

FCC PART 15.247

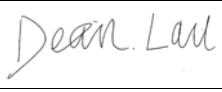
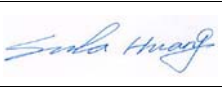
TEST REPORT

For

ALATECH Technology Limited Co.

39F., No.758, Jungming S. RD. Taichung, Taiwan, R.O.C.

FCC ID: YQOSC002

Report Type: Original Report	Product Type: Dual Mode Speed & Cadence Sensor
Test Engineer: Dean Liu	
Report Number: RTW150210051-00B	
Report Date: 2015-03-03	
Reviewed By: Sula Huang RF Leader	
Test Laboratory: Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn	

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan). This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

TABLE OF CONTENTS

GENERAL INFORMATION.....	4
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	4
OBJECTIVE	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY	4
TEST FACILITY	4
SYSTEM TEST CONFIGURATION.....	5
DESCRIPTION OF TEST CONFIGURATION	5
EUT EXERCISE SOFTWARE	5
EQUIPMENT MODIFICATIONS	5
BLOCK DIAGRAM OF TEST SETUP	5
SUMMARY OF TEST RESULTS	6
FCC §15.247 (i) & §1.1307 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE).....	7
APPLICABLE STANDARD	7
FCC §15.203 - ANTENNA REQUIREMENT.....	8
APPLICABLE STANDARD	8
ANTENNA CONNECTOR CONSTRUCTION	8
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS.....	9
APPLICABLE STANDARD	9
MEASUREMENT UNCERTAINTY	9
EUT SETUP	9
EMI TEST RECEIVER & SPECTRUM ANALYZER SETUP	10
TEST PROCEDURE	10
CORRECTED AMPLITUDE & MARGIN CALCULATION	11
TEST EQUIPMENT LIST AND DETAILS.....	11
TEST RESULTS SUMMARY	11
TEST DATA	12
FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH.....	16
APPLICABLE STANDARD	16
TEST PROCEDURE	16
TEST EQUIPMENT LIST AND DETAILS.....	16
TEST DATA	16
FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER	19
APPLICABLE STANDARD	19
TEST PROCEDURE	19
TEST EQUIPMENT LIST AND DETAILS.....	19
TEST DATA	19
FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE.....	22
APPLICABLE STANDARD	22
TEST PROCEDURE	22
TEST EQUIPMENT LIST AND DETAILS.....	22
TEST DATA	22
FCC §15.247(e) - POWER SPECTRAL DENSITY	24

APPLICABLE STANDARD24

TEST PROCEDURE24

TEST EQUIPMENT LIST AND DETAILS.....24

TEST DATA24

FINAL

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *ALATECH Technology Limited Co.*'s product, model number: *SC002 (FCC ID: YQOSC002)* (the "EUT") in this report was a *Dual Mode Speed & Cadence Sensor*, which was measured approximately: 8 cm (L) x 7.5 cm (W) x 2 cm (H), rated input voltage: DC 3.0V from battery.

All measurement and test data in this report was gathered from production sample serial number: 150210051 (Assigned by BACL, Dongguan). The EUT was received on 2015-02-12.

Objective

This report is prepared on behalf of *ALATECH Technology Limited Co.* in accordance with Part 2-Subpart J, Part 15-Subparts A, B and C of the Federal Communications Commission's rules.

The tests were performed in order to determine the compliance of the EUT with FCC Part 15-Subpart C, section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15C DXX submissions with FCC ID: YQOSC002

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Dongguan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

Test site at Bay Area Compliance Laboratories Corp. (Dongguan) has been fully described in reports submitted to the Federal Communications Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 06, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in an engineering mode, which was provided by manufacturer. The engineering mode was configured the system transmitting with maximum power.

For Bluetooth LE mode, 40 channels are provided for testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	...	...
...	...	...	...
...	...	...	...
..	...	38	2478
19	2440	39	2480

EUT was tested with channel 0, 19 and 39.

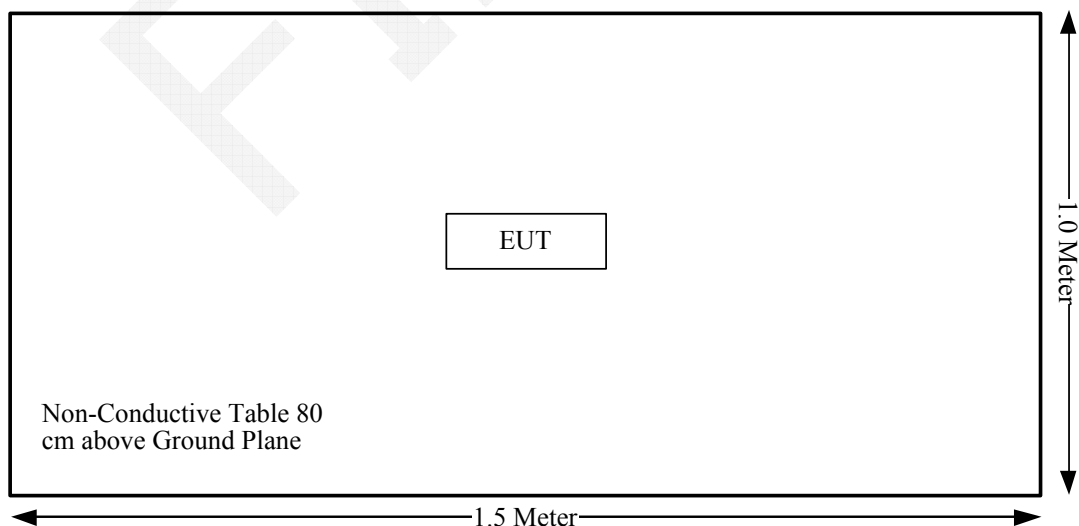
EUT Exercise Software

No test software was used.

Equipment Modifications

No modification was made to the EUT.

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i), §1.1307 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Not Applicable
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

Not Applicable: the EUT powered by battery.

FCC §15.247 (i) & §1.1307 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart 15.247(i) and subpart §1.1307, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary:

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Frequency (MHz)	Antenna Gain		Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
	(dBi)	(numeric)	(dBm)	(mW)			
2402	-0.5	0.89	-2.76	0.53	20.00	0.00009	1.0

Result: The device meet FCC MPE at 20 cm distance

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
 - b. Antenna must use a unique type of connector to attach to the EUT.
- Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

Antenna Connector Construction

The EUT has one integral PCB antenna arrangement, which was permanently attached and the antenna gain is -0.5 dBi, fulfill the requirement of this section. Please refer to the EUT photos.

Result: Compliance.

FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

FCC §15.247 (d); §15.209; §15.205;

Measurement Uncertainty

Compliance or non-compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 2, then:

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

If U_{lab} is greater than U_{cispr} of Table 1, then:

- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cispr})$, exceeds the disturbance limit.

Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:

30M~200MHz: 5.0 dB

200M~1GHz: 6.2 dB

1G~6GHz: 4.45 dB

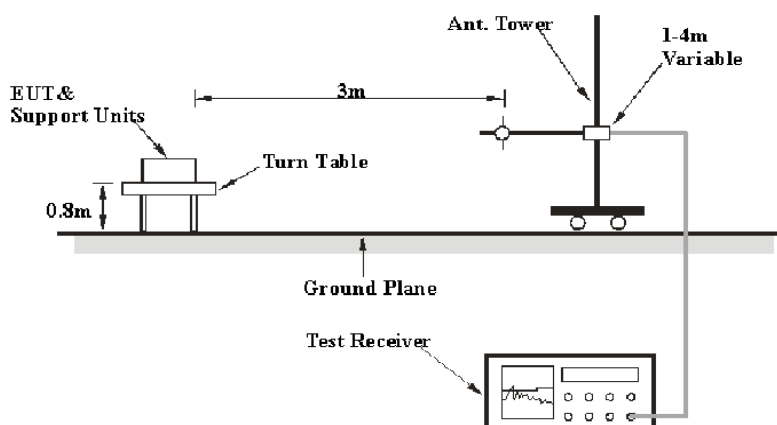
6G~18GHz: 5.23 dB

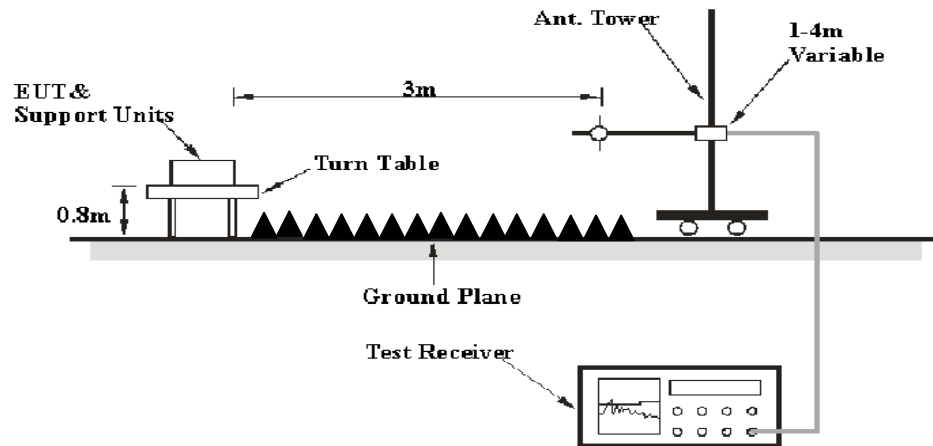
Table 2 – Values of U_{cispr}

Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC) (30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR) (1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR) (6 GHz to 18 GHz)	5.5 dB

EUT Setup

Below 1GHz:



Above 1GHz:

The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC 15.209, and FCC 15.247 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz	/	Ave.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2014-05-09	2015-05-09
Sunol Sciences	Antenna	JB3	A060611-3	2014-07-28	2017-07-27
HP	Amplifier	8447E	2434A02181	2014-09-01	2015-09-01
R&S	Spectrum Analyzer	FSEM	DE31388	2014-05-09	2015-05-09
ETS LINDGREN	Horn Antenna	3115	000 527 35	2012-09-06	2015-09-06
Mini-Circuit	Amplifier	ZVA-213-S+	054201245	2014-02-19	2015-02-19
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2014-06-16	2017-06-15
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2014-09-06	2015-09-06

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Section 15.205, 15.209 and 15.247, with the worst margin reading of:

3.86 dB at 4804 MHz in the Horizontal polarization

Test Data**Environmental Conditions**

Temperature:	20.3 °C
Relative Humidity:	66 %
ATM Pressure:	101.3 kPa

** The testing was performed by Dean Liu on 2015-02-12.*

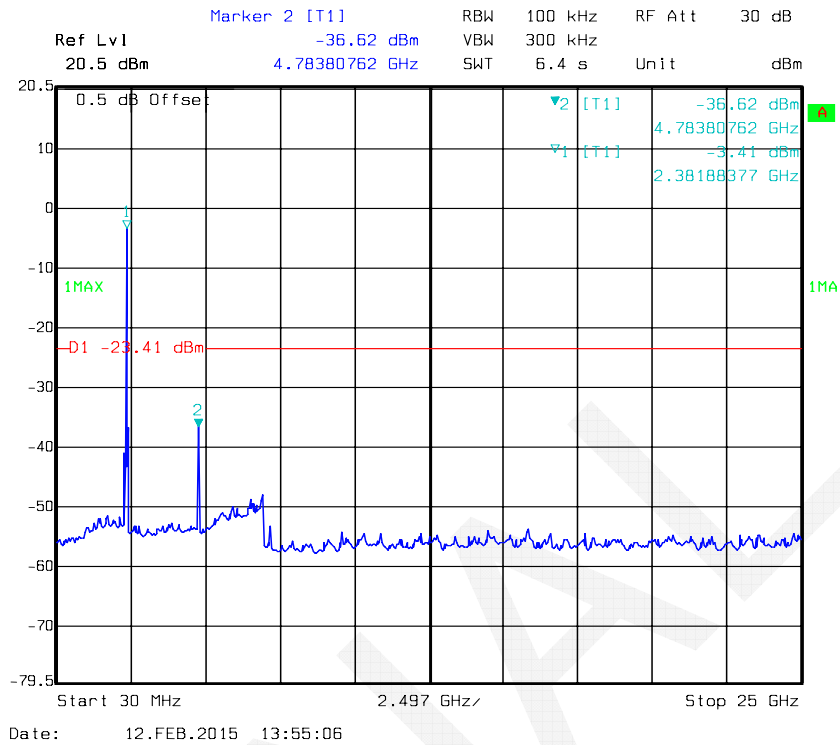
Mode: Transmitting

Frequency (MHz)	Receiver		Rx Antenna		Cable loss (dB)	Amplifier Gain (dB)	Corrected Amplitude (dBµV/m)	FCC 15.247	
	Reading (dBµV)	Detector (PK/QP/AV)	Polar (H/V)	Factor (dB)				Limit (dBµV/m)	Margin (dB)
Low Channel: 2402 MHz									
2402	66.08	PK	H	25.65	3.66	0.00	95.39	N/A	N/A
2402	60.86	AV	H	25.65	3.66	0.00	90.17	N/A	N/A
2402	61.25	PK	V	25.65	3.66	0.00	90.56	N/A	N/A
2402	56.56	AV	V	25.65	3.66	0.00	85.87	N/A	N/A
2390	28.25	PK	H	25.61	3.63	0.00	57.49	74.00	16.51
2390	14.05	AV	H	25.61	3.63	0.00	43.29	54.00	10.71
4804	49.23	PK	H	30.59	5.06	27.41	57.47	74.00	16.53
4804	41.9	AV	H	30.59	5.06	27.41	50.14	54.00	3.86 *
7206	32.65	PK	H	34.09	6.61	25.91	47.44	74.00	26.56
7206	20.56	AV	H	34.09	6.61	25.91	35.35	54.00	18.65
9608	31.67	PK	H	35.96	8.53	27.55	48.61	74.00	25.39
9608	19.68	AV	H	35.96	8.53	27.55	36.62	54.00	17.38
3067	34.01	PK	H	27.41	6.71	27.48	40.65	74.00	33.35
3067	21.84	AV	H	27.41	6.71	27.48	28.48	54.00	25.52
65.89	33.25	QP	H	8.15	1.01	21.41	21.00	40.00	19.00
Middle Channel: 2440 MHz									
2442	65.38	PK	H	25.75	3.77	0.00	94.90	N/A	N/A
2442	59.67	AV	H	25.75	3.77	0.00	89.19	N/A	N/A
2442	62.14	PK	V	25.75	3.77	0.00	91.66	N/A	N/A
2442	56.22	AV	V	25.75	3.77	0.00	85.74	N/A	N/A
4884	48.84	PK	H	30.80	5.20	27.42	57.42	74.00	16.58
4884	41.36	AV	H	30.80	5.20	27.42	49.94	54.00	4.06 *
7326	33.25	PK	H	34.38	6.75	25.88	48.50	74.00	25.50
7326	21.02	AV	H	34.38	6.75	25.88	36.27	54.00	17.73
9768	32.15	PK	H	36.34	8.62	27.19	49.92	74.00	24.08
9768	20.11	AV	H	36.34	8.62	27.19	37.88	54.00	16.12
3067	34.56	PK	H	27.41	6.71	27.48	41.20	74.00	32.80
3067	22.37	AV	H	27.41	6.71	27.48	29.01	54.00	24.99
6133	34.47	PK	H	32.23	5.94	26.87	45.77	74.00	28.23
6133	21.28	AV	H	32.23	5.94	26.87	32.58	54.00	21.42
65.89	32.63	QP	H	8.15	1.01	21.41	20.38	40.00	19.62
High Channel: 2480 MHz									
2480	63.51	PK	H	25.85	3.68	0.00	93.04	N/A	N/A
2480	58.21	AV	H	25.85	3.68	0.00	87.74	N/A	N/A
2480	60.71	PK	V	25.85	3.68	0.00	90.24	N/A	N/A
2480	55.86	AV	V	25.85	3.68	0.00	85.39	N/A	N/A
2483.5	33.34	PK	H	25.86	3.67	0.00	62.87	74.00	11.13
2483.5	15.58	AV	H	25.86	3.67	0.00	45.11	54.00	8.89
4960	43.55	PK	H	31.00	5.34	27.43	52.46	74.00	21.54
4960	36.12	AV	H	31.00	5.34	27.43	45.03	54.00	8.97
7440	32.95	PK	H	34.66	6.89	25.97	48.53	74.00	25.47
7440	20.81	AV	H	34.66	6.89	25.97	36.39	54.00	17.61
9920	31.94	PK	H	36.71	8.71	26.66	50.70	74.00	23.30
9920	19.91	AV	H	36.71	8.71	26.66	38.67	54.00	15.33
3067	34.29	PK	H	27.41	6.71	27.48	40.93	74.00	33.07
3067	22.1	AV	H	27.41	6.71	27.48	28.74	54.00	25.26
65.89	32.83	OP	H	8.15	1.01	21.41	20.58	40.00	19.42

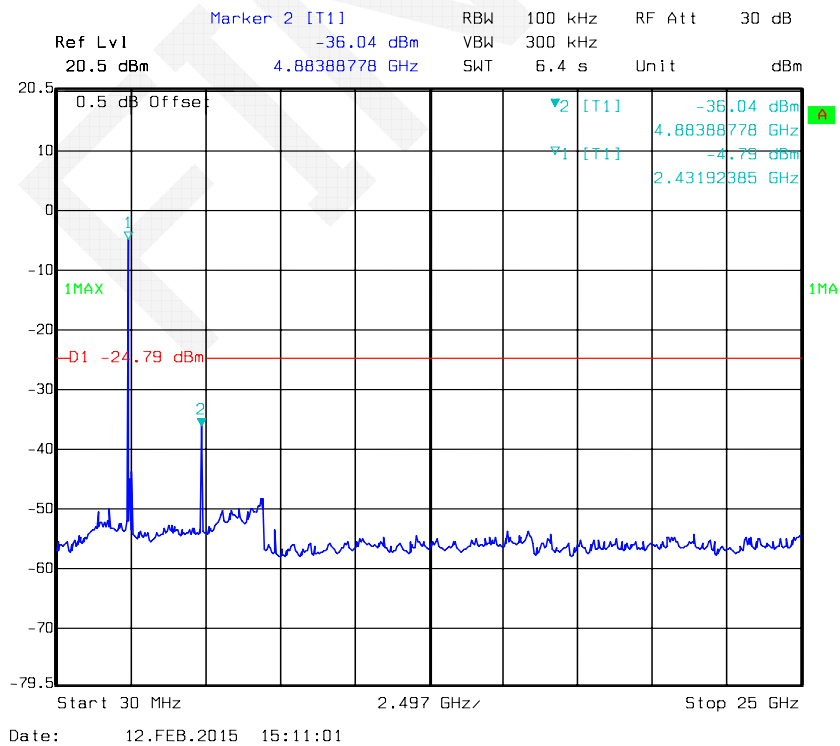
*Within measurement uncertainty!

Conducted Spurious Emissions at Antenna Port

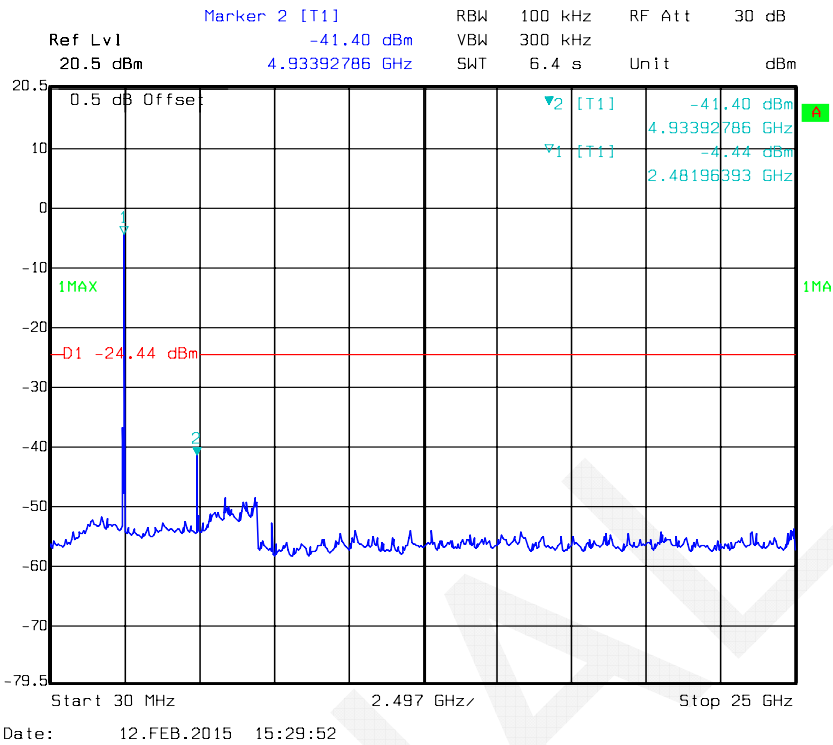
Low Channel



Middle Channel



High Channel



FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r01clause8.1 Option 1:

- Set RBW = 100 kHz.
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	21.2 °C
Relative Humidity:	42 %
ATM Pressure:	101.4 kPa

* The testing was performed by Dean Liu on 2015-02-12.

Test Result: Pass.

Please refer to the following tables and plots.

Channel	Frequency	6 dB Bandwidth	Limit
	(MHz)	(MHz)	(kHz)
Low	2402	0.756	≥500
Middle	2440	0.716	≥500
High	2480	0.631	≥500

Ref Lvl 20.5 dBm

Delta 1 [T1] 0.04 dB

RBW 100 kHz

VBW 300 kHz

SWT 5 ms

Unit dBm

30 dB

0.5 dB Offset

D1 -2.71 dBm

D2 -8.71 dBm

IMAX

T1

T2

T3

T4

T5

T6

T7

T8

T9

T10

T11

T12

T13

T14

T15

T16

T17

T18

T19

T20

T21

T22

T23

T24

T25

T26

T27

T28

T29

T30

T31

T32

T33

T34

T35

T36

T37

T38

T39

T40

T41

T42

T43

T44

T45

T46

T47

T48

T49

T50

T51

T52

T53

T54

T55

T56

T57

T58

T59

T60

T61

T62

T63

T64

T65

T66

T67

T68

T69

T70

T71

T72

T73

T74

T75

T76

T77

T78

T79

T80

T81

T82

T83

T84

T85

T86

T87

T88

T89

T90

T91

T92

T93

T94

T95

T96

T97

T98

T99

T100

T101

T102

T103

T104

T105

T106

T107

T108

T109

T110

T111

T112

T113

T114

T115

T116

T117

T118

T119

T120

T121

T122

T123

T124

T125

T126

T127

T128

T129

T130

T131

T132

T133

T134

T135

T136

T137

T138

T139

T140

T141

T142

T143

T144

T145

T146

T147

T148

T149

T150

T151

T152

T153

T154

T155

T156

T157

T158

T159

T160

T161

T162

T163

T164

T165

T166

T167

T168

T169

T170

T171

T172

T173

T174

T175

T176

T177

T178

T179

T180

T181

T182

T183

T184

T185

T186

T187

T188

T189

T190

T191

T192

T193

T194

T195

T196

T197

T198

T199

T200

T201

T202

T203

T204

T205

T206

T207

T208

T209

T210

T211

T212

T213

T214

T215

T216

T217

T218

T219

T220

T221

T222

T223

T224

T225

T226

T227

T228

T229

T230

T231

T232

T233

T234

T235

T236

T237

T238

T239

T240

T241

T242

T243

T244

T245

T246

T247

T248

T249

T250

T251

T252

T253

T254

T255

T256

T257

T258

T259

T260

T261

T262

T263

T264

T265

T266

T267

T268

T269

T270

T271

T272

T273

T274

T275

T276

T277

T278

T279

T280

T281

T282

T283

T284

T285

T286

T287

T288

T289

T290

T291

T292

T293

T294

T295

T296

T297

T298

T299

T300

T301

T302

T303

T304

T305

T306

T307

T308

T309

T310

T311

T312

T313

T314

T315

T316

T317

T318

T319

T320

T321

T322

T323

T324

T325

T326

T327

T328

T329

T330

T331

T332

T333

T334

T335

T336

T337

T338

T339

T340

T341

T342

T343

T344

T345

T346

T347

T348

T349

T350

T351

T352

T353

T354

T355

T356

T357

T358

T359

T360

T361

T362

T363

T364

T365

T366

T367

T368

T369

T370

T371

T372

T373

T374

T375

T376

T377

T378

T379

T380

T381

T382

T383

T384

T385

T386

T387

T388

T389

T390

T391

T392

T393

T394

T395

T396

T397

T398

T399

T400

T401

T402

T403

T404

T405

T406

T407

T408

T409

T410

T411

T412

T413

T414

T415

T416

T417

T418

T419

T420

T421

T422

T423

T424

T425

T426

T427

T428

T429

T430

T431

T432

T433

T434

T435

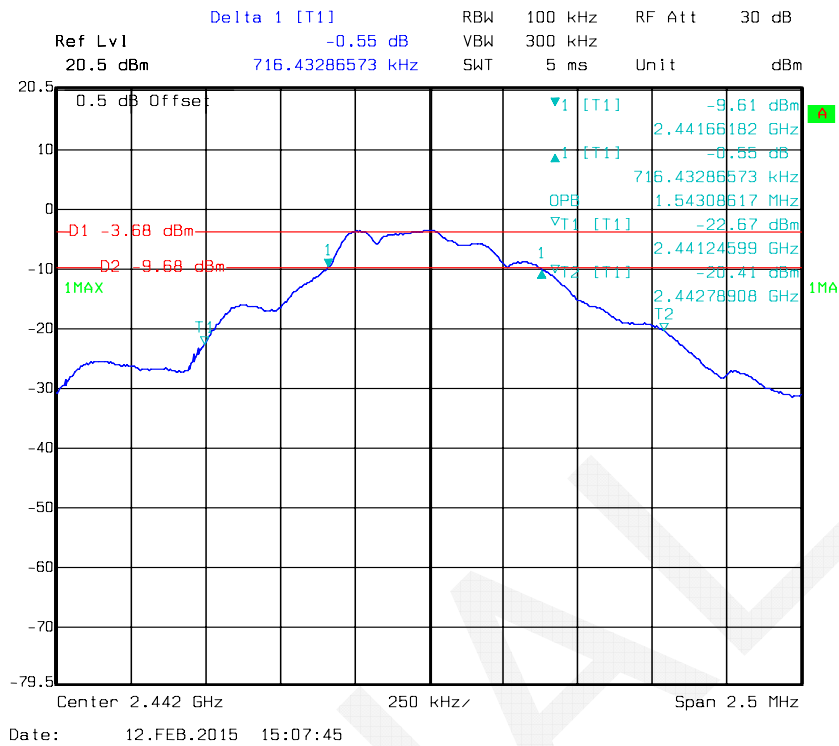
T436

T437

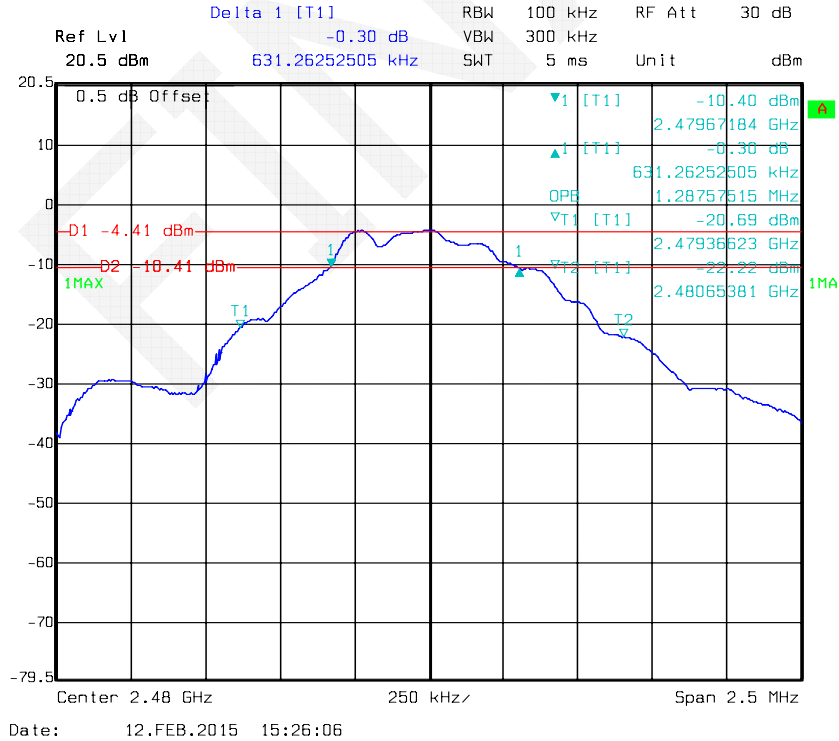
T438

T439

Middle Channel



High Channel



FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r01clause9.1.1:

- a) Set the RBW $\geq$ DTS bandwidth.
- b) Set VBW $\geq 3 \times$ RBW.
- c) Set span $\geq 3 \times$ RBW
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

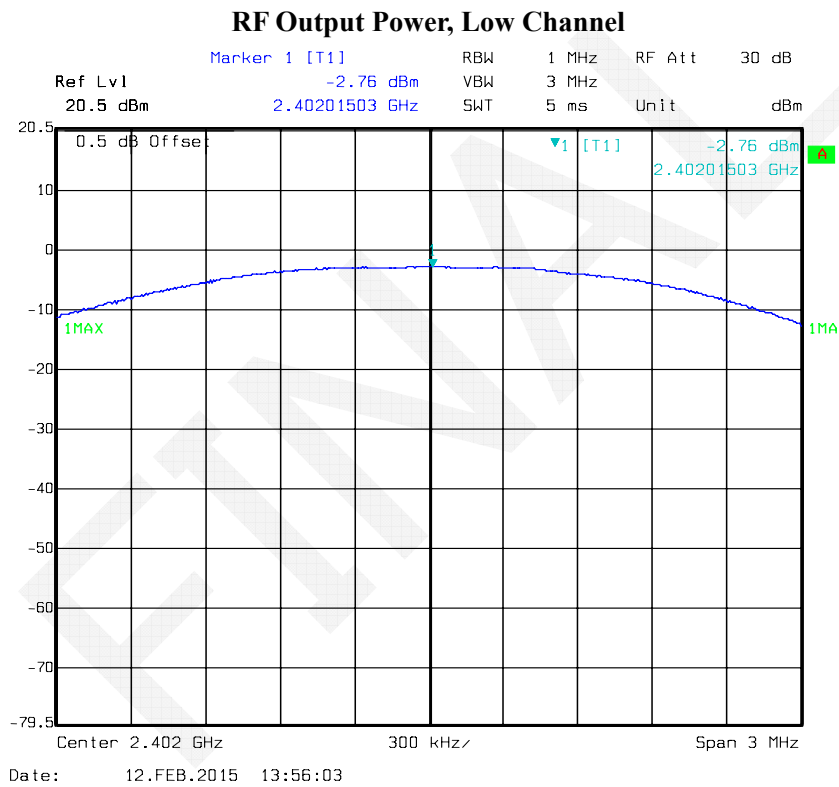
Temperature:	21.2 °C
Relative Humidity:	42 %
ATM Pressure:	101.4 kPa

* The testing was performed by Dean Liu on 2015-02-12.

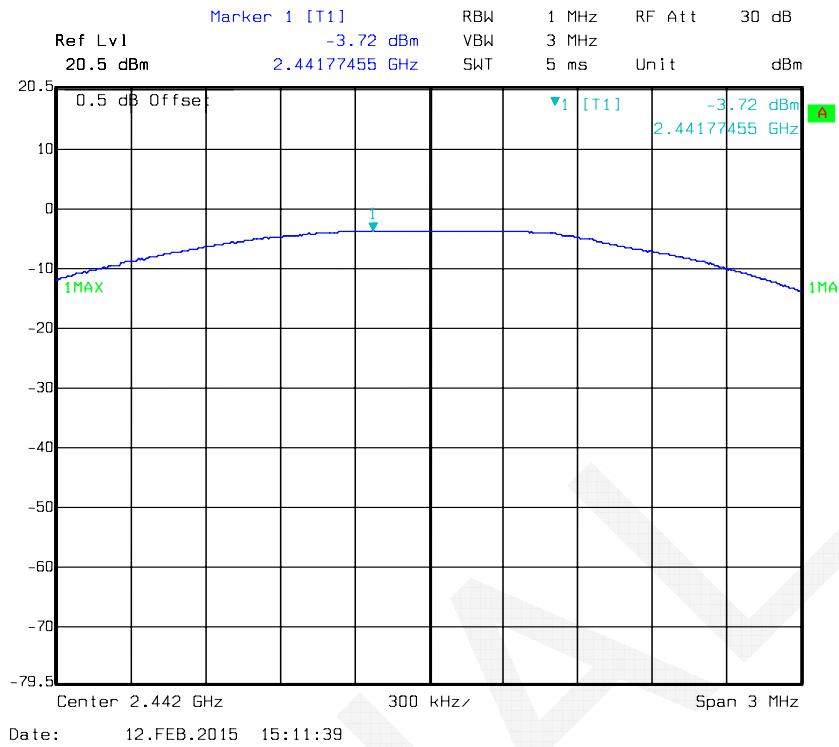
Test Mode: Transmitting

Channel	Frequency	Max Peak Conducted Output Power	Limit	Result
	(MHz)	(dBm)	(dBm)	
Low	2402	-2.76	30	PASS
Middle	2440	-3.72	30	PASS
High	2480	-4.56	30	PASS

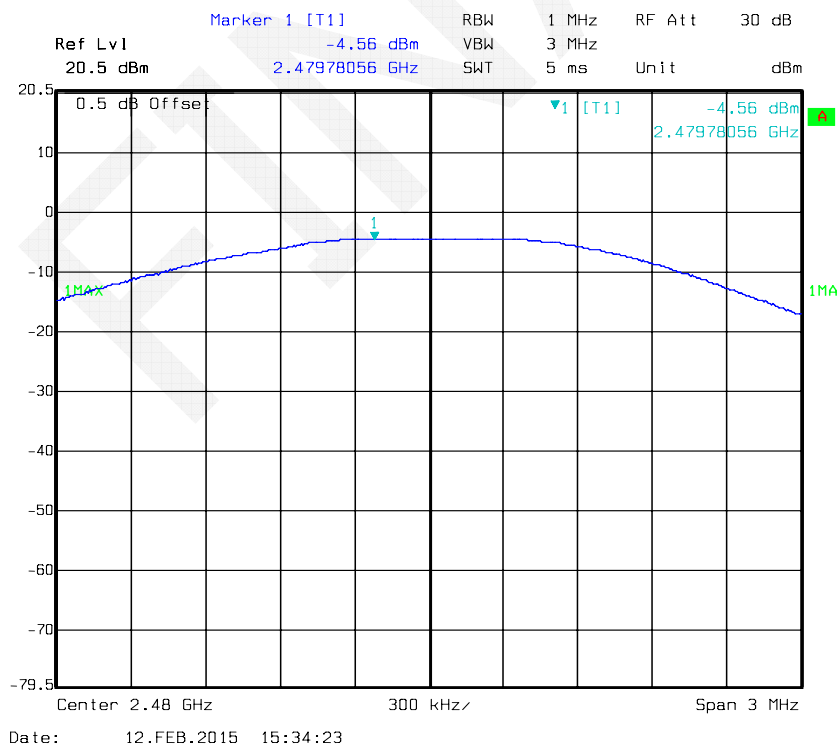
Please refer to the following plots



RF Output Power, Middle Channel



RF Output Power, High Channel



FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE**Applicable Standard**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

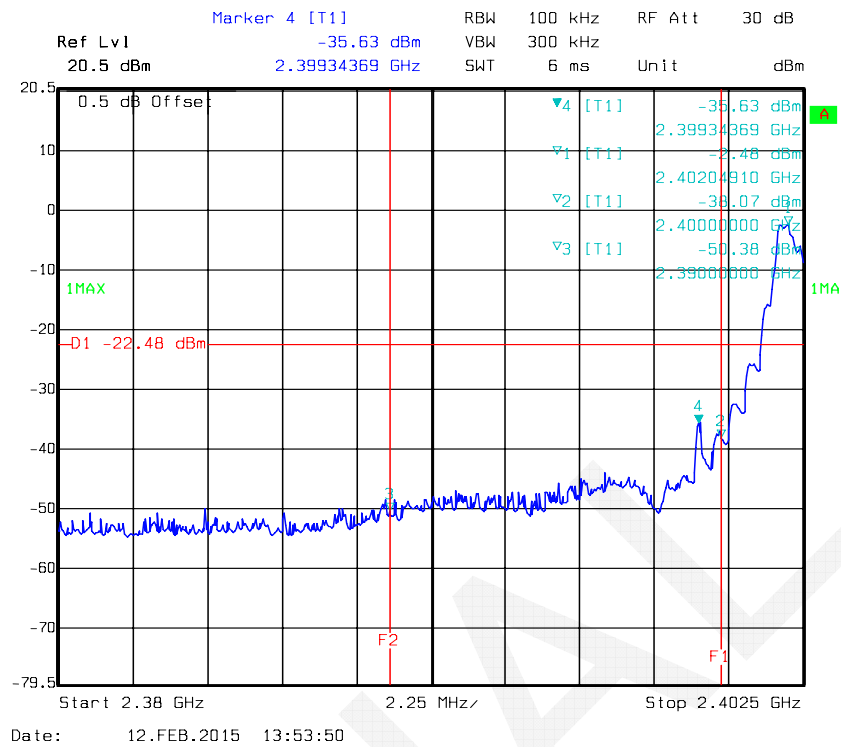
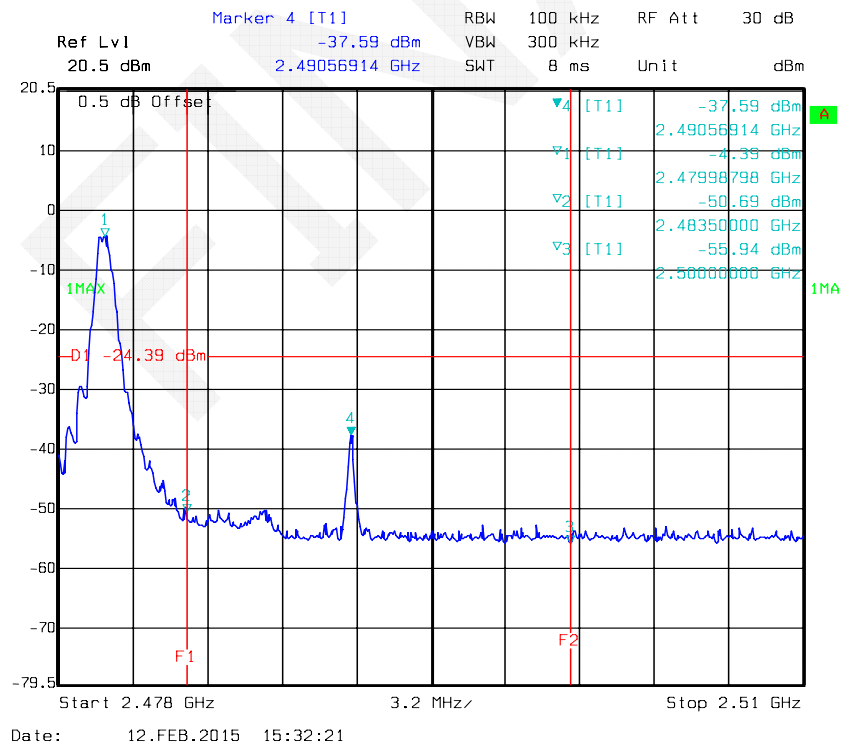
Test Data**Environmental Conditions**

Temperature:	21.2 °C
Relative Humidity:	42 %
ATM Pressure:	101.4 kPa

* The testing was performed by Dean Liu on 2015-02-12.

Test Result: Compliance

Please refer to following plots.

Band Edge, Left Side**Band Edge, Right Side**

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

According to KDB 558074 D01 DTS Meas Guidance v03r01clause10.2:

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- d) Set the VBW $\geq 3 \times \text{RBW}$.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2014-05-09	2015-05-09

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Test Data

Environmental Conditions

Temperature:	21.2 °C
Relative Humidity:	42 %
ATM Pressure:	101.4 kPa

* The testing was performed by Dean Liu on 2015-02-12.

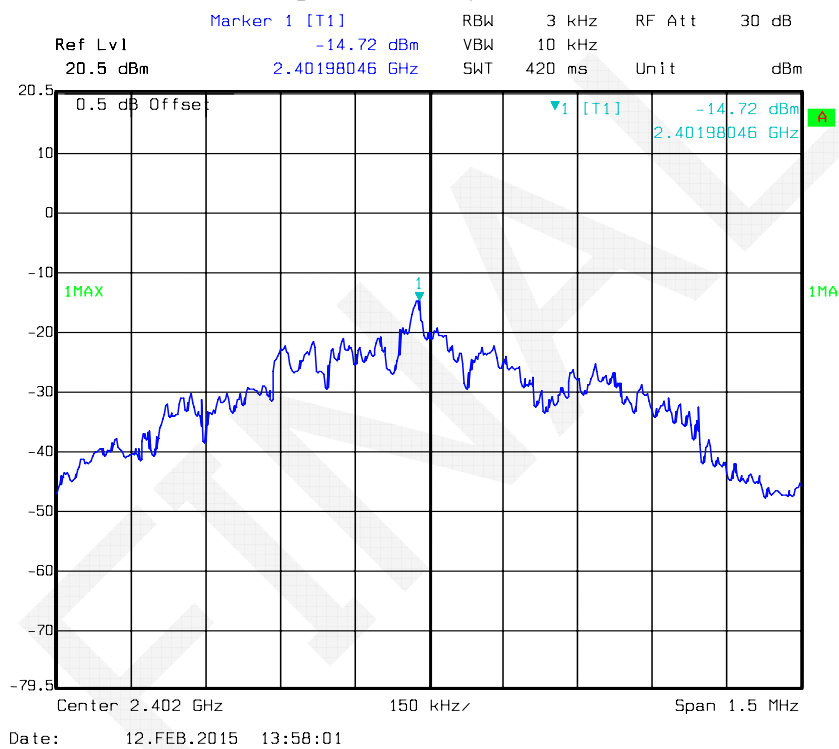
Test Mode: Transmitting

Test Result: Pass

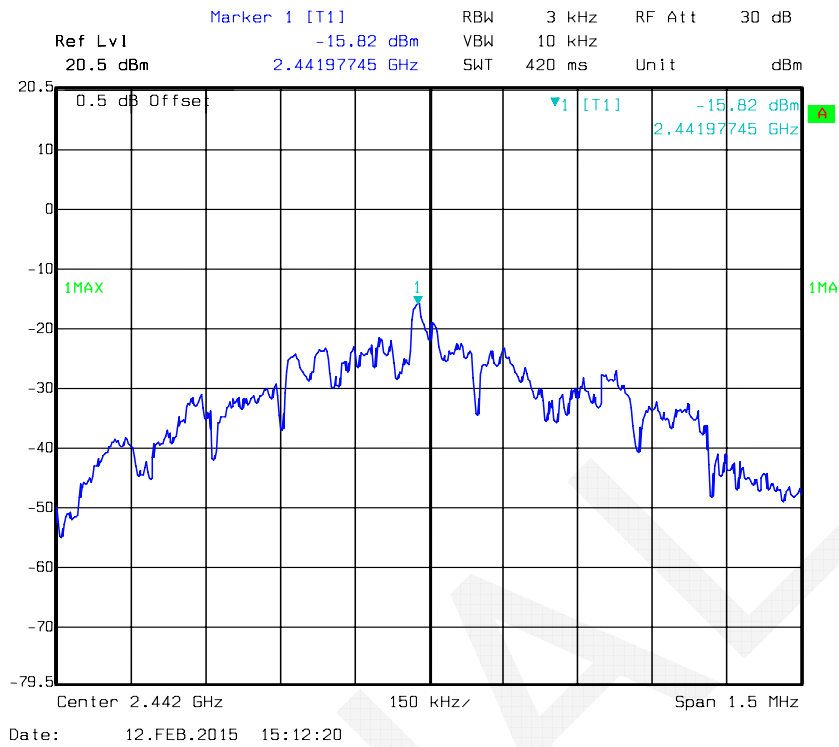
Channel	Frequency	PSD	Limit	Result
	MHz	(dBm/3kHz)	(dBm/3kHz)	
Low	2402	-14.72	≤ 8	PASS
Middle	2440	-15.82	≤ 8	PASS
High	2480	-16.36	≤ 8	PASS

Please refer to the following plots

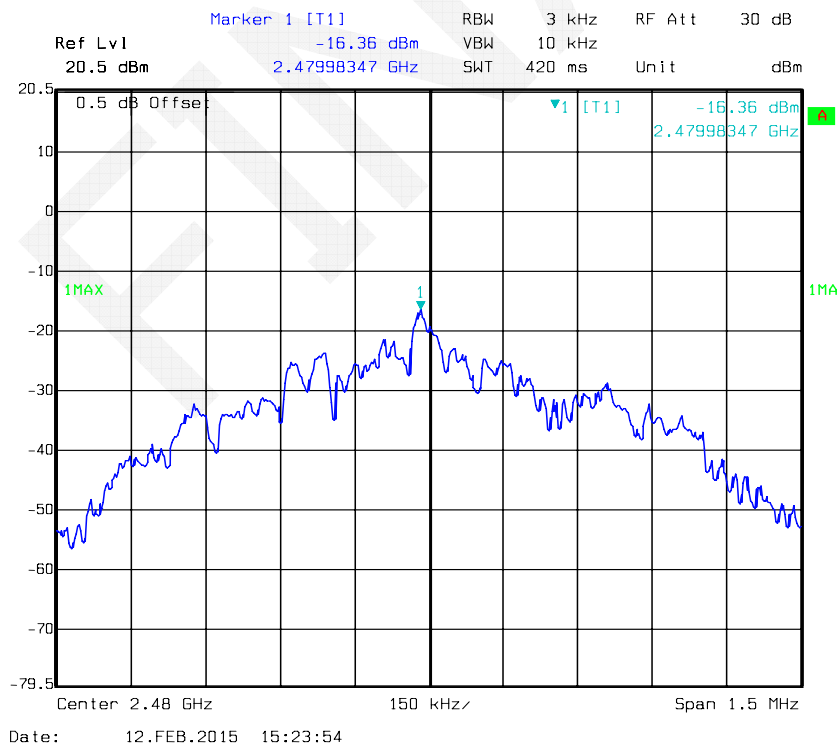
Power Spectral Density, Low Channel



Power Spectral Density, Middle Channel



Power Spectral Density, High Channel



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