TEST REPORT

DT&C Co., Ltd.
42, Yurim-ro, 154Beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea, 17042
Tel : 031-321-2664, Fax : 031-321-1664

1. Report No : DRTFCC1712-0268
2. Customer
   - Name : HYUNDAI MOBIS CO., LTD.
   - Address : 203 Teheran-ro, Gangnam-gu, Seoul, South Korea, 135-977
3. Use of Report : FCC Original Grant
4. Product Name / Model Name : DIGITAL CAR AVN SYSTEM / ATC40B8AN
   FCC ID : TQ8-ATC40B8AN
5. Test Method Used : KDB971168 D01v03, ANSI/TIA-603-E-2016, ANSI C63.26-2015
   Test Specification : §2, §27
6. Date of Test : 2017.11.29 ~ 2017.12.04
7. Testing Environment : Refer to appended test report.
8. Test Result : Refer to the attached test result.

Affirmation	Tested by Name : JaeHyeok Bang (Signature)	Technical Manager Name : GeunKi Son (Signature)

2017 . 12 . 11 .

DT&C Co., Ltd.

If this report is required to confirmation of authenticity, please contact to report@dtnc.net

Test Report Version

Test Report No.	Date	Description
DRTFCC1712-0268	Dec. 11, 2017	Initial issue

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1. GENERAL INFORMATION

Applicant Name : HYUNDAI MOBIS CO., LTD.

Address : 203 Teheran-ro, Gangnam-gu, Seoul, Korea, 135-977

FCC ID : TQ8-ATC40B8AN

FCC Classification : PCS Licensed Transmitter (PCB)

EUT Type : DIGITAL CAR AVN SYSTEM

Model Name : ATC40B8AN

Add Model Name : NA

Supplying power : DC 14.4 V

Antenna Information : External Antenna

Mode	TX Frequency (MHz)	Modulation	ERP/EIRP	
			Max power (dBm)	Max power (W)
LTE Band 13	782 ~ 782	QPSK	23.02	0.200
LTE Band 13	782 ~ 782	16QAM	22.06	0.161
LTE Band 13	779.5 ~ 784.5	QPSK	23.16	0.207
LTE Band 13	779.5 ~ 784.5	16QAM	22.08	0.161
LTE Band 4	1720 ~ 1745	QPSK	27.82	0.605
LTE Band 4	1720 ~ 1745	16QAM	26.95	0.495
LTE Band 4	1717.5 ~ 1747.5	QPSK	28.08	0.643
LTE Band 4	1717.5 ~ 1747.5	16QAM	27.16	0.520
LTE Band 4	1715 ~ 1750	QPSK	27.69	0.587
LTE Band 4	1715 ~ 1750	16QAM	26.75	0.473
LTE Band 4	1712.5 ~ 1752.5	QPSK	27.98	0.628
LTE Band 4	1712.5 ~ 1752.5	16QAM	26.97	0.498
LTE Band 4	1711.5 ~ 1753.5	QPSK	27.91	0.618
LTE Band 4	1711.5 ~ 1753.5	16QAM	26.73	0.471
LTE Band 4	1710.7 ~ 1754.3	QPSK	28.01	0.632
LTE Band 4	1710.7 ~ 1754.3	16QAM	26.90	0.490

2. INTRODUCTION

2.1 EUT DESCRIPTION

The Equipment Under Test (EUT) supports CDMA, LTE with Bluetooth.

2.2. EUT CAPABILITIES

This ETU contains the following capabilities:
850/1900 CDMA, LTE Single transmitting for band 4/13, Bluetooth(BDR, EDR)

2.3. TESTING ENVIRONMENT

Ambient Condition	
▪ Temperature	+21 ℃ ~ +23 ℃
▪ Relative Humidity	43 % ~ 46 %

2.4 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.5. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C 63.4-2014. All measurement uncertainty values are shown with a coverage factor of *k* = 2 to indicate a 95 % level of confidence.

Parameter	Measurement uncertainty
Radiated Disturbance (Below 1 GHz)	± 5.1 dB (The confidence level is about 95 %, k = 2)
Radiated Disturbance (1 GHz ~ 18 GHz)	± 5.4 dB (The confidence level is about 95 %, k = 2)
Radiated Disturbance (Above 18 GHz)	± 5.3 dB (The confidence level is about 95 %, k = 2)

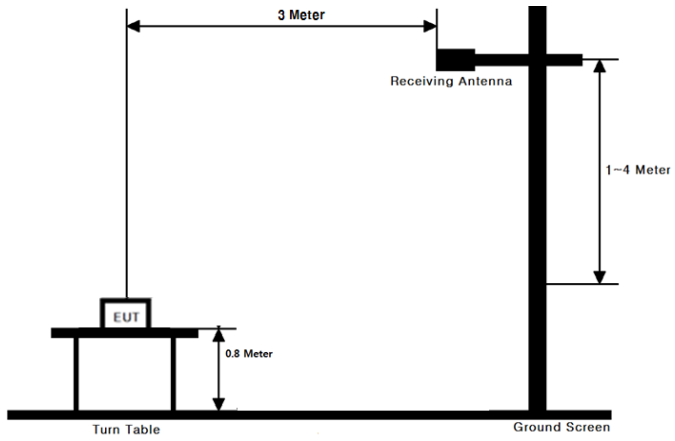
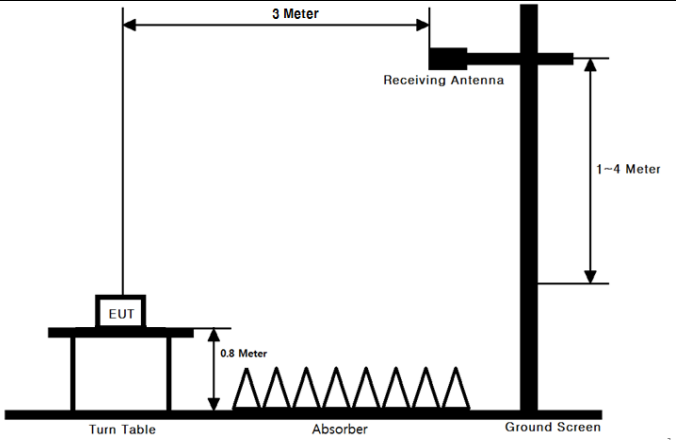
2.6. TEST FACILITY

DT&C Co., Ltd.		
The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042. The site is constructed in conformance with the requirements. **- FCC MRA Accredited Test Firm No. : KR0034**		
www.dtnc.net		
Telephone	:	+ 82-31-321-2664
FAX	:	+ 82-31-321-1664

3. DESCRIPTION OF TESTS

3.1 ERP & EIRP (Effective Radiated Power & Equivalent Isotropic Radiated Power)

Test Set-up

Below 1GHz	Above 1GHz
	

These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 0.8-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

Test Procedure

- **ANSI/TIA-603-E-2016 - Section 2.2.17**
- **KDB971168 D01v03 - Section 5.2.2**
- **ANSI C63.26-2015 – Section 5.2.4.4.1**

Test setting

1. Set span to 2 x to 3 x the OBW.
2. Set RBW = 1% to 5% of the OBW.
3. Set VBW ≥ 3 x RBW.
4. Set number of points in sweep ≥ 2 × span / RBW.
5. Sweep time:
   1) Set = auto-couple, or
   2) Set ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.
6. Detector = power averaging (rms).
7. If the EUT can be configured to transmit continuously, then set the trigger to free run.
8. If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full-power transmissions).
9. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over multiple symbols, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.

10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

The receiver antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminal of the substitute antenna is measured.

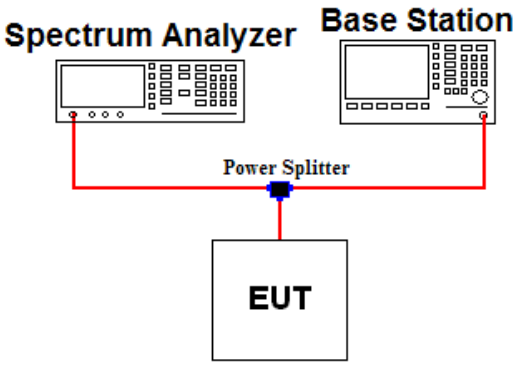
The ERP/EIRP is calculated using the following formula:

ERP/EIRP = The conducted power at the substitute antenna`s terminal [dBm] + Substitute Antenna gain [dBd for ERP , dBi for EIRP]

For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference
Between the gain of the horn antenna and an isotropic antenna are taken into consideration.

3.2 PEAK TO AVERAGE RATIO

Test set-up



Test Procedure

- **KDB971168 D01v03 - Section 5.7.2**
- **ANSI C63.26-2015 – Section 5.2.3.4**

A peak to average ratio measurement is performed at the conducted port of the EUT.
The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The present of time the signal spends at or above the level defines the probability for that particular power level.

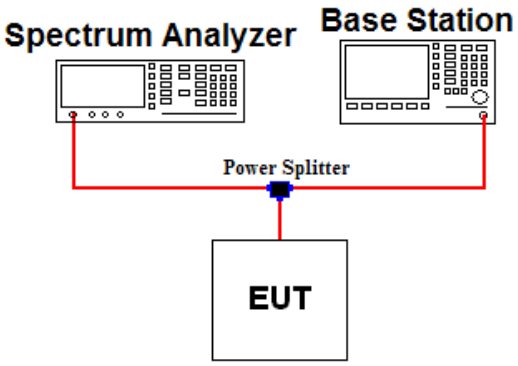
Test setting

The spectrum Analyzer`s CCDF measurement function is enabled.

1. Set resolution/measurement bandwidth ≥ OBW or specified reference bandwidth.
2. Set the number of counts to a value that stabilizes the measured CCDF curve.
3. Set the measurement interval as follows:
   1) For continuous transmissions, set to the greater of [10 × (number of points in sweep) × (transmission symbol period)] or 1 ms.
   2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement interval to a time that is less than or equal to the burst duration.
   3) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
4. Record the maximum PAPR level associated with a probability of 0.1%.
5. The peak power level is calculated form the sum of the PAPR value from step d) to the measured average power.

3.3 OCCUPIED BANDWIDTH.

Test set-up



Test Procedure

- **KDB971168 D01v03 - Section 4.3**
- **ANSI C63.26-2015 – Section 5.4.4**

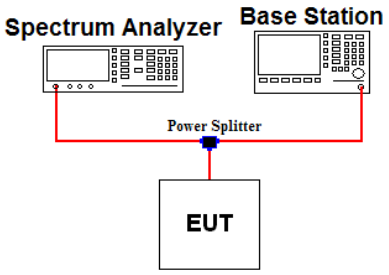
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

Test setting

1. The signal analyzer`s automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 ~ 5 % of the expected OBW & VBW ≥ 3 X RBW
3. Detector = Peak
4. Trance mode = Max hold
5. Sweep = Auto couple
6. The trace was allowed to stabilize
7. If necessary, step 2 ~ 6 were repeated after changing the RBW such that it would be within 1 ~ 5 % of the 99 % occupied bandwidth observed in step 6.

3.4 BAND EDGE EMISSIONS AT ANTENNA TERMINAL

Test set-up



Test Procedure

- **KDB971168 D01v03 - Section 6**
- **ANSI C63.26-2015 – Section 5.7**

All out of band emissions are measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its lowest and highest channel with all bandwidths, modulations and RB configurations.

The power of any spurious emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB.

Test setting

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW ≥ 1 % of the emission bandwidth
4. VBW ≥ 3 X RBW
5. Detector = RMS & Trace mode = Max hold
6. Sweep time = Auto couple or 1 s for band edge
7. Number of sweep point ≥ 2 X span / RBW
8. The trace was allowed to stabilize

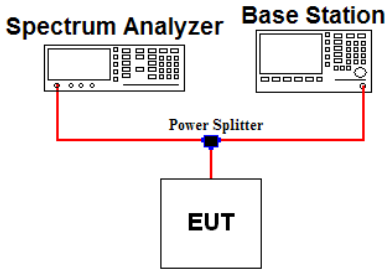
Note 1: Per Part 22.917(b)(1) / 24.238(b) / 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Note 2: Per Part 27.53(c.5) for operations in the 776-788 MHz band, compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Note 3: Per Part 27.53(c.4) for all frequencies between 763-775 MHz and 793-805 MHz, the FCC limit is 65 + 10log10(P[Watts])= -35dBm in a 6.25kHz bandwidth.

3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

Test set-up



Test Procedure

- **KDB971168 D01v03 - Section 6**
- **ANSI C63.26-2015 – Section 5.7**

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its low, middle, high channel with all bandwidths, modulations and RB configurations. The spectrum is scanned from 9 kHz up to a frequency including its 10^{th} harmonic.

The power of any spurious emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB.

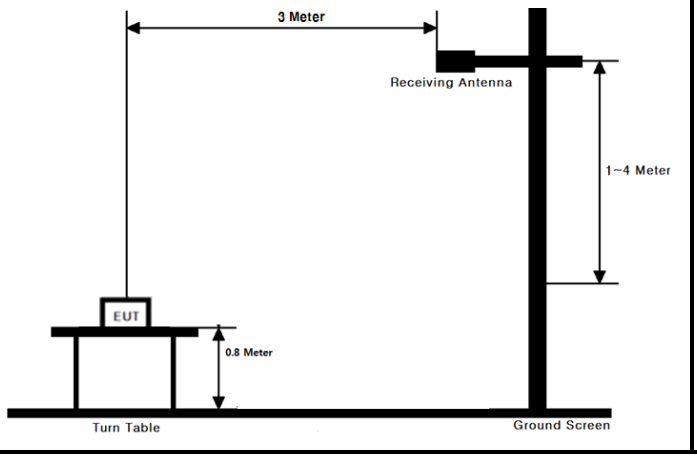
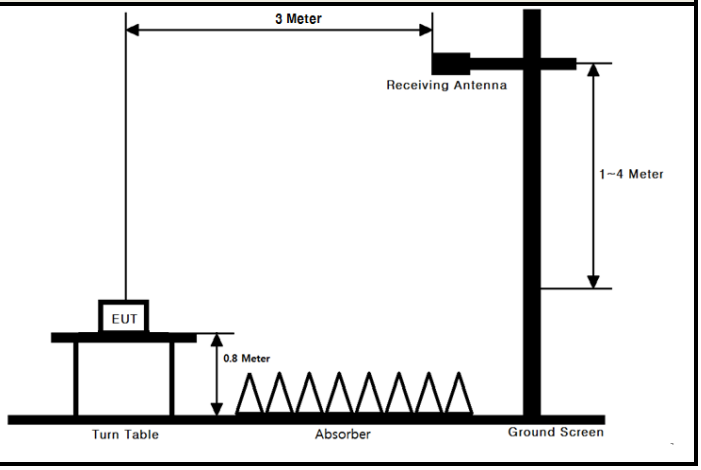
Test setting

1. RBW = 100 kHz(Below 1 GHz) or 1 MHz(Above 1 GHz) & VBW ≥ 3 X RBW (Refer to Note 1)
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point ≥ 2 X span / RBW
5. The trace was allowed to stabilize

Note 1: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1GHz and 1MHz or greater for frequencies greater than 1GHz.

3.6 UNDESIRABLE EMISSIONS

Test Set-up

Below 1GHz	Above 1GHz
	

These measurements were performed at 3 test site. The equipment under test is placed on a non-conductive table 0.8-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

Test Procedure

- **ANSI/TIA-603-E-2016 - Section 2.2.12**
- **KDB971168 D01v03 - Section 5.8**
- **ANSI C63.26-2015 – Section 5.5**

Test setting

1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW ≥ 3 X RBW
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point ≥ 2 X span / RBW
5. The trace was allowed to stabilize

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

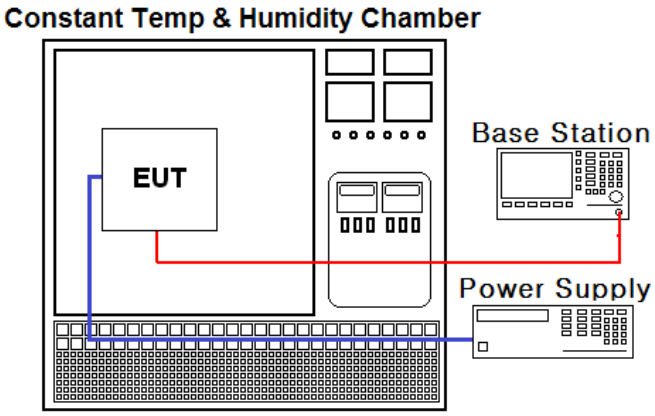
For radiated power measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

For radiated power measurements above 1 GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.

This measurement was performed with the EUT oriented in 3 orthogonal axis.

3.7 FREQUENCY STABILITY

Test Set-up



Test Procedure

- **ANSI/TIA-603-E-2016**
- **KDB971168 D01v03 - Section 9**

The frequency stability of the transmitter is measured by:

a.) **Temperature:**
The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.

b.) **Primary Supply Voltage:**
The primary supply voltage is varied from 85 % to 115 % of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification:

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block for Part 24, 27. The frequency stability of the transmitter shall be maintained within ± 0.000 25 % (± 2.5 ppm) of the center frequency for Part 22.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature.
(20 °C to provide a reference)

2. The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C.
A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

4. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal. Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	17/01/11	18/01/11	MY50200828
DC power supply	Agilent Technologies	66332A	17/09/05	18/09/05	MY43000440
Multimeter	FLUKE	17B	17/04/12	18/04/12	26030065WS
Temp & Humi Test Chamber	SJ Science	SJ-TH-S50	17/01/25	18/01/25	SJ-TH-S50-140205
Thermohygrometer	BODYCOM	BJ5478	17/04/11	18/04/11	120612-2
Radio Communication Analyzer	Anritsu	MT8820C	17/09/07	18/09/07	6201127429
Signal Generator	Rohde Schwarz	SMBV100A	17/01/04	18/01/04	255571
Signal Generator	Rohde Schwarz	SMF100A	17/04/21	18/04/21	102341
Loop Antenna	Schwarzbeck	FMZB1513	16/04/22	18/04/22	1513-128
BILOG ANTENNA	Schwarzbeck	VULB 9160	16/11/11	18/11/11	3151
Dipole Antenna	Schwarzbeck	VHA9103	17/03/14	19/03/14	2116
Dipole Antenna	Schwarzbeck	VHA9103	16/04/15	18/04/15	2117
Dipole Antenna	Schwarzbeck	UHA9105	17/03/14	19/03/14	2261
Dipole Antenna	Schwarzbeck	UHA9105	16/04/15	18/04/15	2262
HORN ANT	ETS	3117	16/05/13	18/05/13	140394
HORN ANT	ETS	3117	16/02/26	18/02/26	152145
Amplifier	RF Bay Inc	MPA-40-40	17/04/12	18/04/12	21151801
Amplifier	EMPOWER	BBS3Q7ELU	17/09/06	18/09/06	1020
PreAmplifier	TSJ	MLA-010K01-B01-27	17/03/06	18/03/06	1844539
PreAmplifier	Agilent	8449B	17/09/05	18/09/05	3008A02108
High-pass filter	Wainwright	WHKX12-935-1000-15000-40SS	17/09/05	18/09/05	7
High-pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	17/09/05	18/09/05	3

5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Status Note 1
2.1046	Conducted Output Power	N/A	Conducted	NA Note2
2.1049	Occupied Bandwidth	N/A		NA Note2
27.50(d.5)	Peak to Average Ratio	< 13 dB		NA Note2
2.1051 27.53(h)	Band Edge / Conducted Spurious Emissions	> 43 + 10log$_{10}$(P) dB at Band edge and for all out-of-band emissions		NA Note2
27.53(c.4)	Undesirable Emissions in 763 ~ 775MHz & 793 ~ 805MHz	< 65 + 10 log10(P) dB		NA Note2
2.1055 27.54	Frequency Stability	< 2.5 ppm (Part 22) Fundamental emissions must stay within Authorized frequency block (Part 24, 27)		NA Note2
27.50(b.10)	Radiated Output Power (B13)	< 3 Watts max. ERP	Radiated	C
27.50(d.4)	Radiated Output Power (B4)	< 1 Watts max. EIRP		C
2.1053 27.53(h)	Undesirable Emissions	> 43 + 10log$_{10}$(P) dB for all out-of-band emissions		C
27.53(f)	Undesirable Emissions in 1559 ~ 1610MHz	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions of less than 700 Hz bandwidth)		C

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable

Note 2: These test items were not performed because this device uses the granted module.
(FCC: LHJ-CASAN)
Please refer to the test report of the granted module

6. SAMPLE CALCULATION

A. For substitution method

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Spectrum Reading Value(dBm)	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
15	1747.5	QPSK	1/36	-17.69	Z	H	22.42	5.66	28.08	0.643

ERP or EIRP = Level @ Ant Terminal LEVEL(dBm) + Tx Ant. Gain

1) The EUT mounted on a non-conductive turntable is 0.8 meter above test site ground level.
2) During the test, the turn table is rotated until the maximum signal is found.
3) Record the field strength meter's level.
4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
6) The signal generator output level with substituted antenna gain is the rating of ERP, EIRP or Radiated spurious emission.

7.TEST DATA

7.1 CONDUCTED OUTPUT POWER

- Not Applicable

7.2 OCCUPIED BANDWIDTH

- Not Applicable

7.3 PEAK TO AVERAGE RATIO

- Not Applicable

7.4 BAND EDEG EMISSIONS (Conducted)

- Not Applicable

7.5 SPURIOUS AND HARMONICS EMISSIONS (Conducted)

- Not Applicable

7.6 ERP & EIRP

7.6.1 LTE Band 13

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	782	QPSK	1/49	V	21.76	1.26	23.02	0.200
		16QAM	1/49	V	20.80	1.26	22.06	0.161
5	779.5	QPSK	1/24	V	20.79	1.26	22.05	0.160
		16QAM	1/24	V	19.66	1.26	20.92	0.124
	784.5	QPSK	1/24	V	21.91	1.25	23.16	0.207
		16QAM	1/24	V	20.83	1.25	22.08	0.161

Note: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

7.6.2 LTE Band 4

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1720	QPSK	1/50	H	21.63	5.82	27.45	0.556
		16QAM	1/50	H	20.55	5.82	26.37	0.434
	1732.5	QPSK	1/0	H	21.98	5.75	27.73	0.593
		16QAM	1/0	H	20.92	5.75	26.67	0.465
	1745	QPSK	1/50	H	22.15	5.67	27.82	0.605
		16QAM	1/50	H	21.28	5.67	26.95	0.495
15	1717.5	QPSK	1/36	H	22.08	5.84	27.92	0.619
		16QAM	1/36	H	21.05	5.84	26.89	0.489
	1732.5	QPSK	1/74	H	22.18	5.75	27.93	0.621
		16QAM	1/74	H	21.25	5.75	27.00	0.501
	1747.5	QPSK	1/36	H	22.42	5.66	28.08	0.643
		16QAM	1/36	H	21.50	5.66	27.16	0.520
10	1715	QPSK	1/49	H	21.64	5.85	27.49	0.561
		16QAM	1/49	H	20.68	5.85	26.53	0.450
	1732.5	QPSK	1/0	H	20.23	5.75	25.98	0.396
		16QAM	1/0	H	19.42	5.75	25.17	0.329
	1750	QPSK	1/25	H	22.05	5.64	27.69	0.587
		16QAM	1/25	H	21.11	5.64	26.75	0.473
5	1712.5	QPSK	1/24	H	21.04	5.87	26.91	0.491
		16QAM	1/24	H	19.92	5.87	25.79	0.379
	1732.5	QPSK	1/0	H	21.72	5.75	27.47	0.558
		16QAM	1/0	H	20.60	5.75	26.35	0.432
	1752.5	QPSK	1/0	H	22.35	5.63	27.98	0.628
		16QAM	1/0	H	21.34	5.63	26.97	0.498
3	1711.5	QPSK	1/0	H	20.74	5.87	26.61	0.458
		16QAM	1/0	H	19.68	5.87	25.55	0.359
	1732.5	QPSK	1/0	H	21.73	5.75	27.48	0.560
		16QAM	1/0	H	20.65	5.75	26.40	0.437
	1753.5	QPSK	1/0	H	22.29	5.62	27.91	0.618
		16QAM	1/0	H	21.11	5.62	26.73	0.471
1.4	1710.7	QPSK	1/5	H	20.51	5.88	26.39	0.436
		16QAM	1/5	H	19.46	5.88	25.34	0.342
	1732.5	QPSK	1/5	H	21.91	5.75	27.66	0.583
		16QAM	1/5	H	20.78	5.75	26.53	0.450
	1754.3	QPSK	1/5	H	22.40	5.61	28.01	0.632
		16QAM	1/5	H	21.29	5.61	26.90	0.490

Note: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

7.7 UNDESIRABLE EMISSIONS (Radiated)

7.7.1 LTE Band 13

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBd)	Result		Limit (dBc)
								(dBm)	(dBc)	
10	782	1/0	QPSK	2359.60	V	-50.34	4.01	-46.33	69.35	36.02
		1/0	16QAM	2359.46	V	-49.96	4.01	-45.95	68.01	35.06
5	779.5	1/0	QPSK	2345.09	V	-49.92	3.99	-45.93	67.98	35.05
		1/0	16QAM	2344.96	V	-50.13	3.99	-46.14	67.06	33.92
	784.5	1/0	QPSK	2360.02	V	-50.03	4.01	-46.02	69.18	36.16
		1/0	16QAM	2359.99	V	-49.96	4.01	-45.95	68.03	35.08

Note 1: Limit Calculation = 43 + $10\log_{10}$ (P[Watts])

Note 2: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

Note 3: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions above table.

UNDESIRABLE EMISSIONS IN 1559~1610MHz (LTE Band 13)

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result	Margin	Limit (dBm/MHz)
								(dBm)	(dB)	
10	782	1/49	QPSK	1572.82	V	-52.05	6.32	-45.73	5.73	-40.00
		1/49	16QAM	1572.77	V	-52.42	6.32	-46.10	6.10	
5	779.5	1/24	QPSK	1563.43	V	-52.18	6.36	-45.82	5.82	
		1/24	16QAM	1563.50	V	-52.15	6.36	-45.79	5.79	
	784.5	1/24	QPSK	1573.24	V	-52.09	6.31	-45.78	5.78	
		1/24	16QAM	1573.12	V	-51.55	6.31	-45.24	5.24	

7.7.2 LTE Band 4

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result		Limit (dBc)
								(dBm)	(dBc)	
20	1720	1/50	QPSK	3440.21	V	-46.28	8.30	-37.98	65.43	40.45
				5160.37	V	-52.34	10.38	-41.96	69.41	
		1/50	16QAM	3440.16	V	-45.83	8.30	-37.53	63.90	39.37
				5160.39	V	-52.41	10.38	-42.03	68.40	
	1732.5	1/0	QPSK	3447.09	V	-46.31	8.32	-37.99	65.72	40.73
				5170.75	V	-51.74	10.40	-41.34	69.07	
		1/0	16QAM	3447.22	V	-46.57	8.33	-38.24	64.91	39.67
				5170.82	V	-52.15	10.40	-41.75	68.42	
	1745	1/50	QPSK	3490.21	V	-50.59	8.48	-42.11	69.93	40.82
				5235.44	V	-51.80	10.47	-41.33	69.15	
		1/50	16QAM	3490.37	V	-50.62	8.48	-42.14	69.09	39.95
				5235.21	V	-51.99	10.47	-41.52	68.47	
15	1717.5	1/36	QPSK	3434.66	V	-45.82	8.28	-37.54	65.46	40.92
				5152.12	V	-51.40	10.37	-41.03	68.95	
		1/36	16QAM	3434.79	V	-45.58	8.28	-37.30	64.19	39.89
				5152.31	V	-51.64	10.37	-41.27	68.16	
	1732.5	1/74	QPSK	3478.18	V	-48.97	8.43	-40.54	68.47	40.93
				5217.49	V	-51.88	10.46	-41.42	69.35	
		1/74	16QAM	3478.16	V	-49.25	8.43	-40.82	67.82	40.00
				5217.62	V	-51.59	10.46	-41.13	68.13	
	1747.5	1/36	QPSK	3494.79	V	-50.85	8.49	-42.36	70.44	41.08
				5241.94	V	-51.71	10.48	-41.23	69.31	
		1/36	16QAM	3494.57	V	-51.17	8.49	-42.68	69.84	40.16
				5241.63	V	-52.19	10.48	-41.71	68.87	

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result		Limit (dBc)
								(dBm)	(dBc)	
10	1715	1/49	QPSK	3438.86	V	-47.19	8.30	-38.89	66.38	40.49
				5158.24	V	-52.05	10.38	-41.67	69.16	
		1/49	16QAM	3439.03	V	-46.97	8.30	-38.67	65.20	39.53
				5158.22	V	-52.00	10.38	-41.62	68.15	
	1732.5	1/0	QPSK	3456.16	V	-46.54	8.36	-38.18	64.16	38.98
				5184.43	V	-51.77	10.42	-41.35	67.33	
		1/0	16QAM	3456.05	V	-46.40	8.36	-38.04	63.21	38.17
				5184.25	V	-51.84	10.42	-41.42	66.59	
	1750	1/25	QPSK	3500.36	V	-50.01	8.51	-41.50	69.19	40.69
				5250.10	V	-51.70	10.49	-41.21	68.90	
		1/25	16QAM	3500.31	V	-50.56	8.51	-42.05	68.80	39.75
				5250.02	V	-51.59	10.49	-41.10	67.85	
5	1712.5	1/24	QPSK	3429.36	V	-45.51	8.26	-37.25	64.16	39.91
				5144.19	V	-51.68	10.36	-41.32	68.23	
		1/24	16QAM	3429.23	V	-45.46	8.26	-37.20	62.99	38.79
				5143.88	V	-51.20	10.35	-40.85	66.64	
	1732.5	1/0	QPSK	3460.67	V	-47.28	8.37	-38.91	66.38	40.47
				5191.29	V	-51.77	10.44	-41.33	68.80	
		1/0	16QAM	3460.66	V	-47.13	8.37	-38.76	65.11	39.35
				5190.96	V	-51.88	10.43	-41.45	67.80	
	1752.5	1/0	QPSK	3500.71	V	-51.27	8.51	-42.76	70.74	40.98
				5251.01	V	-52.19	10.49	-41.70	69.68	
		1/0	16QAM	3500.69	V	-51.62	8.51	-43.11	70.08	39.97
				5251.34	V	-52.75	10.49	-42.26	69.23	

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result		Limit (dBc)
								(dBm)	(dBc)	
3	1711.5	1/0	QPSK	3425.61	V	-45.37	8.25	-37.12	63.73	39.61
				5138.02	V	-50.69	10.34	-40.35	66.96	
		1/0	16QAM	3425.61	V	-45.42	8.25	-37.17	62.72	38.55
				5138.30	V	-51.19	10.35	-40.84	66.39	
	1732.5	1/0	QPSK	3462.42	V	-47.55	8.38	-39.17	66.65	40.48
				5193.56	V	-51.00	10.44	-40.56	68.04	
		1/0	16QAM	3462.64	V	-46.81	8.38	-38.43	64.83	39.40
				5194.09	V	-51.66	10.44	-41.22	67.62	
	1753.5	1/0	QPSK	3504.69	V	-51.56	8.51	-43.05	70.96	40.91
				5256.90	V	-51.52	10.49	-41.03	68.94	
		1/0	16QAM	3504.56	V	-51.81	8.51	-43.30	70.03	39.73
				5256.79	V	-51.19	10.49	-40.70	67.43	
1.4	1710.7	1/5	QPSK	3422.24	V	-45.40	8.24	-37.16	63.55	39.39
				5133.50	V	-51.34	10.34	-41.00	67.39	
		1/5	16QAM	3422.14	V	-45.49	8.24	-37.25	62.59	38.34
				5133.48	V	-51.51	10.34	-41.17	66.51	
	1732.5	1/5	QPSK	3465.98	V	-47.13	8.39	-38.74	66.40	40.66
				5198.42	V	-51.40	10.45	-40.95	68.61	
		1/5	16QAM	3465.77	V	-47.74	8.39	-39.35	65.88	39.53
				5198.91	V	-51.45	10.45	-41.00	67.53	
	1754.3	1/5	QPSK	3509.85	V	-53.18	8.51	-44.67	72.68	41.01
				5264.61	V	-51.85	10.50	-41.35	69.36	
		1/5	16QAM	3509.25	V	-53.25	8.51	-44.74	71.64	39.90
				5264.16	V	-52.41	10.49	-41.92	68.82	

Note 1: Limit Calculation = 43 + $10\log_{10}$ (P[Watts])
Note 2: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.
Note 3: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions above table.