810		

No.	Frequency	SG Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	161.5000	-79.85	6.13	-73.72	-13.00	-60.72	peak
2	263.5000	-82.03	-4.93	-86.96	-13.00	-73.96	peak
3	413.5000	-80.40	2.33	-78.07	-13.00	-65.07	peak
4	572.5000	-78.06	6.69	-71.37	-13.00	-58.37	peak
5	635.5000	-80.93	6.48	-74.45	-13.00	-61.45	peak
6	742.0000	-81.34	8.16	-73.18	-13.00	-60.18	peak
7	3340.000	-70.70	12.49	-58.21	-13.00	-45.21	peak
8	4636.000	-74.11	14.72	-59.39	-13.00	-46.39	peak
9	7132.000	-73.97	23.89	-50.08	-13.00	-37.08	peak

Job No.:	P22 24 Harmonic	Ant.Polar.:	Vertical
Standard:	FCC_P22.24.27_other	Date:2015/4/1	Time:上午 01:32:43
Test item:	Radiated Emission	Distance:	3m
EUT:	GPS TRACKER	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Model:	ARROW-G	Power:	AC 120V/60Hz
Mode:	GPRS 1900	Test By:	Ricky
Description:	CH810		

No.	Frequency	SG Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBm)	Factor(dB)	(dBm)	(dBm)	(dB)	
1	146.5000	-77.55	14.81	-62.74	-13.00	-49.74	peak
2	239.5000	-82.78	0.12	-82.66	-13.00	-69.66	peak
3	363.0000	-81.15	1.51	-79.64	-13.00	-66.64	peak
4	531.0000	-80.73	2.85	-77.88	-13.00	-64.88	peak
5	660.0000	-78.91	9.04	-69.87	-13.00	-56.87	peak
6	747.5000	-81.37	10.52	-70.85	-13.00	-57.85	peak
7	3268.000	-70.48	15.57	-54.91	-13.00	-41.91	peak
8	4756.000	-73.63	19.59	-54.04	-13.00	-41.04	peak
9	7120.000	-73.65	21.63	-52.02	-13.00	-39.02	peak

Mark:the correct factor=antenna factor+cable loss

9 Frequency Stability (Temperature & Voltage Variation) Test

9.1. Limit

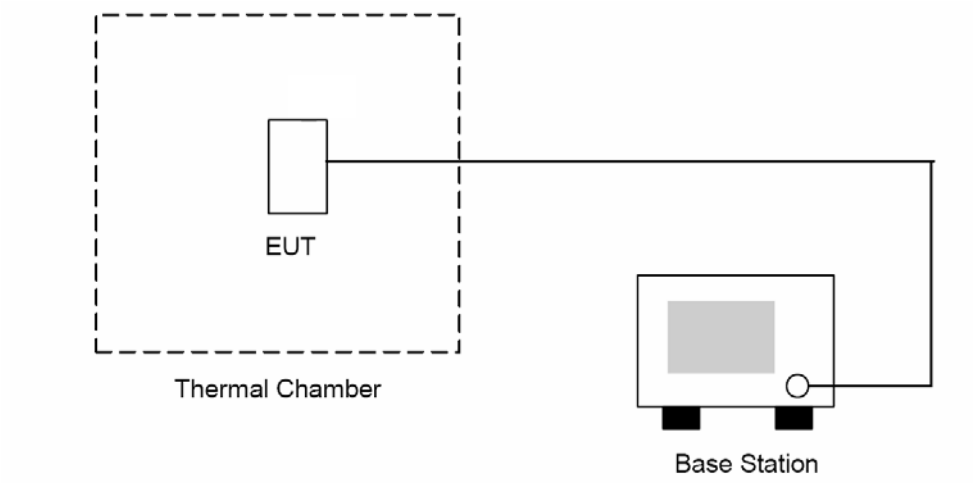
The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

9.2. Test Instruments

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Universal Radio Communication Tester	R & S	CMU200	109369	08/07/2014	(1)
Temperature & Humidity Chamber	TAICHY	MHU-225LA	980729	08/07/2014	(1)
RF cable	WOKEN	--	S02-140428-045	07/14/2014	(1)
Test Site	ATL	TE05	TE05	N.C.R.	-----

Remark: (1) Calibration period 1 year. (2) Calibration period 2 years.
Note: N.C.R. = No Calibration Request.

9.3. Setup



9.4. Test Procedure

The measurement is made according to FCC rules part 22 and 24:

1. The EUT and test equipment were set up as shown on the following section.
2. With all power removed, the temperature was decreased to -30℃ and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was note within one minute.
3. With power OFF, the temperature was raised in 10℃ steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
4. The EUT was placed in a temperature chamber at 25±5 ℃ and connected as the following section.
5. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
6. The temperature tests were performed for the worst case.
7. Test data was recorded.

9.5. Uncertainty

The measurement uncertainty is defined as for Frequency Stability (Temperature Variation) measurement is ± 10Hz.

9.6. Test Result

Model Number	ARROW-G					
Test Item	Frequency Stability (Temperature & Voltage Variation)					
Test Mode	Mode 1					
Date of Test	03/15/2015				Test Site	TE05
Level	Voltage [DC]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
Normal	12	-30	13.44	0.016	±2.5	Pass
Normal	12	-20	12.15	0.016	±2.5	Pass
Normal	12	-10	12.25	0.016	±2.5	Pass
Normal	12	0	10.22	0.016	±2.5	Pass
Normal	12	10	9.75	0.016	±2.5	Pass
High	13.2	20	9.03	0.016	±2.5	Pass
Normal	12	20	8.21	0.016	±2.5	Pass
Low	10.8	20	7.24	0.016	±2.5	Pass
Normal	12	30	7.01	0.016	±2.5	Pass
Normal	12	40	6.68	0.016	±2.5	Pass
Normal	12	50	6.61	0.016	±2.5	Pass

Model Number	ARROW-G					
Test Item	Frequency Stability (Temperature & Voltage Variation)					
Test Mode	Mode 2					
Date of Test	03/15/2015				Test Site	TE05
Level	Voltage [DC]	Temperature (℃)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Result
Normal	12	-30	-26.34	-0.014	±2.5	Pass
Normal	12	-20	-24.69	-0.014	±2.5	Pass
Normal	12	-10	-25.54	-0.014	±2.5	Pass
Normal	12	0	-26.67	-0.014	±2.5	Pass
Normal	12	10	-26.35	-0.014	±2.5	Pass
Power full point	13.2	20	-24.68	-0.014	±2.5	Pass
Normal	12	20	-25.57	-0.014	±2.5	Pass
Power cut-off point	10.8	20	-23.34	-0.014	±2.5	Pass
Normal	12	30	-24.55	-0.014	±2.5	Pass
Normal	12	40	-22.15	-0.014	±2.5	Pass
Normal	12	50	-22.03	-0.014	±2.5	Pass